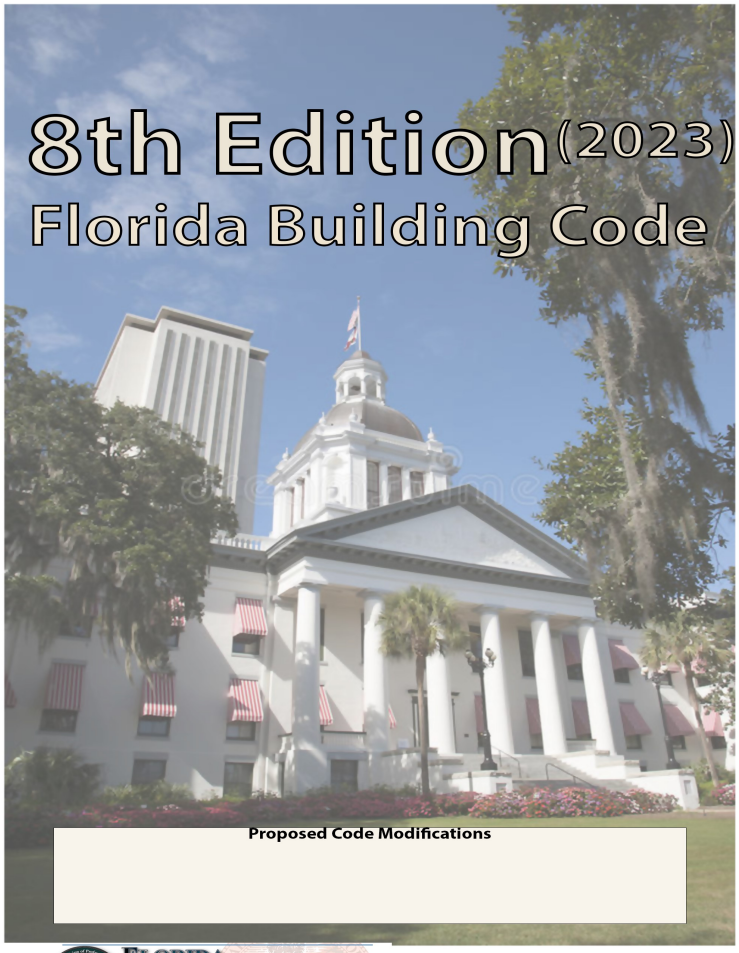


FLORIDA BUILDING COMMISSION
"Stronger Codes Through Science and Consensus"

dbpr Department of Business & Professional Regulation

ICC 2021 Code Changes

This document created by the Florida Department of Business and Professional Regulation - 850-487-1824

TAC: Roofing

Total Mods for **Roofing** in **Pending Review: 52**

Total Mods for report: 52

Sub Code: Building

R9343/G3-18

1

Date Submitted	2/25/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			**Staff Classification**	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments **Yes**

Related Modifications

202

Summary of Modification

Definition "Emittance" is needed because the term emittance is used in various sections of the code and in the definition for radiant barrier.

Rationale

This definition is needed because the term emittance is used in various sections of the code and in the definition for radiant barrier. It is consistent with the definition found in ASHRAE and ASTM standards.

Comment Period History

R9343-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

Add new definition as follows:

EMITTANCE. The ratio of radiant heat flux emitted by a specimen to that emitted by a blackbody at the same temperature and under the same conditions.

Code Change No: G3-18

Original Proposal

Section(s): 202

Proponent: Amanda Hickman, representing RIMA International (amanda@thehickmangroup.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2018 International Building Code

Add new definition as follows:

EMITTANCE. The ratio of radiant heat flux emitted by a specimen to that emitted by a blackbody at the same temperature and under the same conditions.

Reason: This definition is needed because the term emittance is used in various sections of the code and in the definition for radiant barrier. It is consistent with the definition found in ASHRAE and ASTM standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding a definition of EMITTANCE will neither increase or decrease construction costs. This is only a definition and is identical to the definition found in existing ASHRAE and ASTM standards.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: It correctly defines a word used in the codes, and provides good clarification. (Vote 9-4)

Assembly Action: **None**

Final Action

G3-18 **AS**

R9466/G8-19

2

Date Submitted	3/2/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

[BS] 202

Summary of Modification

The first part of the change is to delete the term consideration and replace it with evaluation. The term consideration is vague and unenforceable. The change will clarify that an evaluation is required – not just a consideration.

Rationale

The first part of the change is to delete the term consideration and replace it with evaluation. The term consideration is vague and unenforceable. The change will clarify that an evaluation is required – not just a consideration. The definition of positive roof drainage refers to the drainage condition where consideration has been made for loading deflections. The term consideration is vague and unenforceable. This change clarifies that an evaluation is required – not consideration. The term evaluation is consistent with the provisions in Section 1608 and 1611 on ponding instability. The link between 1608, 1611 and definition of positive drainage will be described below.

The definition does not describe what drainage conditions require consideration. If you go to Section 1511.1, Exception #1 you see that the condition mentioned in the definition of positive roof drainage is where the roof does not provide the code required minimum slope of ¼" inch per foot. So, the definition allows roofs without the minimum slope if "consideration" has been made for all loading deflections of the roof deck, and additional slope has been provided to ensure drainage of the roof within 48 hours of precipitation. (Please see uploaded mod G8-19 for the complete text)

Comment Period History

R9466-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

[BS] POSITIVE ROOF DRAINAGE. The drainage condition in which ~~consideration has been made~~ an evaluation is required for all loading deflections of the roof deck, and additional slope ~~has been~~ shall be provided to ensure drainage of the roof within 48 hours of precipitation.

Modified Proposal:

[BS] POSITIVE ROOF DRAINAGE. ~~The drainage condition in which an evaluation is required for all loading deflections of the roof deck, and additional slope shall be provided to ensure drainage of the roof within 48 hours of precipitation.~~ A design that accounts for deflections from all design loads and has sufficient additional slope to ensure that drainage of the roof occurs within 48 hours of precipitation.

Code Change No: G8-19

Original Proposal

Section(s): [BS] 202

Proponent: Wanda Edwards, Wanda Edwards Consulting, Inc., representing RCI, Inc. (wedwards@rci-online.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE

2018 International Building Code

Revise as follows:

[BS] POSITIVE ROOF DRAINAGE. The drainage condition in which ~~consideration has been made~~ an evaluation is required for all loading deflections of the roof deck, and additional slope ~~has been~~ shall be provided to ensure drainage of the roof within 48 hours of precipitation.

Reason: The first part of the change is to delete the term consideration and replace it with evaluation. The term consideration is vague and unenforceable. The change will clarify that an evaluation is required – not just a consideration. The definition of positive roof drainage refers to the drainage condition where **consideration** has been made for loading deflections. The term consideration is vague and unenforceable. This change clarifies that an evaluation is required – not consideration. The term evaluation is consistent with the provisions in Section 1608 and 1611 on ponding instability. The link between 1608, 1611 and definition of positive drainage will be described below.

The definition does not describe what drainage conditions require consideration. If you go to Section 1511.1, Exception #1 you see that the condition mentioned in the definition of positive roof drainage is where the roof does not provide the code required minimum slope of ¼" inch per foot. So, the definition allows roofs without the minimum slope if "consideration" has been made for all loading deflections of the roof deck, and additional slope has been provided to ensure drainage of the roof within 48 hours of precipitation.

The route to determine that an evaluation is required is a long and winding road. The code defines susceptible bay as a roof or portion thereof with a slope less than ¼" inch per foot. If you look at Section 1608 - Snow Loads and 1611 - Rain Loads, you will see that both sections require an evaluation of susceptible bays in accordance with ASCE 7. It is clear that roofs or portions of roofs that do not provide the minimum slope are considered susceptible bays and require an evaluation and must provide positive drainage.

Roofs that do not provide the minimum slope required by the code are more prone to collapse due to the accumulation of water. It should be clear in the definition that an evaluation is required. Also, the definition is in past tense; *consideration has been made*, *additional slope has been provided*. The language should be changed to say *shall* in lieu of has been. It is mandatory that these two requirements be met, and the definition should state that.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is to clarify the current requirements of the code. The proposal will not change the current code requirements and will not increase or decrease the cost of construction.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

[BS] POSITIVE ROOF DRAINAGE. ~~The drainage condition in which an evaluation is required for all loading deflections of the roof deck, and additional slope shall be provided to ensure drainage of the roof within 48 hours of precipitation.~~ A design that accounts for deflections from all design loads and has sufficient additional slope to ensure that drainage of the roof occurs within 48 hours of precipitation.

Committee Reason: The first part of the change is to delete the term consideration and replace it with evaluation. The term consideration is vague and unenforceable. The change will clarify that an evaluation is required – not just a consideration. The definition of positive roof drainage refers to the drainage condition where consideration has been made for loading deflections. The

term consideration is vague and unenforceable. The term evaluation is consistent with the provisions in Section 1608 and 1611 on ponding instability. The link between 1608, 1611 and definition of positive drainage will be described below. The modification clarifies the definition. (Vote: 12-0)

Assembly Action: **None**

Final Action

G8-19 **AM**

R9467/G9-19

3

Date Submitted	3/2/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

202

Summary of Modification

Modifies definition "Steep Slope", the proposal corrects the definition to be consistent with the requirements in Chapter 15.

Rationale

Steep slope roofing requirements are triggered at a slope of 2:12. Low slope requirements in Sections 1504.6 and 1504.7 are triggered at "less than" 2:12. Asphalt shingles are defined as a steep slope roof covering; Section 1507.2.2 permits installation of asphalt shingles at 2:12 or greater. Underlayment requirements include roof slope of equal to or greater then 2:12 in Table 1507.1.1(2). The proposal corrects the definition to be consistent with the requirements in Chapter 15.

Comment Period History

R9467-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Comment Period History

R9467-G2

Proponent Aaron Phillips **Submitted** 6/22/2021 **Attachments** No

Comment:

ARMA encourages a motion to Approve this Mod to align the definition with existing provisions of Chapter 15.

Approved as Submitted

2018 International Building Code

Revise as follows:

[BF] STEEP SLOPE. A roof slope ~~greater than~~ two units vertical in 12 units horizontal (17-percent slope) or greater.

Code Change No: G9-19

Original Proposal

Section(s): 202

Proponent: Mike Fischer, Kellen Company, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE

2018 International Building Code

Revise as follows:

[BF] STEEP SLOPE. A roof slope ~~greater than~~ two units vertical in 12 units horizontal (17-percent slope) or greater.

Reason: Steep slope roofing requirements are triggered at a slope of 2:12. Low slope requirements in Sections 1504.6 and 1504.7 are triggered at "less than" 2:12. Asphalt shingles are defined as a steep slope roof covering; Section 1507.2.2 permits installation of asphalt shingles at 2:12 or greater. Underlayment requirements include roof slope of equal to or greater then 2:12 in Table 1507.1.1(2). The proposal corrects the definition to be consistent with the requirements in Chapter 15.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: Editorial: The proposal corrects the definition to be consistent with the requirements in Chapter 15. (Vote: 14-0)

Assembly Action: **None**

Final Action

G9-19 **AS**

R9167/CCC-IBC5-19

4

Date Submitted 2/19/2021	**Section** 1504.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

IBC®: 1504.1, 1504.1.1, TABLE 1504.1.1

Original text of this code change is not consistent with that of the 2020 FBC-B. The wording of section 1504.2 is not consistent with that of the 2020 FBC-B/Section 1507.2.7.1 Wind resistance of asphalt shingles.

Summary of Modification

Reordering of the section numbering

Rationale

The current numbering hierarchy in Section 1504 is incorrect. The proposal resets the order to read more consistently.

R9167 Text Modification

Please see attachment

CCC-IBC5-19

IBC®: 1504.1, 1504.1.1, TABLE 1504.1.1

Proponent: Mike Fischer, Kellen Company, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

2018 International Building Code

Revise as follows:

1504.1 Wind resistance of roofs. Roof decks and roof coverings shall be designed for wind loads in accordance with Chapter 16 and Sections 1504.2, 1504.3, 1504.4 and ~~1504.4.~~ 1504.5.

~~**1504.1.1**~~ **1504.2 Wind resistance of asphalt shingles.** Asphalt shingles shall be tested in accordance with ASTM D7158. Asphalt shingles shall meet the classification requirements of Table ~~1504.1.1~~ 1504.2 for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D7158 and the required classification in Table ~~1504.1.1.~~ 1504.2.

Exception: Asphalt shingles not included in the scope of ASTM D7158 shall be tested and labeled in accordance with ASTM D3161. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D3161 and the required classification in Table ~~1504.1.1.~~ 1504.2.

TABLE ~~1504.1.1~~ 1504.2
CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D316 OR D71581

MAXIMUM BASIC WIND SPEED, V, FROM FIGURES 1609.3(1)-(8) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}, FROM TABLE 1609.3.1 (mph)	ASTM D7158[a] CLASSIFICATION	ASTM D3161 CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Reason: The current numbering hierarchy in Section 1504 is incorrect. The proposal resets the order to read more consistently.

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

Proposal # 5631

R9168/CCC-IBC2-19

5

Date Submitted	2/19/2021	**Section**	1504.8	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

This section is marked reserved under the 2020 FBC-B

Summary of Modification

This section applies to a much broad area than hurricane prone regions.

Rationale

It appears that the word "design" was mistakenly omitted from the title, "registered design professional." There is a reference to Section R106.1 which uses the title, "registered design professional." "Design professional" and "registered design professional" are two titles used within the IRC and defined in Section 202, but "registered professional" is not.

R9168 Text Modification

Please see attachment

CCC-IBC2-19

IBC®: 1504.8

Proponent: Edwin Huston, representing National Council of Structural Engineers' Associations (NCSEA (huston@smithhustoninc.com)

2018 International Building Code

Revise as follows:

1504.8 Surfacing and ballast materials ~~in hurricane prone regions.~~ For a building located in a hurricane-prone region as defined in Section 202, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site, the following materials shall not be used on the roof:

1. Aggregate used as surfacing for roof coverings.
2. Aggregate, gravel or stone used as ballast.

Reason: This section applies to a much braoded area than hurricane prone regions. The current title may cause a RDP to miss that fact.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It only clarifies the affected areas.

Proposal # 5462

R9322/FS152-18

6

Date Submitted 2/24/2021	**Section** 1505.9	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		**Staff Classification** Correlates Directly
Commission Action Pending Review		

Comments

General Comments **Yes**

Related Modifications

1505.9

FBC-B/Section 1505.8

Summary of Modification

Modification of text of Section 1505.9 "Rooftop mounted photovoltaic panel system", removes reference to UL 1703.

Rationale

Fire classification for rooftop rack-mounted photovoltaic panel systems are determined in accordance with UL 2703.
UL 1703 includes partial fire testing of the photovoltaic panel, which is one of the components of the photovoltaic panel system. UL 2703 uses the results of that component testing, and includes further evaluation and testing of the photovoltaic panel system (i.e. the photovoltaic panel and the rack support system) to establish the Fire Classification for the system. UL 1703 is referenced within UL 2703.

Comment Period History

R9322-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

Revise as follows:

~~[BF]~~ 1505.9 Rooftop mounted photovoltaic panel systems. Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL ~~1703 and UL~~ 2703. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Code Change No: FS152-18

Original Proposal

Section(s): 1505.9

Proponent: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2018 International Building Code

Revise as follows:

~~[BF]~~ **1505.9 Rooftop mounted photovoltaic panel systems.** Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL ~~1703 and UL~~ 2703. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Reason: Fire classification for rooftop rack-mounted photovoltaic panel systems are determined in accordance with UL 2703. UL 1703 includes partial fire testing of the photovoltaic panel, which is one of the components of the photovoltaic panel system. UL 2703 uses the results of that component testing, and includes further evaluation and testing of the photovoltaic panel system (i.e. the photovoltaic panel and the rack support system) to establish the Fire Classification for the system. UL 1703 is referenced within UL 2703.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Fire classification of these systems are determined in accordance with UL 2703 currently.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee did not agree with eliminating all reference to UL1703, but determined that the reference did not belong in this section. The proposal was approved with request for public comment to add a reference to the IBC section that requires UL 1703. (Vote 12-1).

Assembly Action: **None**

Final Action

FS152-18	**AS**

R9487/S1-18

7

Date Submitted 3/2/2021	**Section** 1502.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

[P]1502.1, [P]1502.2

Original text of this code change is not consistent with that of the 2020 FBC-B. The wording of section 1502.1 is not consistent with that of the 2020 FBC/Section 1503.4.

Summary of Modification

Section 1502.1, the proposed change provides a pointer to IBC Section 1611—Rain Loads

Rationale

The proposed change provides a pointer to IBC Section 1611—Rain Loads. This pointer makes sure a designer considers the structural-related requirements for roof drainage system design that are currently in the structural section of the code. Additionally, we proposed to modify the references to sections in the International Plumbing Code. Currently, only Section 1106—Size of Conductors, Leaders and Storms Drains and Section 1108—Secondary (Emergency) Roof Drains are referenced where other sections in Chapter 11 may be relevant for a particular project. This problem is remedied by referencing IPC Chapter 11 as opposed to specific subsections.

Approved as Submitted

2018 International Building Code

Revise as follows:

[P] 1502.1 General.Design and installation of roof drainage systems shall comply with this Section and Section ~~1502~~ 1611 of this code ~~and Sections 1106 and 1108, as applicable,~~ and Chapter 11 of the International Plumbing Code.

[P] 1502.2 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. The installation and sizing of secondary emergency overflow drains, leaders and conductors shall comply with ~~Sections 1106 and 1108, as applicable,~~ Section 1611 of this code and Chapter 11 of the International Plumbing Code.

Code Change No: S1-18

Original Proposal

Section(s): [P]1502.1, [P]1502.2

Proponent: Mark Graham (mgraham@nrca.net)

THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL PLUMBING CODE COMMITTEE. SEE THE IPC-IPSDC HEARING AGENDA.

2018 International Building Code

Revise as follows:

[P] 1502.1 General. Design and installation of roof drainage systems shall comply with this Section and Section ~~1502~~ 1611 of this code ~~and Sections 1106 and 1108, as applicable,~~ and Chapter 11 of the International Plumbing Code.

[P] 1502.2 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. The installation and sizing of secondary emergency overflow drains, leaders and conductors shall comply with ~~Sections 1106 and 1108, as applicable,~~ Section 1611 of this code and Chapter 11 of the International Plumbing Code.

Reason: The proposed change provides a pointer to IBC Section 1611—Rain Loads. This pointer makes sure a designer considers the structural-related requirements for roof drainage system design that are currently in the structural section of the code. Additionally, we proposed to modify the references to sections in the *International Plumbing Code*. Currently, only Section 1106—Size of Conductors, Leaders and Storms Drains and Section 1108—Secondary (Emergency) Roof Drains are referenced where other sections in Chapter 11 may be relevant for a particular project. This problem is remedied by referencing IPC Chapter 11 as opposed to specific subsections.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This provides a clear indicator as to where to look in the IBC for the information. (Vote:14-0)

Assembly Action: **None**

Final Action

S1-18 **AS**

R9488/S3-18

8

Date Submitted	3/2/2021	**Section**	1505.8	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **No**

Related Modifications

[BF] 1505.8, [BF] 1505.9

Summary of Modification

Modifies text of Section 1505.8, 1505.9. This proposal includes editorial changes only, and does not change technical requirements.

Rationale

This proposal includes editorial changes only, and does not change technical requirements.
The definition of Building-Integrated Photovoltaic (BIPV) Products in Chapter 2 already includes the shortened acronym BIPV. As BIPV products become more popular, the code can be made easier to read by moving toward use of the abbreviation/acronym "BIPV" instead of the 11-syllable long term. By using the full term and abbreviation/acronym in the title of Section 1505.8 (as in the Chapter 2 definition), the reader will understand the meaning of BIPV.
Similarly, the abbreviation "PV" entered the 2018 IFC in Section 1204.1. Even though the abbreviation "PV" is not yet included in IBC Chapter 2 definitions, language can be clear if both "photovoltaic" and "PV" terms are used. The definitions themselves cannot be revised until Group B, as they are preceded by [BS]. This usage will set up the code for a transition to greater use of the abbreviation.
In Section 1505.9, the language "Rooftop rack-mounted" is revised to "Rooftop-mounted" because there are an increasing number of rooftop mounted systems that are "rail-less" or "rail-free." These systems use the module frame as the bending member, and do not appear to be installed on a "rack." This proposed language improves Section 1505.9 by using language consistent with other sections of these codes, and consistent with a growing number of mounting systems in the marketplace.

Approved as Submitted

2018 International Building Code

Revise as follows:

[BF] 1505.8 Building-integrated photovoltaic (BIPV) products. ~~Building-integrated photovoltaic~~ BIPV products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with Section 1505.1.

[BF] 1505.9 Rooftop-mounted photovoltaic (PV) panel systems. Rooftop ~~rack~~-mounted photovoltaic (PV) panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Code Change No: S3-18

Original Proposal

Section(s): [BF] 1505.8, [BF] 1505.9

Proponent: Joseph Cain, Solar Energy Industries Association (SEIA), representing Solar Energy Industries Association (JoeCainPE@gmail.com)

THIS PROPOSAL WILL BE HEARD BY THE IBC FIRE SAFETY CODE COMMITTEE. SEE THE IBC-FS HEARING AGENDA.

2018 International Building Code

Revise as follows:

[BF] 1505.8 Building-integrated photovoltaic (BIPV) products. ~~Building-integrated photovoltaic~~ BIPV products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with Section 1505.1.

[BF] 1505.9 Rooftop-mounted photovoltaic (PV) panel systems. Rooftop ~~rack~~-mounted photovoltaic (PV) panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Reason: This proposal includes editorial changes only, and does not change technical requirements.

The definition of Building-Integrated Photovoltaic (BIPV) Products in Chapter 2 already includes the shortened acronym BIPV. As BIPV products become more popular, the code can be made easier to read by moving toward use of the abbreviation/acronym "BIPV" instead of the 11-syllable long term. By using the full term and abbreviation/acronym in the title of Section 1505.8 (as in the Chapter 2 definition), the reader will understand the meaning of BIPV.

Similarly, the abbreviation "PV" entered the 2018 IFC in Section 1204.1. Even though the abbreviation "PV" is not yet included in IBC Chapter 2 definitions, language can be clear if both "photovoltaic" and "PV" terms are used. The definitions themselves cannot be revised until Group B, as they are preceded by [BS]. This usage will set up the code for a transition to greater use of the abbreviation.

In Section 1505.9, the language "Rooftop rack-mounted" is revised to "Rooftop-mounted" because there are an increasing number of rooftop mounted systems that are "rail-less" or "rail-free." These systems use the module frame as the bending member, and do not appear to be installed on a "rack." This proposed language improves Section 1505.9 by using language consistent with other sections of these codes, and consistent with a growing number of mounting systems in the marketplace.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal includes editorial changes only, and does not change technical requirements.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee determined this change would help advance the code without making any technical changes. (Vote 13-0)

Assembly Action: **None**

Final Action

S3-18 **AS**

R9489/S4-18

9

Date Submitted 3/2/2021	**Section** 1505.9	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Correlates Directly

Comments

General Comments **No**

Related Modifications

1505.9

Summary of Modification

Modifies text of Section 1505.9 "Rooftop mounted photovoltaic panel systems". Adds text "Listed systems shall include roof-mounting hardware".

Rationale

The purpose of this change is to remedy a potential unintended consequence of adopted reference standards. It is important that roof mounting hardware be part of tested rooftop mounted photovoltaic panel system listings required by IBC Section 1505.9. If such hardware is not included in listings such hardware would be unregulated and mounting methods such as pieces of untreated lumber could potentially be used with unknown impacts on fire-related performance. There is lack of consensus within the roofing industry regarding systems listed according to UL 2703, “Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.” UL 2703 is not clear regarding the inclusion of roof-mounting hardware. NRCA has requested and UL has established a work group to issue an official interpretation, but the issue date of the interpretation is open-ended. It seems prudent to add a clarifying statement to code text as we believe it makes clear the intent of the code section.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

[BF] 1505.9 Rooftop mounted photovoltaic panel systems. Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. Listed systems shall include roof-mounting hardware. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Modified Proposal:

1505.9 Roof top mounted photovoltaic panel systems. Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. ~~Listed systems shall include roof-mounting hardware.~~ Listed systems shall be installed in accordance with the manufacturer's installation instructions and its listing. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Code Change No: S4-18

Original Proposal

Section(s): 1505.9

Proponents: Mark Graham (mgraham@nrca.net)

THIS PROPOSAL WILL BE HEARD BY THE IBC FIRE SAFETY CODE COMMITTEE. SEE THE IBC-FS HEARING AGENDA.

2018 International Building Code

Revise as follows:

[BF] 1505.9 Rooftop mounted photovoltaic panel systems. Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. Listed systems shall include roof-mounting hardware. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Reason: The purpose of this change is to remedy a potential unintended consequence of adopted reference standards. It is important that roof mounting hardware be part of tested rooftop mounted photovoltaic panel system listings required by IBC Section 1505.9. If such hardware is not included in listings such hardware would be unregulated and mounting methods such as pieces of untreated lumber could potentially be used with unknown impacts on fire-related performance. There is lack of consensus within the roofing industry regarding systems listed according to UL 2703, "Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels." UL 2703 is not clear regarding the inclusion of roof-mounting hardware. NRCA has requested and UL has established a work group to issue an official interpretation, but the issue date of the interpretation is open-ended. It seems prudent to add a clarifying statement to code text as we believe it makes clear the intent of the code section.

Cost Impact: The code change proposal will increase the cost of construction
The magnitude of cost impact cannot be determined until UL issues their interpretation. It is possible some systems may need to be retested with roof-mounting hardware and that some hardware may need to be improved to obtain desired test results.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1505.9 Roof top mounted photovoltaic panel systems. Rooftop rack-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703 and UL 2703. ~~Listed systems shall include roof-mounting hardware.~~ Listed systems shall be installed in accordance with the manufacturer's installation instructions and its listing. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Committee Reason: The committee determined this language is needed to ensure systems are installed properly and that the modification addressed the questions and concerns about the proposal. (Vote 13-0)

Assembly Action: **None**

Final Action

S4-18 **AM**

R9490/S9-18

10

Date Submitted 3/2/2021	**Section** 1508.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		**Staff Classification** Correlates Directly
Commission Action Pending Review		

Comments

General Comments **Yes**

Related Modifications

1508.1

Summary of Modification

The purpose of this proposal is to add an option to the allowable exceptions in the code. Currently the exception is limited to concrete roof deck and does not include a composite metal and concrete roof deck.

Rationale

The purpose of this proposal is to add an option to the allowable exceptions in the code. Currently the exception is limited to concrete roof deck and does not include a composite metal and concrete roof deck.

Comment Period History

R9490-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

Revise as follows:

[BF] 1508.1 General. The use of above-deck thermal insulation shall be permitted provided that such insulation is covered with an approved roof covering and passes the tests of NFPA 276 or UL 1256 when tested as an assembly.

Exceptions:

1. Foam plastic roof insulation shall conform to the material and installation requirements of Chapter 26.
2. Where a concrete or composite metal and concrete roof deck is used and the above-deck thermal insulation is covered with an approved roof covering.

Code Change No: S9-18

Original Proposal

Section(s): 1508.1

Proponent: Bill McHugh, representing Chicago Roofing Contractors Association (billmchugh-jr@att.net)

THIS PROPOSAL WILL BE HEARD BY THE IBC FIRE SAFETY CODE COMMITTEE. SEE THE IBC-FS HEARING AGENDA.

2018 International Building Code

Revise as follows:

[BF] 1508.1 General. The use of above-deck thermal insulation shall be permitted provided that such insulation is covered with an approved roof covering and passes the tests of NFPA 276 or UL 1256 when tested as an assembly.

Exceptions:

1. Foam plastic roof insulation shall conform to the material and installation requirements of Chapter 26.
2. Where a concrete or composite metal and concrete roof deck is used and the above-deck thermal insulation is covered with an approved roof covering.

Reason: The purpose of this proposal is to add an option to the allowable exceptions in the code. Currently the exception is limited to concrete roof deck and does not include a composite metal and concrete roof deck.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase the cost of construction as it provides an alternative to the type of concrete roof deck used for foam plastic insulation.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee determined the proposed change made an excellent clarification. (Vote 12-1)

Assembly Action: **None**

Final Action

S9-18 **AS**

R9492/S11-18

11

Date Submitted 3/2/2021	**Section** 1510.2.4	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Correlates Directly

Comments

General Comments **Yes**

Related Modifications

FBC-B/1510.2.5

Summary of Modification

Section 1510.2.4 Type of Construction, the addition of text "Building element".

Rationale

The addition of “Building element” is more fitting. See Table 601.

Comment Period History

R9492-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC’s recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

Revise as follows:

[BG] 1510.2.4 Type of construction. Penthouses shall be constructed ~~with walls, floors and roofs~~ of building elements as required for the type of construction of the building on which such penthouses are built.

Exceptions:

1. On buildings of Type I construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall not be required to have a fire-resistance rating.

2. On buildings of Type I construction two stories or less in height above grade plane or of Type II construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating or a lesser fire-resistance rating as required by Table 602 and be constructed of fire-retardant-treated wood. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be constructed of fire-retardant-treated wood and shall not be required to have a fire-resistance rating. Interior framing and walls shall be permitted to be constructed of fire-retardant-treated wood.

3. On buildings of Type III, IV or V construction, the exterior walls of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating or a lesser fire-resistance rating as required by Table 602. On buildings of Type III, IV or VA construction, the exterior walls of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be of heavy timber construction complying with Sections 602.4 and 2304.11 or noncombustible construction or fire-retardant-treated wood and shall not be required to have a fire-resistance rating.

Code Change No: S11-18

Original Proposal

Section(s): 1510.2.4

Proponent: Homer Maiel, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

THIS PROPOSAL WILL BE HEARD BY THE IBC GENERAL CODE COMMITTEE. SEE THE IBC-G HEARING AGENDA.

2018 International Building Code

Revise as follows:

~~[BG]~~ 1510.2.4 Type of construction. Penthouses shall be constructed ~~with walls, floors and roofs~~ of building elements as required for the type of construction of the building on which such penthouses are built.

Exceptions:

1. On buildings of Type I construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall not be required to have a fire-resistance rating.
2. On buildings of Type I construction two stories or less in height above grade plane or of Type II construction, the exterior walls and roofs of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating or a lesser fire-resistance rating as required by Table 602 and be constructed of fire-retardant-treated wood. The exterior walls and roofs of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be constructed of fire-retardant-treated wood and shall not be required to have a fire-resistance rating. Interior framing and walls shall be permitted to be constructed of fire-retardant-treated wood.
3. On buildings of Type III, IV or V construction, the exterior walls of penthouses with a fire separation distance greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour fire-resistance rating or a lesser fire-resistance rating as required by Table 602. On buildings of Type III, IV or VA construction, the exterior walls of penthouses with a fire separation distance of 20 feet (6096 mm) or greater shall be permitted to be of heavy timber construction complying with Sections 602.4 and 2304.11 or noncombustible construction or fire-retardant-treated wood and shall not be required to have a fire-resistance rating.

Reason: The addition of "Building element" is more fitting. See Table 601.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the proposal simply substitutes terms to more clearly reflect the intent of the code.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This does a very good job of clarifying the code. It is much more precise that we're going to a definition. (Vote: 14-0)

Assembly Action: **None**

Final Action

S11-18 **AS**

R9493/S13-18

12

Date Submitted	3/2/2021	**Section**	1510.7	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1510.7, 1510.7.1, 1510.7.2, 1512, 1512.1

Original text of this code change is not consistent with that of the 2020 FBC-B. Section 1512 of this code change does not exist in the 2020 FBC-B.

Summary of Modification

This proposal seeks to strike out IBC Sections 1510.7 and 1512, as they are entirely redundant with corresponding portions of IBC Section 3111.

Rationale

This proposal seeks to strike out IBC Sections 1510.7 and 1512, as they are entirely redundant with corresponding portions of IBC Section 3111. Section 3111 was expanded and improved during the 2018 IBC development cycle, with the intent of providing and improved and consolidated "road map" of requirements for solar energy systems. There is nothing unique in Section 1510.7 or 1512. In fact, these sections fall short of the improved language in Section 3111.

Section 1510.7 is redundant with IBC Section 3111.3:

1510.7 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be designed in accordance with this section.
3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the International Fire Code, NFPA 70 and the manufacturers installation instructions.
Section 1510.7.1 is redundant with IBC Section 3111.3.2:
1510.7.1 Fire classification. Rooftop-mounted photovoltaic panels and modules shall have the fire classification in accordance with Section 1505.9.
(Please see the uploaded mod S13-18 for the complete text)

Approved as Submitted

2018 International Building Code

Delete without substitution:

~~**[BG] 1510.7 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be designed in accordance with this section.**~~

~~**[BG] 1510.7.1 Fire classification. Rooftop-mounted photovoltaic panels and modules shall have the fire classification in accordance with Section 1505.9.**~~

~~**[BG] 1510.7.2 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with the manufacturer's instructions.**~~

~~**SECTION 1512**~~
~~**PHOTOVOLTAIC PANELS AND MODULES**~~

~~**1512.1 Photovoltaic panels and modules. Photovoltaic panels and modules installed on a roof or as an integral part of a roof assembly shall comply with the requirements of this code and the International Fire Code.**~~

Code Change No: S13-18

Original Proposal

Section(s): 1510.7, 1510.7.1, 1510.7.2, 1512, 1512.1

Proponent: Joseph Cain, Solar Energy Industries Association (SEIA), representing Solar Energy Industries Association (JoeCainPE@gmail.com)

THIS PROPOSAL WILL BE HEARD BY THE IBC GENERAL CODE COMMITTEE. SEE THE IBC-G HEARING AGENDA.

2018 International Building Code

Delete without substitution:

~~**[BG] 1510.7 Photovoltaic panels and modules.** Rooftop-mounted photovoltaic panels and modules shall be designed in accordance with this section.~~

~~**[BG] 1510.7.1 Fire classification.** Rooftop-mounted photovoltaic panels and modules shall have the fire classification in accordance with Section 1505.9.~~

~~**[BG] 1510.7.2 Photovoltaic panels and modules.** Rooftop-mounted photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with the manufacturer's instructions.~~

~~**SECTION 1512**~~
~~**PHOTOVOLTAIC PANELS AND MODULES**~~

~~**1512.1 Photovoltaic panels and modules.** Photovoltaic panels and modules installed on a roof or as an integral part of a roof assembly shall comply with the requirements of this code and the International Fire Code.~~

Reason: This proposal seeks to strike out IBC Sections 1510.7 and 1512, as they are entirely redundant with corresponding portions of IBC Section 3111. Section 3111 was expanded and improved during the 2018 IBC development cycle, with the intent of providing and improved and consolidated "road map" of requirements for solar energy systems. There is nothing unique in Section 1510.7 or 1512. In fact, these sections fall short of the improved language in Section 3111.

Section 1510.7 is redundant with IBC Section 3111.3:

1510.7 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be designed in accordance with this section.
3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the International Fire Code, NFPA 70 and the manufacturers installation instructions.
Section 1510.7.1 is redundant with IBC Section 3111.3.2:
1510.7.1 Fire classification. Rooftop-mounted photovoltaic panels and modules shall have the fire classification in accordance with Section 1505.9.
3111.3.2 Fire classification. Rooftop-mounted photovoltaic systems shall have a fire classification in accordance with Section 1505.9. Building-integrated photovoltaic systems shall have a fire classification in accordance with Section 1505.8.

Section 1510.7.2 is redundant with IBC Section 3111.3.1:

1510.7.2 Photovoltaic panels and modules. Rooftop-mounted photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with manufacturer's instructions.

3111.3.1 Equipment. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

IBC Section 1512 is redundant with IBC Section 3111.3:

1512.1 Photovoltaic panels and modules. Photovoltaic panels and modules installed on a roof or as an integral part of a roof assembly shall comply with the requirements of this code and the International Fire Code.
3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the International Fire Code, NFPA 70 and the manufacturers installation instructions.

In each case, IBC Section 3111 does a better job of listing requirements in a cohesive manner. Sections 1510.7 and 1512 fall short of the guidance provided in the "road map" of Section 3111. The important technical requirements in Sections 1505.8 and 1505.9 remain in Chapter 15, and they are referenced in Section 3111.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposals only removes redundant language from the IBC, and does not change any technical requirement.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This is a good cleanup. Having requirements in multiple sections leads to confusion. (Vote: 14-0)

Assembly Action: **None**

Final Action

S13-18 **AS**

R9504/S5-19

13

Date Submitted	3/3/2021	**Section**	1511.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1511.3 (IEBC 705.3)

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

Modifies text of Section 1511.3 "Roof replacement".

Rationale

The current code language instructs the user to remove all roofing materials down to the deck when performing a roof replacement. The exception for ice barrier membrane illustrates that fact. The definition of roof replacement includes instructions to repair damaged substrate (such as the roof deck and supporting structure):

ROOF REPLACEMENT. The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.

IBC Section 1511.1 reads:

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.
(Please see the uploaded mod S5-19 for the complete text)

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1511.3 Roof replacement. ***Roof replacement*** **shall include the removal of all existing layers of roof coverings and roof assembly materials down to the roof deck.**

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Modified Proposal:

1511.3 Roof replacement. *Roof replacement* shall include the removal of all existing layers of ~~roof coverings and~~ roof assembly materials down to the roof deck.

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Code Change No: S5-19

Original Proposal

Section(s): 1511.3 (IEBC 705.3)

Proponents: Mike Fischer, Kellen Company, representing The Polyisocyanurate Insulation Manufacturers Association (mfischer@kellencompany.com); Marcin Pazera, representing The Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

2018 International Building Code

Revise as follows:

1511.3 Roof replacement. *Roof replacement* shall include the removal of all existing layers of roof coverings and roof assembly materials down to the roof deck.

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Reason: The current code language instructs the user to remove all roofing materials down to the deck when performing a roof replacement. The exception for ice barrier membrane illustrates that fact. The definition of roof replacement includes instructions to repair damaged substrate (such as the roof deck and supporting structure):

ROOF REPLACEMENT. The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

IBC Section 1511.1 reads:

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Requirements for roof assemblies in Chapter 15 include assembly testing for wind and fire resistance. The assembly tests typically include all materials including fasteners, insulation, and cover boards. There have been indications of a practice known as "peel and replace" where only the outermost layer (roof covering membrane) is removed, and another membrane subsequently applied. This practice makes it impossible to meet the IBC provisions for repairing damaged substrate because the deck will not be exposed for inspection. It also conflicts with 1511.3 because the requirements for wind and fire testing are based on assembly tests with known materials, not an assembly of new and existing materials that may or may not comply with current material properties and standards.

This proposal is a clarification of the current code provisions, industry recommendations, and test requirements. The need to install new roof assembly materials in a roof replacement in a manner that is consistent with tested assemblies is necessary to demonstrate code compliance and ensure that the system will perform as intended. This interpretation of the intent of the code is consistent with industry guidance on the subject.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is a clarification to current requirements.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1511.3 Roof replacement. *Roof replacement* shall include the removal of all existing layers of ~~roof coverings and~~ roof assembly materials down to the roof deck.

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

Committee Reason: The provision is a clarification of existing code. Clarifies what is removed in a 'roof replacement'. The modification removes redundant language. (Vote: 14-0)

Assembly Action: **None**

Final Action

S5-19 **AM**

R9505/S10-19

14

Date Submitted	3/3/2021	**Section**	1511.5	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1511.5 (IEBC 705.5)

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

Modifies text of Section 1511.5 "Reinstallation of materials". This proposal is intended to clarify the intent of the code.

Rationale

This proposal is intended to clarify the intent of the code.
Small diameter aggregate, such as that used as surfacing on built-up roof membranes, is generally considered not appropriate for re-use because the aggregate is contaminated with the existing roof's bitumen flood coat; this is already addressed in the last sentence of Sec. 1511.5. However, it is recognized in the roof industry existing aggregate ballast and pavers, such as that used on ballasted single-ply membrane roof systems, is appropriate for re-use, provided the pavers are not damaged, cracked or broken. Since the code's current language prohibiting the re-use of aggregate surfacing can be interpreted as also applying to aggregate and paver ballast, aggregate and paver ballast is sometimes disposed of unnecessarily.
This proposal is intended to provide differentiation between aggregate and paver ballast, and aggregate surfacing using the code's already existing terminology and is intended to eliminate the need for unnecessarily disposing of roof ballast materials.

Approved as Submitted

2018 International Building Code

Revise as follows:

1511.5 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. ~~Aggregate~~ Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

Code Change No: S10-19

Original Proposal

Section(s): 1511.5 (IEBC 705.5)

Proponent: Mark Graham, National Roofing Contractors Association (NRCA), representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

Revise as follows:

1511.5 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. ~~Aggregate~~ Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

Reason: This proposal is intended to clarify the intent of the code.

Small diameter aggregate, such as that used as surfacing on built-up roof membranes, is generally considered not appropriate for re-use because the aggregate is contaminated with the existing roof's bitumen flood coat; this is already addressed in the last sentence of Sec. 1511.5. However, it is recognized in the roof industry existing aggregate ballast and pavers, such as that used on ballasted single-ply membrane roof systems, is appropriate for re-use, provided the pavers are not damaged, cracked or broken. Since the code's current language prohibiting the re-use of aggregate surfacing can be interpreted as also applying to aggregate and paver ballast, aggregate and paver ballast is sometimes disposed of unnecessarily.

This proposal is intended to provide differentiation between aggregate and paver ballast, and aggregate surfacing using the code's already existing terminology and is intended to eliminate the need for unnecessarily disposing of roof ballast materials.

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

In situations where existing aggregate or paver ballast is re-used, the material cost of the aggregate or paver ballast is saved.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal is intended to clarify the intent of the code and improve the language of the code. The proposal saves resources by clarifying what can and what cannot be reused. This proposal is intended to provide differentiation between aggregate and paver ballast, and aggregate surfacing using the code's already existing terminology and is intended to eliminate the need for unnecessarily disposing of roof ballast materials. (Vote: 14-0)

Assembly Action: **None**

Final Action

S10-19 **AS**

R9506/S12-19

15

Date Submitted	3/3/2021	**Section**	1503.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1503.3, 1503.3.1 (New), 1503.3.2 (New)

Summary of Modification

This proposal provides the much needed clarity as to when and how parapet walls are to be properly coped or covered. Adds new Section 1503.3.1 and 1503.3.2.

Rationale

The current language in this section is in dire need of an update, as it does not address current technologies or practices. This language is a carry over from the legacy code and was meant to apply to the coping of masonry parapet walls. The use of the word coping is also confusing, as it is often used interchangeably with the word covered. Depending on the type of roofing system that is being used, traditional metal or masonry copings are not always used to cap or cover a parapet wall.

This proposal provides the much needed clarity as to when and how parapet walls are to be properly coped or covered. The requirement has been broken out into 2 subsections for the two different parapet wall types. 1503.3.1 is for parapet walls that are required to comply with 705.11 must be coped or covered with weatherproof and noncombustible materials.

1503.3.2 is for parapet walls that do not have to comply with 705.11, are required to be coped or covered with weatherproof materials.

This revision will provide additional options for maintaining a continuous air barrier. For example, the roof membrane could be used to wrap the top of the parapet wall and extend down the exterior side of the wall. The membrane could then be tied into the wall air barrier system. See also Figures 1 through 4.

(Please see the uploaded mod S12-19 for the complete text)

Comment Period History

R9506-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1503.3 ~~Coping.~~ Parapet walls. Parapet walls shall be ~~properly coped with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall~~ coped or covered in accordance with Sections 1503.3.1 and 1503.3.2. The top surface of the parapet wall shall provide positive drainage.

Add new text as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with non-combustible, weatherproof materials of a width not less than the thickness of the parapet wall.

Revise as follows:

1503.3.2 Other parapet walls. Parapet walls meeting one of the exceptions in Section 705.11 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

Modified Proposal:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with ~~non-combustible,~~ weatherproof materials of a width not less than the thickness of the parapet wall such that the fire resistance rating of the wall is not decreased.

Code Change No: S12-19

Original Proposal

Section(s): 1503.3, 1503.3.1 (New), 1503.3.2 (New)

Proponents: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2018 International Building Code

Revise as follows:

1503.3 ~~Coping.~~ Parapet walls. Parapet walls shall be ~~properly coped with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall~~ coped or covered in accordance with Sections 1503.3.1 and 1503.3.2. The top surface of the parapet wall shall provide positive drainage.

Add new text as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with non-combustible, weatherproof materials of a width not less than the thickness of the parapet wall.

Revise as follows:

1503.3.2 Other parapet walls. Parapet walls meeting one of the exceptions in Section 705.11 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

Reason: The current language in this section is in dire need of an update, as it does not address current technologies or practices. This language is a carry over from the legacy code and was meant to apply to the coping of masonry parapet walls. The use of the word coping is also confusing, as it is often used interchangeably with the word covered. Depending on the type of roofing system that is being used, traditional metal or masonry copings are not always used to cap or cover a parapet wall.

This proposal provides the much needed clarity as to when and how parapet walls are to be properly coped or covered. The requirement has been broken out into 2 subsections for the two different parapet wall types. 1503.3.1 is for parapet walls that are required to comply with 705.11 must be coped or covered with weatherproof and noncombustible materials.

1503.3.2 is for parapet walls that do not have to comply with 705.11, are required to be coped or covered with weatherproof materials.

This revision will provide additional options for maintaining a continuous air barrier. For example, the roof membrane could be used to wrap the top of the parapet wall and extend down the exterior side of the wall. The membrane could then be tied into the wall air barrier system. See also Figures 1 through 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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No additional materials or detailing will be required based on this code change proposal; therefore it will not increase the cost of construction.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with ~~non-combustible,~~ weatherproof materials of a width not less than the thickness of the parapet wall such that the fire resistance rating of the wall is not decreased.

Committee Reason: The current language in this section is in dire need of an update, as it does not address current technologies or practices. This language is a carry over from the legacy code and was meant to apply to the coping of masonry parapet walls. The use of the word coping is also confusing, as it is often used interchangeably with the word covered. Depending on the type of roofing system that is being used, traditional metal or masonry copings are not always used to cap or cover a parapet wall. This proposal provides the much needed clarity as to when and how parapet walls are to be properly coped or covered. The requirement has been broken out into 2 subsections for the two different parapet wall types. 1503.3.1 is for parapet walls that are required to comply with 705.11 must be coped or covered with weatherproof and noncombustible materials. The modification is clarifies the wording (editorial). (Vote: 14-0)

Assembly Action: **None**

Final Action

S12-19 **AM**

R9507/S13-19

16

Date Submitted	3/3/2021	**Section**	1503.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **No**

Related Modifications

1503.3, 1503.3.1 (New), 1503.3.2 (New)

Summary of Modification

This proposal clarifies how to properly cope or cover the two different types of parapet wall types (those that must comply with Section 705.11 and those that do not)

Rationale

: This proposal clarifies how to properly cope or cover the two different types of parapet wall types (those that must comply with Section 705.11 and those that do not).

The current language does not address current technologies or practices. This language is a carry over from the legacy code and was meant to apply to the coping of masonry parapet walls. The use of the word coping is also confusing, as it is often used interchangeably with the word covered. Depending on the type of roofing system that is being used, traditional metal or masonry copings are not always used to cap or cover a parapet wall.

This revision will provide additional options for maintaining a continuous air barrier. For example, the roof membrane could be used to wrap the top of the parapet wall and extend down the exterior side of the wall. The membrane could then be tied into the wall air barrier system.

(Please see the uploaded mod S13-19 for the complete text)

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1503.3 ~~Coping~~ Parapet Walls. Parapet walls shall be ~~properly~~ coped ~~with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall.~~or covered in accordance with Sections 1503.3.1 and 1503.3.2. The top surface of the parapet wall shall provide positive drainage.

Add new text as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with non-combustible, weatherproof materials of a width not less than the thickness of the parapet wall.

1503.3.2 Other parapet walls. Parapet walls meeting one of the exceptions in Section 705.11 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

Modified Proposal:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with ~~non-combustible~~, weatherproof materials of a width not less than the thickness of the parapet wall such that the fire resistance rating of the wall is not decreased.

Code Change No: S13-19

Original Proposal

Section(s): 1503.3, 1503.3.1 (New), 1503.3.2 (New)

Proponents: Amanda Hickman, The Hickman Group, representing The Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2018 International Building Code

Revise as follows:

1503.3 ~~Coping~~ Parapet Walls. Parapet walls shall be ~~properly~~ coped ~~with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall.~~or covered in accordance with Sections 1503.3.1 and 1503.3.2. The top surface of the parapet wall shall provide positive drainage.

Add new text as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with non-combustible, weatherproof materials of a width not less than the thickness of the parapet wall.

1503.3.2 Other parapet walls. Parapet walls meeting one of the exceptions in Section 705.11 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

Reason: This proposal clarifies how to properly cope or cover the two different types of parapet wall types (those that must comply with Section 705.11 and those that do not).

The current language does not address current technologies or practices. This language is a carry over from the legacy code and was meant to apply to the coping of masonry parapet walls. The use of the word coping is also confusing, as it is often used interchangeably with the word covered. Depending on the type of roofing system that is being used, traditional metal or masonry copings are not always used to cap or cover a parapet wall.

This revision will provide additional options for maintaining a continuous air barrier. For example, the roof membrane could be used to wrap the top of the parapet wall and extend down the exterior side of the wall. The membrane could then be tied into the wall air barrier system.

Examples of covered parapets as required by 1503.3.2.

Examples of coped parapets as required by 1503.3.1.

Fascia on 6” wide by 4” high “Parapet”

Adelman Travel - Fascia on radius "parapet" @ 6" high x 6" wide

Hyvee Iowa Fascia on 18" parapet condition

Rowan project – Fascia on 24" parapet

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction. This proposal clarifies the difference between parapet wall types and how they should be covered or coped. Where metal coping is not required this proposal would lead to a decrease in the cost of construction by reducing material and labor. This could result in a cost reduction as much as $5-10 per foot.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1503.3.1 Fire-resistance-rated parapet walls. Parapet walls required by section 705.11 shall be coped or covered with ~~non-combustible,~~ weatherproof materials of a width not less than the thickness of the parapet wall such that the fire resistance rating of the wall is not decreased.

Committee Reason: The committee reviewed S12 and S13 combined - see reason statement for S12. The modification clarifies the wording (editorial). (Vote: 14-0)

Assembly Action: **None**

Final Action

S13-19 **AM**

R9508/S14-19

17

Date Submitted 3/3/2021	**Section** 1504.2.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		**Staff Classification** Correlates Directly
Commission Action Pending Review		

Comments

General Comments **Yes**

Related Modifications

1504.2.1, 1504.2.1.2, 1504.2.1.3 (New), Reference Standards, ASTM

Summary of Modification

Adds new Section 1504.2.1.3 "Air permeability testing". Adds standards ASTC 1569-03 (2016) and C1570-03(2016). Modifies text of Section of 1504.2.1 and Section 1504.2.1.2.

Rationale

In 2003, ASTM International Subcommittee C15.06 replicated SSTD 11-99 by subdividing the SBCCI standard into three different ASTM standards:

1) ASTM C1568- 03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method),
2) ASTM C1569-03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Wind Tunnel Method), and
3) ASTM C1570-03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method).
(Please see the uploaded mod S14-19 for the complete text)

Comment Period History

R9508-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Comment Period History

R9508-G2

Proponent Joseph Belcher **Submitted** 6/28/2021 **Attachments** No

Comment:

The Florida Concrete and Associated Products (FICAP) Association request approval of the proposed code change.

Approved as Submitted

2018 International Building Code

Revise as follows:

1504.2 Wind resistance of clay and concrete tile. Wind loads on clay and concrete tile roof coverings shall be in accordance with Section 1609.5.

1504.2.1 Testing. Testing of concrete and clay roof tiles shall be in accordance with Sections 1504.2.1.1, 1504.2.1.2 and ~~1504.2.1.2.~~1504.2.1.3.

1504.2.1.1 Overturning resistance. Concrete and clay roof tiles shall be tested to determine their resistance to overturning due to wind in accordance with Chapter 15 and either SBCCI SSTD 11 or ASTM C1568.

1504.2.1.2 Wind tunnel testing. Where concrete and clay roof tiles do not satisfy the limitations in Chapter 16 for rigid tile, a wind tunnel test shall be used to determine the wind characteristics of the concrete or clay tile roof covering in accordance with Chapter 15 and either SBCCI SSTD 11 ~~and Chapter 15~~ or ASTM C1569.

Add new text as follows:

1504.2.1.3 Air permeability testing. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined in accordance with SBCCI SSTD 11 or ASTM C1570.

Add new standard(s) as follows:

ASTC1569-03(2016): Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Wind Tunnel Method)

C1570-03(2016): Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method)

Code Change No: S14-19

Original Proposal

Section(s): 1504.2.1, 1504.2.1.2, 1504.2.1.3 (New), ASTM Chapter 35

Proponent: Rob Brooks, Rob Brooks and Associates, LLC, representing DowDuPont (rob@rtbrooks.com)

2018 International Building Code

Revise as follows:

1504.2 Wind resistance of clay and concrete tile. Wind loads on clay and concrete tile roof coverings shall be in accordance with Section 1609.5.

1504.2.1 Testing. Testing of concrete and clay roof tiles shall be in accordance with Sections 1504.2.1.1, 1504.2.1.2 and ~~1504.2.1.2.~~1504.2.1.3.

1504.2.1.1 Overturning resistance. Concrete and clay roof tiles shall be tested to determine their resistance to overturning due to wind in accordance with Chapter 15 and either SBCCI SSTD 11 or ASTM C1568.

1504.2.1.2 Wind tunnel testing. Where concrete and clay roof tiles do not satisfy the limitations in Chapter 16 for rigid tile, a wind tunnel test shall be used to determine the wind characteristics of the concrete or clay tile roof covering in accordance with Chapter 15 and either SBCCI SSTD 11 ~~and Chapter 15~~ or ASTM C1569.

Add new text as follows:

1504.2.1.3 Air permeability testing. The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined in accordance with SBCCI SSTD 11 or ASTM C1570.

Add new standard(s) as follows:

ASTC1569-03(2016):	Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Wind Tunnel Method)
C1570-03(2016):	Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method)

Reason: In 2003, ASTM International Subcommittee C15.06 replicated SSTD 11-99 by subdividing the SBCCI standard into three different ASTM standards:

1) ASTM C1568- 03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method),
2) ASTM C1569-03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Wind Tunnel Method), and
3) ASTM C1570-03, Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method).

In the previous code cycle, ASTM C1568 for mechanical uplift resistance was added to Section 1504.2.1.1 as an alternate to SSTD 11-99. This code change adds ASTM C1569 to Section 1504.2.1.2 for wind tunnel testing.

The ASTM C1569 test method determines the uplift forces acting as a result of the simulated wind when tiles are attached to a section a roof deck in accordance with the manufacturer?s instructions.

The cross-correlation of ASTM C1569 and SSTD 11 is as follows:

C1569 Section 5 relates to SSTD 11 Section 801
C1569 Section 7.2 relates to SSTD 11 Section 802
C1569 Section 7.5 relates to SSTD 11 Section 803
C1569 Section 7.6 relates to SSTD 11 Section 804
C1569 Section 7.7 relates to SSTD 11 Section 805
C1569 Section 7.8 relates to SSTD 11 Section 806
C1569 Section 7.9 relates to SSTD 11 Section 807

This code change also adds ASTM C1570 to Section 1504.2.1.3 for air permeability testing.

The ASTM C1570 test method measures the ability of the roof system to relieve wind-induced uplift pressures as a result of the overall air permeability of the roof assembly as it relates to the resistance of the roof system to damage induced by the wind. It serves to evaluate the uplift coefficient CL, referenced in IBC Section 1609.5.3, Equation 16-34, where the lift coefficient determination states: The lift coefficient for concrete and clay tile shall be 0.2 or shall be determined by test in accordance with Section 1504.2.1. That pointer has been modified to Section 1504.2.1.3.

The cross-correlation of ASTM C1570 and SSTD 11 is as follows:

C1570 Section 1.2 relates to SSTD 11 Section 901
C1570 Section 4.1 relates to SSTD 11 Section 902.1
C1570 Section 6 relates to SSTD 11 Section 902.2
C1570 Section 7 relates to SSTD 11 Section 902.3
C1570 Section 8 relates to SSTD 11 Section 902.4
C1570 Section 9 relates to SSTD 11 Section 902.5
C1570 Section 10 relates to SSTD 11 Section 902.6
C1570 Section 11 relates to SSTD 11 Section 902.7
C1570 Section 12 relates to SSTD 11 Section 903
C1570 Section 13 relates to SSTD 11 Section 904

There are no technical changes proposed with this code change request. ASTM C1569 and C1570 are simply a duplication of the relevant sections of SSTD 11-99 with regard to the wind tunnel and air-permeability test methods. This modification now references ASTM consensus standards that will have the capability to be updated in the future, as SSTD 11 has not been updated since 1999.

Bibliography:
Additional information on the background and development of the ASTM standards is available at [http://rci-online.org/wp-content/uploads/2014-11-smith-masters-gurley.pdf]
The chronology of the progression of these standardized test methods is found in Table 1 at [https://www.researchgate.net/publication/299487049_A_study_of_wind_load_interaction_for_roofing_field_tiles]

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The ASTM standards replicate the current requirements of SBCCI SSTD-99, and therefore will not increase the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM C1569-03(2016) and C1570-03(2016) , with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The proposal adds reference and updates to the latest ASTM's. (Vote: 13-0)

Assembly Action: **None**

Final Action

S14-19 **AS**

R9509/S15-19

18

Date Submitted	3/3/2021	**Section**	1504.4	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1504.4, 1504.8

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

This proposal revises Section 1504.4 so that ballasted roofs comply with ANSI/SPRI RP-4 and not 1504.8.

Rationale

This proposal makes a much-needed correction to section 1504.4 for ballasted roof systems for low-slope single-ply roofs. This proposal revises Section 1504.4 so that ballasted roofs comply with ANSI/SPRI RP-4 and not 1504.8. The requirements in RP-4 were developed for the appropriate application, installation and to prevent ballast scour for this specific type of single-ply ballasted system. The scour wind speed is below that at which blowoff would occur. It also provides design options for various conditions.
Section 1504.8 is based on the wind speeds for blow-off and only deals with smaller aggregate used for surfacing of built up roofs (BUR) and sprayed polyurethane foam (SPUF) roofs, which are completely different systems than ballasted roofs. For this reason an exception has been added in Section 1504.8 for ballasted single-ply roof systems complying with Section 1504.4.
(Please see the uploaded mod S15-19 for the complete text)

Approved as Submitted

2018 International Building Code

Revise as follows:

1504.4 Ballasted low-slope single-ply roof systems. Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Sections 1507.12 and 1507.13 shall be designed in accordance with ~~Section 1504.8 and~~ ANSI/SPRI RP-4.

1504.8 Surfacing and ballast materials in hurricane-prone regions. For a building located in a hurricane-prone region as defined in Section 202, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site, the following materials shall not be used on the roof:

1. Aggregate used as surfacing for roof coverings.
2. Aggregate, gravel or stone used as ballast.

Exception: Ballasted single-ply roof systems complying with Section 1504.4

Code Change No: S15-19

Original Proposal

Section(s): 1504.4, 1504.8

Proponent: Amanda Hickman, The Hickman Group, representing The Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com); Jay Crandell, P.E., ARES Consulting, representing self (jcrandell@aresconsulting.biz)

2018 International Building Code

Revise as follows:

1504.4 Ballasted low-slope single-ply roof systems. Ballasted low-slope (roof slope < 2:12) single-ply roof system coverings installed in accordance with Sections 1507.12 and 1507.13 shall be designed in accordance with ~~Section 1504.8 and~~ ANSI/SPRI RP-4.

1504.8 Surfacing and ballast materials in hurricane-prone regions. For a building located in a hurricane-prone region as defined in Section 202, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site, the following materials shall not be used on the roof:

1. Aggregate used as surfacing for roof coverings.
2. Aggregate, gravel or stone used as ballast.

Exception: Ballasted single-ply roof systems complying with Section 1504.4

Reason: This proposal makes a much-needed correction to section 1504.4 for ballasted roof systems for low-slope single-ply roofs. This proposal revises Section 1504.4 so that ballasted roofs comply with ANSI/SPRI RP-4 and not 1504.8. The requirements in RP-4 were developed for the appropriate application, installation and to prevent ballast scour for this specific type of single-ply ballasted system. The scour wind speed is below that at which blowoff would occur. It also provides design options for various conditions.

Section 1504.8 is based on the wind speeds for blow-off and only deals with smaller aggregate used for surfacing of built up roofs (BUR) and sprayed polyurethane foam (SPUF) roofs, which are completely different systems than ballasted roofs. For this reason an exception has been added in Section 1504.8 for ballasted single-ply roof systems complying with Section 1504.4.

The requirements in ANSI/SPRI RP-4 are based on a complete set of wind tunnel tests conducted in the largest commercially available wind tunnel in North America located at the National Research Council Canada. In this test series all variables that would impact the wind performance of ballasted single ply roof assemblies were evaluated, including stone size and size distribution as specified in ASTM D7655 Standard Classification for Size of stone used as ballast for membrane roof systems.

In this series of tests three critical windspeeds were identified for each condition of parapet height and stone size, windspeed 1 is the speed at which the stone distribution first begins to move, windspeed 2 is the speed is that which if maintained would result in stone scouring, and windspeed three is the speed at which stone blow-off occurs. The requirements in the Design Table of ANSI/SPRI RP-4 are based on windspeed 2, or the windspeed at which stone scour would occur.

The requirements of this standard have been updated based on field performance and in the most recent edition the design tables have been revised to reflect current methodology for interpreting wind tunnel data. Section 1504.8 does not consider the critical variables of parapet height and stone size and should not be applicable to ballasted single ply roof systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies what design requirements are to be used for ballasted single-ply roof systems.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The requirements of this standard have been updated based on field performance and in the most recent edition the design tables have been revised to reflect current methodology for interpreting wind tunnel data. Section 1504.8 does not consider the critical variables of parapet height and stone size and should not be applicable to ballasted single ply roof systems. (Vote: 13-1)

Assembly Action: None

Final Action

S15-19 **AS**

R9510/S16-19

19

Date Submitted	3/3/2021	**Section**	1504.5	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1504.5

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

This proposal is intended to clarify that regardless if the roof membrane is either independently or dependently terminated, the edge metal system needs to be properly tested to the appropriate standard.

Rationale

KULIK: This proposal is intended to clarify that regardless if the roof membrane is either independently or dependently terminated, the edge metal system needs to be properly tested to the appropriate standard. Metal edge systems prevent water infiltration, and in many cases to also secure the roof membrane. Loss of the edge system or components of the edge system during a high wind event could allow for water infiltration even if the roof membrane remains secure. Furthermore, any component of the edge system that becomes disengaged during a high wind event will become a projectile that can damage the roof membrane and other building components (windows, doors, walls, etc.), and possibly injure people. Therefore, metal edge systems should be tested per ES-1 whether they secure the membrane or not.

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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

(Please see the uploaded mod S16-19 for the complete text)

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1504.5 Edge ~~securement~~ systems for low-slope roofs. ~~Low-slope~~ Metal edge systems, except gutters, installed on built-up, modified bitumen and single-ply roof ~~system metal edge securement, except gutters,~~ systems having a slope less than 2:12, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(8) as applicable.

Modified Proposal:

1504.5 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roof systems having a slope less than 2:12, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(8) as applicable.

Code Change No: S16-19

Original Proposal

Section(s): 1504.5

Proponents: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Amanda Hickman, representing The Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2018 International Building Code

Revise as follows:

1504.5 Edge ~~securement~~ systems for low-slope roofs. ~~Low-slope~~ Metal edge systems, except gutters, installed on built-up, modified bitumen and single-ply roof ~~system metal edge securement, except gutters,~~ systems having a slope less than 2:12, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(8) as applicable.

Reason:
KULIK: This proposal is intended to clarify that regardless if the roof membrane is either independently or dependently terminated, the edge metal system needs to be properly tested to the appropriate standard. Metal edge systems prevent water infiltration, and in many cases to also secure the roof membrane. Loss of the edge system or components of the edge system during a high wind event could allow for water infiltration even if the roof membrane remains secure. Furthermore, any component of the edge system that becomes disengaged during a high wind event will become a projectile that can damage the roof membrane and other building components (windows, doors, walls, etc.), and possibly injure people. Therefore, metal edge systems should be tested per ES-1 whether they secure the membrane or not.

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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

HICKMAN: This proposal clarifies that the edge metal systems need to be properly tested to the appropriate standard regardless if the roof membrane is either independently or dependently terminated.

Metal edge systems prevent water infiltration, and in many cases to also secure the roof membrane. Loss of the edge system or components of the edge system during a high wind event could allow for water infiltration even if the roof membrane remains secure.

Furthermore, any component of the edge system that becomes disengaged during a high wind event will become a projectile that can damage the roof membrane and other building components (windows, doors, walls, etc.), and possibly injure people. Therefore, metal edge systems should be tested per ES-1 whether they secure the membrane or not.

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

KULIK: This proposal just clarifies that this test applies to edge metal regardless of installation method.

HICKMAN: The code change proposal will not increase or decrease the cost of construction. This proposal only clarifies that this test applies to edge metal regardless of installation method.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1504.5 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roof systems having a slope less than 2:12, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(8) as applicable.

Committee Reason: Clarifies the testing requirements to appropriate standards. The modification clarifies that the counterflashing are excluded from the proposed requirement. (Vote: 14-0)

Assembly Action: **None**

Final Action

S16-19 **AM**

R9511/S17-19

20

Date Submitted	3/3/2021	**Section**	1504.5.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1504.5.1 (New), Reference Standards SPRI

Summary of Modification

Adds new Section 1504.5.1 "Gutter securement for low-slope roofs". Adds new standard GT-1-2016 "Test Standard for Gutter Systems".

Rationale

Studies of the aftermath of high-wind events revealed that many gutter systems did not resist the loads that occur during these high-wind events. Examples of these observations are shown below. SPRI developed the gutter test standard to address this issue. The wind resistance tests included in this standard measure the resistance of the gutter system to wind forces acting outwardly (away from the building) and to wind forces acting upwardly tending to lift the gutter off of the building. The standard also measures the resistance of the gutter system to static forces of water, snow and ice acting downward. The six figures at the end of this reason statement are examples of gutter failures during high wind events observed during investigations conducted by the Roofing Industry Committee on Weather Issues (RICOWI).

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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on theBCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

(Please see uploaded mod S17-19 for the complete text)

Comment Period History

R9511-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Modified by Public Comment 2

Original Proposal:

2018 International Building Code

Add new text as follows:

1504.5.1 Gutter securement for low-slope roofs. External gutters that are used to secure the edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen, and single ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

Add new standard(s) as follows:

SPRI
GT-1-2016: Test Standard for Gutter Systems

Modified Proposal PC2:

2018 International Building Code

1504.5.1 Gutter securement for low-slope roofs. ~~External gutters~~ Gutters that are used to secure the perimeter edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen, and single ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

Code Change No: S17-19

Original Proposal

Section(s): 1504.5.1 (New), SPRI Chapter 35 (New)

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Amanda Hickman, representing The Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com)

2018 International Building Code

Add new text as follows:

1504.5.1 Gutter securement for low-slope roofs. External gutters that are used to secure the edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen, and single ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

Add new standard(s) as follows:

SPRI
GT-1-2016: Test Standard for Gutter Systems

Reason:
KULIK: Studies of the aftermath of high-wind events revealed that many gutter systems did not resist the loads that occur during these high-wind events. Examples of these observations are shown below. SPRI developed the gutter test standard to address this issue. The wind resistance tests included in this standard measure the resistance of the gutter system to wind forces acting outwardly (away from the building) and to wind forces acting upwardly tending to lift the gutter off of the building. The standard also measures the resistance of the gutter system to static forces of water, snow and ice acting downward. The six figures at the end of this reason statement are examples of gutter failures during high wind events observed during investigations conducted by the Roofing Industry Committee on Weather Issues (RICOWI).

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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on theBCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

HICKMAN: This proposal requires that gutters that are used as part of the edge securement of single-ply roof membranes be tested to the appropriate standard for acceptable wind resistance performance.

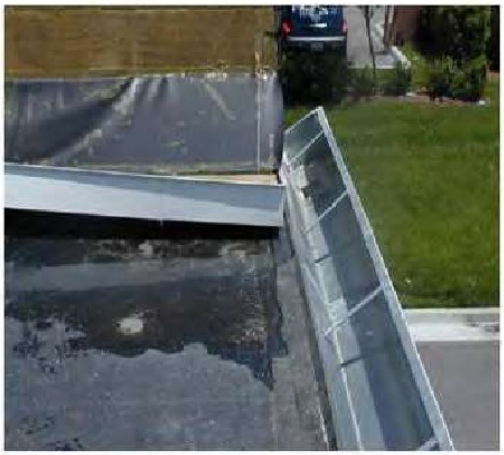
Studies of the aftermath of high-wind events revealed that many gutter systems did not resist the loads that occur during these high-wind events. When gutters are used to secure the roof membrane, a gutter failure can become a much bigger problem as it can cause a roof failure. Examples of these observations are shown below.

SPRI developed the gutter test standard to address this issue. The wind resistance tests included in this standard measure the resistance of the gutter system to wind forces acting outwardly (away from the building) and to wind forces acting upwardly tending to lift the gutter off of the building. Following are examples of gutter failures during high wind events observed during investigations conducted by the Roofing Industry Committee on Weather Issues (RICOWI).

2.11-2. Membrane peeled away from the insulation and detached from the roof in most

2.11-10. Photo of gutter/cleat attachment is a good example of damage progression.

3-08-1. Small retail building. Close up of windblown, deflected gutter.



3-08-2. Small retail building. Roof view of lifted gutter and metal edge. Note roof membrane has not peeled back.

3-09-2. Large retail building. Gutter metal blew across the roof, puncturing the roof membrane and breaking skylights.

3-09-3. Large retail building. Broken skylights became wind-borne debris, puncturing roof membrane—SE view.

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

KULIK: Even though there would be some increased cost to the manufacturer due to the testing of the gutter, it would be negligible, estimated around $0.058 /LF. This would be a one-time cost amortized over production time of the gutter. The nominal cost would most likely not increase the cost of construction. Not every gutter is required to be tested (depends on profile and attachment type). Once the gutter is tested, it is good forever so the cost of the test is spread out over time and over all the feet of gutter produced.

HICKMAN: The code change proposal will not increase or decrease the cost of construction. This would be a one-time cost amortized over production time of the gutter. Once the gutter is tested, it is good forever so the cost of the test is spread out over time and over all the feet of gutter produced. Even though there would be some increased cost to the manufacturer due to the testing of the gutter, it would be negligible, less than $0.05 /LF. Not every gutter is required to be tested (depends on profile and attachment type).

Staff Analysis: A review of the standard proposed for inclusion in the code, SPRIGT-1-2016, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Disapproved**

Committee Reason: The committee felt that the gutter flange or drop are typically not tested. Unclear on the term 'extreme gutter'. The committee felt it was inappropriate to have gutters in two different places in the code. The committee asked the proponent if gutter replacement requires a permit and were told 'no'. (Vote: 9-5)

Assembly Action: **None**

Public Comments

Public Comment 2:

Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2018 International Building Code

1504.5.1 Gutter securement for low-slope roofs. ~~External gutters~~ Gutters that are used to secure the perimeter edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen, and single ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

Commenter's Reason: Members of BCAC as well as a number of stakeholders discussed both the need for and the specific language of this proposal at great lengths. To address the committee and stakeholder feedback only minor editorial changes have been made in this public comment. Low slope roofs that use gutters as a means to completely or in some part secure the perimeter edge of the roof membrane (see Figure 1) can be particularly vulnerable to roof failure. Therefore, it is critical that where a gutter blow-off could cause a roof membrane failure, the gutter needs to be tested appropriately for resistance to wind load.

All new construction and reroof projects must be permitted. Anytime a new gutter is included in the scope of that work, it is part of the submitted plans for permit. The proposed language is easily enforceable and will lead to safer better performing roofs.

This public comment 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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as w ell as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/codedevelopment-process/building-code-actioncommitteebcac.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Even though there would be some increased cost to the manufacturer due to the testing of the gutter, it would be negligible, estimated around $0.058 /LF. This would be a one-time cost amortized over production time of the gutter. The nominal cost would most likely not increase the cost of construction. Not every gutter is required to be tested (depends on profile and attachment type). Once the gutter is tested, it is good forever so the cost of the test is spread out over time and over all the feet of gutter produced. performing roofs.

Final Action

S17-19 **AMPC2**

R9512/S18-19

21

Date Submitted 3/3/2021	**Section** 1504.7	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

1504.7

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

The proposal removes the section reference to avoid correlation issues should the referenced standard section numbering be revised in the future. The correct reference is section 4.6 of FM 4470 which has been corrected from section 5.5 per the errata for IBC 2018.

Rationale

The proposal removes the section reference to avoid correlation issues should the referenced standard section numbering be revised in the future. The correct reference is section 4.6 of FM 4470 which has been corrected from section 5.5 per the errata for IBC 2018.

Approved as Submitted

2018 International Building Code

Revise as follows:

1504.7 Impact resistance. Roof coverings installed on low-slope roofs (roof slope < 2:12) in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in ~~Section 5.5 of~~ FM 4470.

Code Change No: S18-19

Original Proposal

Section(s): 1504.7

Proponent: Mike Fischer, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

2018 International Building Code

Revise as follows:

1504.7 Impact resistance. Roof coverings installed on low-slope roofs (roof slope < 2:12) in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in ~~Section 5.5 of~~ FM 4470.

Reason: The proposal removes the section reference to avoid correlation issues should the referenced standard section numbering be revised in the future. The correct reference is section 4.6 of FM 4470 which has been corrected from section 5.5 per the errata for IBC 2018.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The proposal removes the section reference to avoid correlation issues should the referenced standard section numbering be revised in the future. The correct reference is section 4.6 of FM 4470 which has been corrected from section 5.5 per the errata for IBC 2018.
(Vote: 14-0)

Assembly Action: **None**

Final Action

S18-19	**AS**

R9513/S21-19

22

Date Submitted	3/3/2021	**Section**	1504.8	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1504.8, TABLE 1504.8, S19-16

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

Updates Table 1504.8 to a “basic design wind speed” basis and eliminates use of ASD wind speed to be consistent with changes made throughout the IBC in previous cycle to correlate with newer wind maps based on “ultimate” wind speeds . (Three other modifications)

Rationale

: In summary, this proposal has the following features:

1. Updates Table 1504.8 to a “basic design wind speed” basis and eliminates use of ASD wind speed to be consistent with changes made throughout the IBC in previous cycle to correlate with newer wind maps based on “ultimate” wind speeds (now called basic design wind speed).
2. Provides an engineering and scientific basis for roof design to prevent aggregate blow-off based on over 200 wind tunnel tests coupled with subsequent field studies from several different hurricane events with documented conditions and performance. See Bibliography (Kind-Wardlaw, 1976; Kind, 1977; Crandell & Smith, 2009; Crandell & Fischer, 2010; etc.)
3. Corrects unsafe conditions that the current Table 1504.8 allows based on scientifically incorrect assumptions (e.g., allows 170’ tall buildings with aggregate surfaced roofs and NO PARAPET).
4. Accounts for aggregate size distribution in the referenced ASTM aggregate standards, including the minimum permitted aggregate size in the referenced mixes as addressed in the referenced wind tunnel studies for this proposal which replicated actual aggregate size distribution (Kind, 1977) as also confirmed in field studies (e.g., Crandell & Smith, 2009).
5. Has been independently confirmed by later field study subsequent to the original research with the purpose of verifying the accuracy and effectiveness of the design methodology based on actual performance of real buildings and real hurricane events (Morrison, 2011).

(Please see the uploaded mod S21-19 for the complete text)

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

Delete and substitute as follows:

~~**1504.8 Surfacing and ballast materials in hurricane-prone regions. For a building located in a hurricane-prone region as defined in Section 202, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site, the following materials shall not be used on the roof:**~~

~~1. Aggregate used as surfacing for roof coverings.~~

~~2. Aggregate, gravel or stone used as ballast.~~

1504.8 Wind resistance of aggregate-surfaced roofs. Aggregate surfaced roofs shall comply with Table 1504.8.

~~**TABLE 1504.8**~~
~~**MAXIMUM ALLOWABLE MEAN ROOF HEIGHT PERMITTED FOR BUILDINGS WITH AGGREGATE ON THE ROOF IN AREAS OUTSIDE A HURRICANE-PRONE REGION**~~

~~**NOMINAL DESIGN WIND SPEED, V_{asd} (mph)**~~[b, d]	~~**MAXIMUM MEAN ROOF HEIGHT (ft)**~~[a, c]		
	~~**Exposure category**~~		
	~~**B**~~	~~**C**~~	~~**D**~~
~~85~~	~~170~~	~~60~~	~~30~~
~~90~~	~~110~~	~~35~~	~~15~~
~~95~~	~~75~~	~~20~~	~~NP~~
~~100~~	~~55~~	~~15~~	~~NP~~
~~105~~	~~40~~	~~NP~~	~~NP~~
~~110~~	~~30~~	~~NP~~	~~NP~~
~~115~~	~~20~~	~~NP~~	~~NP~~
~~120~~	~~15~~	~~NP~~	~~NP~~
~~Greater than 120~~	~~NP~~	~~NP~~	~~NP~~

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

~~a. Mean roof height as defined in ASCE 7.~~

~~b. For intermediate values of V_{asd}, the height associated with the next higher value of V_{asd} shall be used, or direct interpolation is permitted.~~

~~c. NP = gravel and stone not permitted for any roof height.~~

~~d. V_{asd} shall be determined in accordance with Section 1609.3.1.~~

R9513 Text Modification

TABLE 1504.8
MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a,b,c]

REGATE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		<=95	100	105	110	115	120	130	140	150	<=95	100	105	110	115	120	130	140	150
M D1863 or 7) or M D7655)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
M D1863)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, V, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Modifies Proposal:

Modify proposal as follows:

1504.8 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.8.

TABLE 1504.8

MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a,b,c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		<=95	100	105	110	115	120	130	140	150	<=95	100	105	110	115	120	130	140	150
ASTM D1863 (No.7 or No.67) ~~or ASTM D7655 (No.4)~~	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No.6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, V, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

R9513 Rationale

Page: 1

Code Change No: S21-19

Original Proposal

Section(s): 1504.8, TABLE 1504.8

Proponents: Jay Crandell, P.E., ARES Consulting, representing self; Mike Fischer, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com); Ellen Thorp, EPDM Roofing Association

2018 International Building Code

Revise as follows:

Delete and substitute as follows:

~~**1504.8 Surfacing and ballast materials in hurricane-prone regions.** For a building located in a hurricane-prone region as defined in Section 202, or on any other building with a mean roof height exceeding that permitted by Table 1504.8 based on the exposure category and basic wind speed at the site, the following materials shall not be used on the roof:~~

~~1. Aggregate used as surfacing for roof coverings.~~
~~2. Aggregate, gravel or stone used as ballast.~~

1504.8 Wind resistance of aggregate-surfaced roofs. Aggregate surfaced roofs shall comply with Table 1504.8.

~~**TABLE 1504.8**~~
~~**MAXIMUM ALLOWABLE MEAN ROOF HEIGHT PERMITTED FOR BUILDINGS WITH AGGREGATE ON THE ROOF IN AREAS OUTSIDE A HURRICANE-PRONE REGION**~~

~~NOMINAL DESIGN WIND SPEED, V_{asd} (mph)[b, d]~~	~~MAXIMUM MEAN ROOF HEIGHT (ft)[a, c]~~		
	~~Exposure category~~		
	~~B~~	~~C~~	~~D~~
~~85~~	~~170~~	~~60~~	~~30~~
~~90~~	~~110~~	~~35~~	~~15~~
~~95~~	~~75~~	~~20~~	~~NP~~
~~100~~	~~55~~	~~15~~	~~NP~~
~~105~~	~~40~~	~~NP~~	~~NP~~
~~110~~	~~30~~	~~NP~~	~~NP~~
~~115~~	~~20~~	~~NP~~	~~NP~~
~~120~~	~~15~~	~~NP~~	~~NP~~
~~Greater than 120~~	~~NP~~	~~NP~~	~~NP~~

~~For SI: 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.~~
~~a. Mean roof height as defined in ASCE 7.~~
~~b. For intermediate values of V_{asd}, the height associated with the next higher value of V_{asd} shall be used, or direct interpolation is permitted.~~
~~c. NP = gravel and stone not permitted for any roof height.~~
~~d. V_{asd} shall be determined in accordance with Section 1609.3.1.~~

TABLE 1504.8
MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a,b,c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		<=95	100	105	110	115	120	130	140	150	<=95	100	105	110	115	120	130	140	150
ASTM D1863 (No.7 or No.67) or ASTM D7655 (No.4)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No.6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.

b. Basic design wind speed, V, and wind exposure shall be determined in accordance with Section 1609.

c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.

d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Reason: In summary, this proposal has the following features:

1. Updates Table 1504.8 to a "basic design wind speed" basis and eliminates use of ASD wind speed to be consistent with changes made throughout the IBC in previous cycle to correlate with newer wind maps based on "ultimate" wind speeds (now called basic design wind speed).
2. Provides an engineering and scientific basis for roof design to prevent aggregate blow-off based on over 200 wind tunnel tests coupled with subsequent field studies from several different hurricane events with documented conditions and performance. See Bibliography (Kind-Wardlaw, 1976; Kind, 1977; Crandell & Smith, 2009; Crandell & Fischer, 2010; etc.)
3. Corrects unsafe conditions that the current Table 1504.8 allows based on scientifically incorrect assumptions (e.g., allows 170' tall buildings with aggregate surfaced roofs and NO PARAPET).
4. Accounts for aggregate size distribution in the referenced ASTM aggregate standards, including the minimum permitted aggregate size in the referenced mixes as addressed in the referenced wind tunnel studies for this proposal which replicated actual aggregate size distribution (Kind, 1977) as also confirmed in field studies (e.g., Crandell & Smith, 2009).
5. Has been independently confirmed by later field study subsequent to the original research with the purpose of verifying the accuracy and effectiveness of the design methodology based on actual performance of real buildings and real hurricane events (Morrison, 2011).

This proposal is consistent with S19-16 and a public comment (PC#2) that was submitted in response to the structural committee's direction in 2016. The public comment was approved at public hearing only to be spuriously overturned during the on-line governmental vote. What follows, for the record, are the reason statements from the original S19-16 proposal and PC#2 (with modest editing to fit the context of this proposal):

A) From the original S19-16 proposal (excerpt slightly edited):
The current provisions in Section 1504.8, and specifically Table 1504.8, are not based on the Kind-Wardlaw (K-W) design method (Kind Wardlaw 1976), the wind tunnel studies underlying the K-W design method (Kind 1977), or a quantitative analysis of observed good and bad roofing system performances in real wind events. Instead, current building code requirements are based on variation in surface pressure with building height which is known to be an inappropriate predictor of aggregate blow -off or scour due to pressure equalization effects (Smith, 1997). Furthermore, these recent requirements do not address critical parameters such as aggregate size and parapet height which govern performance. This code change proposal replaces the current Table 1504.8 with one based on the K-W design method and new research by the Asphalt Roofing Manufacturers Association (ARMA) (Crandell and Fischer, 2010). Results demonstrate that the use of aggregate-surfaced roofing systems is a viable option in high wind areas with appropriate aggregate sizing and parapet design. The K-W design method has been simplified, improved, and calibrated to a number of field observations from actual hurricane events to refine its application to low-slope, built-up roof (BUR) and sprayed polyurethane foam (SPF) roof systems (Crandell Smith, 2009).

B) From PC2 on S19-16 (slightly edited):
In response to the structural committee's comments and indication that "this proposal is headed in the right direction", this public comment addresses the committee's recommendation to simplify and improve readability of the table (which was partly a font size or CDP access table formatting issue). These revisions are technically consistent with the original S19-16 proposal and the referenced research.
The 2016 committee also mentioned that questions were raised with regard to how the provisions were developed from the referenced research. The methodology (and design procedure) is clearly documented in the referenced research in an

understandable, repeatable, and scientific manner (see original S19-16 proposal's reason statement (above) and bibliography (below) for referenced research reports and papers. The procedure used is consistent with the findings of many wind tunnel studies and uses the same principles as applied in the ANSI/SPRI RP-4 standard currently referenced in the code. It is also consistent with the treatment of aggregate blow-off as incorporated in wind risk models. Furthermore, the analytical procedure was evaluated by comparison to numerous documented field studies of successful and failed loose aggregate surfaced roofs systems in various high wind events to confirm its ability to reliably predict performance as a means to design roofs (or develop prescriptive provisions as proposed) to prevent roof aggregate blow-off. Thus, a robust combination of current engineering practice, wind tunnel data, and field research was used to support development of the requirements as proposed for Table 1504.8.

However, this proposal does not merely provide a more academic solution. It is necessary to correct deficiencies in the current code provisions. For example, the current Table 1504.8 allows buildings up to 170' tall or buildings in areas with design wind speeds up to 120 mph with NO PARAPET which creates a general safety hazard (e.g., falling debris from the roof) and unacceptable wind damage vulnerability (i.e., aggregate blow-off risk). This proposal corrects this safety and building performance issue based on correct scientific principles and sound engineering practices.

If implemented, this proposal will serve to prevent many past observations of roof aggregate blow-off from being repeated. Simply put, this proposal is implementing lessons learned in a rational, scientific manner based on real-world and wind tunnel laboratory data to prevent history from repeating itself in an unfavorable manner. Any argument against this proposal as being inadequate is an argument to leave the code in a far worse condition from a building safety and performance standpoint.

In closing, the following quote from Morrison (2011) provides independent, confirmation of the design methodology used for this proposal and is based on the documented performance (and aggregate and parapet conditions) of 20 buildings with aggregate surfaced roofs experiencing Hurricanes Francis and Jeanne in 2004:

"The major intent of this study was to determine the validity of Crandell's Modified Kind-Wardlaw Design Method for Buildings of All Heights [Crandell & Smith, 2009; Crandell & Fischer, 2010].

An X-value calculation was determined to compare the adjusted critical wind speed (Vcr') to the actual estimated wind speed (Vroof). Per Crandell's Method, a positive X-value would be "safe" from the standpoint of aggregate blow-off. Indeed, this was consistent with the observations.

In fact, Crandell's Method appears to be quite conservative since 12 of the 20 roofs observed had negative X-values but no observed or reported aggregate blow-off. The single roof that did experience blow-off had an X-value of -52. While this might suggest that Crandell's Method has a "safety factor" of about 50 mph wind speed, this is only one sample, and there were multiple uncertainties in this analysis."

In summary, this proposal is a significant improvement of the existing provisions in the code and will result in better performing and safer aggregate surfaced roofs based on a proven and robust design approach.

Bibliography:

Crandell, J. H. and Smith, T.L.. (2009) Design Method Improvements to Prevent Roof Aggregate Blow -Off, Hurricane Hugo 20th Anniversary Symposium on Building Safer Communities – Improving Disaster Resistance, ATC-77, North Charleston, SC, October 22-23, 2009

Kind, R.J. and Wardlaw R.L. (1976). Design of Rooftops Against Gravel Blow -Off. National Aeronautical Establishment, National Research Council, Canada.

Kind, R.J. (1977). Further Wind Tunnel Tests on Building Models to Measure Wind Speeds at Which Gravel is Blow n Off Rooftops. LTR-LA-189. National Aeronautical Establishment, National Research Council, Canada.

Smith, T.L. (June 1997). Aggregate Blow -Off from BUR and SPF Roofs: Recognizing the Potential Hazards and Avoiding Problems. Proceedings of The &th U.S. Conference on Wind

Engineering, AAWE.

ANSI/SPRI RP-4 (2013). Wind Design Standard for Ballasted Single-Ply Roofing Systems. SPRI, Waltham, MA (www.spri.org)

Crandell, J. H. and Fischer, M. (2010). Winds of Change: Resolving Roof Aggregate Blow -Off, RCI 25th International Convention and Trade Show, March 25-30, 2010, RCI, Inc., Raleigh, NC

Morrison, R.V. (2011). Field Investigation of Aggregate Blow-off of Spray Polyurethane Foam Roofs, *RCI Interface*, Technical Journal of RCI, Inc. (presented at RICOWI Fall Symposium, November 11, 2010)

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

Overall, the proposed new Table 1504.8 will provide additional options for use of aggregate surfaced roofs that are safer than the current provisions and which may reduce cost. In some cases, depending on current practice and the basic design wind speed condition for a building site, a parapet (or taller parapet) and/or larger aggregate may be required for compliance. In these cases, an incremental cost increase can be expected.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1504.8 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.8.

TABLE 1504.8
MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a,b,c]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC DESIGN WIND SPEED (MPH)																	
		Exposure B									Exposure C[d]								
		<=95	100	105	110	115	120	130	140	150	<=95	100	105	110	115	120	130	140	150
ASTM D1863 (No.7 or No.67) ~~or ASTM D7655 (No.4)~~	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No.6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Interpolation shall be permitted for mean roof height and parapet height.
b. Basic design wind speed, V, and wind exposure shall be determined in accordance with Section 1609.
c. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.
d. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm).

Committee Reason: The proposal brings in the latest research into the code with wide insurance industry support. The modifications 1) corrects the aggregate size and 2) clarifies the proposal. (Vote: 13-1)

Assembly Action: **None**

Final Action

S21-19 **AM**

R9514/S22-19

23

Date Submitted	3/3/2021	**Section**	1506	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1506, 1506.1

Summary of Modification

This code change proposal is intended to clarify the intent of the code. Modifies the text of Section 1506.1 "Scope".

Rationale

This code change proposal is intended to clarify the intent of the code.
The requirement for roof coverings "...be applied in accordance with... the manufacturer's installation instructions." is unnecessary and redundant in this section because this is already required in Section 1507-Requirements for Roof Coverings.
A requirement for the roofing covering to be applied according to the listing is added here for clarity. Section 1505-Fire Classification already requires roof assemblies and roof coverings to be listed and Section 1506.3 requires materials and product packaging to bear testing agency labels.

Comment Period History

R9514-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the ~~manufacturer's installation instructions.~~ roof covering listing. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Modified Proposal:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the roof covering listing as required by Section 1505. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Code Change No: S22-19

Original Proposal

Section(s): SECTION 1506, 1506.1

Proponents: Mark Graham, National Roofing Contractors Association (NRCA), representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the ~~manufacturer's installation instructions.~~ roof covering listing. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Reason: This code change proposal is intended to clarify the intent of the code.
The requirement for roof coverings "...be applied in accordance with... the manufacturer's installation instructions." is unnecessary and redundant in this section because this is already required in Section 1507-Requirements for Roof Coverings.
A requirement for the roofing covering to be applied according to the listing is added here for clarity. Section 1505-Fire Classification already requires roof assemblies and roof coverings to be listed and Section 1506.3 requires materials and product packaging to bear testing agency labels.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The stringency of the code is not increased or decreased by this code change proposal.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the roof covering listing as required by Section 1505. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

Committee Reason: This code change proposal is intended to clarify the intent of the code. The requirement for roof coverings "...be applied in accordance with... the manufacturer's installation instructions." is unnecessary and redundant in this section because this is already required in Section 1507-Requirements for Roof Coverings. The modification provides a specific reference to section 1505. (Vote: 14-0)

Assembly Action: **None**

Final Action

S22-19 **AM**

R9515/S24-19

24

Date Submitted 3/3/2021	**Section** 1507.1.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

1507.1.1

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

The requirements for ASTM D1970 underlayment are redundant as the standard is listed in Section 1507.1.1.

Rationale

The requirements for ASTM D1970 underlayment are redundant as the standard is listed in Section 1507.1.1.

Approved as Submitted

2018 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

~~1. As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed shall be permitted.~~

~~2.~~1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.

~~3.~~2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (mm). The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch (mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.

~~4.~~3. Structural metal panels that do not require a substrate or underlayment.

Code Change No: S24-19

Original Proposal

Section(s): 1507.1.1

Proponent: Mike Fischer, Kellen Company, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

2018 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. ~~As an alternative, self-adhering polymer modified bitumen underlayment complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed shall be permitted.~~
2. ~~2.~~1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
3. ~~3.~~2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (mm). The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch (mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19.1 mm) into the roof sheathing.
4. ~~4.~~3. Structural metal panels that do not require a substrate or underlayment.

Reason: The requirements for ASTM D1970 underlayment are redundant as the standard is listed in Section 1507.1.1.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: Proposal eliminates redundant requirements. The requirements for ASTM D1970 underlayment are redundant as the standard is listed in Section 1507.1.1. (Vote: 14-0)

Assembly Action: **None**

Final Action

S24-19 **AS**

R9516/S25-19

25

Date Submitted 3/3/2021	**Section** 1507.3.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

1507.3.1

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

Section 1507.3.1 is amended to require concrete and clay tiles to be installed only over solid structural sheathing boards.

Rationale

Section 1507.3.1 is amended to require concrete and clay tiles to be installed only over solid structural sheathing boards. The change is necessary because there were numerous observations of tile roofs pulling away from wood framed buildings following the 1994 Northridge Earthquake. The SEAOSC/LA City Post Northridge Earthquake committee findings indicated significant problems with tile roofs was due to inadequate design and/or construction. Therefore, the amendment is needed to minimize such occurrences in the event of future significant earthquakes. This amendment will reduce the failure of concrete and clay tile roofs during a significant earthquake and is in accordance with the scope and objectives of the California Building Code.

Approved as Modified

Original Proposal:

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

1507.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

Modified Proposal:

1507.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

Exception: Spaced lumber sheathing shall be permitted in Seismic Design Categories A, B and C.

R9516 Rationale

Page: 1

Code Change No: S25-19

Original Proposal

Section(s): 1507.3.1

Proponents: Shahen Akelyan, representing LAOBS and ICC IA Basin Chapter (shahen.akelyan@lacity.org)

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

1507.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

Reason: Section 1507.3.1 is amended to require concrete and clay tiles to be installed **only** over solid structural sheathing boards. The change is necessary because there were numerous observations of tile roofs pulling away from wood framed buildings following the 1994 Northridge Earthquake. The SEAOSC/LA City Post Northridge Earthquake committee findings indicated significant problems with tile roofs was due to inadequate design and/or construction. Therefore, the amendment is needed to minimize such occurrences in the event of future significant earthquakes. This amendment will reduce the failure of concrete and clay tile roofs during a significant earthquake and is in accordance with the scope and objectives of the California Building Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The revision limits use of spaced sheathing which does no increase any cost.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1507.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

Exception: Spaced lumber sheathing shall be permitted in Seismic Design Categories A, B and C.

Committee Reason: Section 1507.3.1 is amended to require concrete and clay tiles to be installed only over solid structural sheathing boards. The change is necessary because there were numerous observations of tile roofs pulling away from wood framed buildings following the 1994 Northridge Earthquake. The SEAOSC/LA City Post Northridge Earthquake committee findings indicated significant problems with tile roofs was due to inadequate design and/or construction. Therefore, the amendment is needed to minimize such occurrences in the event of future significant earthquakes. This amendment will reduce the failure of concrete and clay tile roofs during a significant earthquake and is in accordance with the scope and objectives of the California Building Code. Modification clarifies scope for high seismic only. (Vote: 14-0)

Assembly Action: **None**

Final Action

S25-19 **AM**

R9517/S28-19

26

Date Submitted 3/3/2021	**Section** 1507.3.6	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		**Staff Classification** Correlates Directly
Commission Action Pending Review		

Comments

General Comments **No**

Related Modifications

1507.3.6

Summary of Modification

ASTM F1667-18 requires that when gage is used as a diameter for nails, a decimal equivalent must also be shown.

Rationale

ASTM F1667-18 requires that when gage is used as a diameter for nails, a decimal equivalent must also be shown. This requirement was put in place because of the multiple and conflicting wire gage tables that are used in the manufacturing of nails.

Approved as Submitted

2018 International Building Code

Revise as follows:

1507.3.6 Fasteners. Tile fasteners shall be corrosion resistant and not less than 11-gage, [0.120 inch (3 mm)], $^{5}/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck not less than $^{3}/_{4}$ inch (19.1 mm) or through the thickness of the deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 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.

Code Change No: S28-19

Original Proposal

Section(s): 1507.3.6

Proponent: Rick Allen, International Staple, Nail and Tool Association, representing International Staple, Nail and Tool Association (rallen@isanta.org)

2018 International Building Code

Revise as follows:

1507.3.6 Fasteners. Tile fasteners shall be corrosion resistant and not less than 11-gage, [0.120 inch (3 mm)], $^{5}/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck not less than $^{3}/_{4}$ inch (19.1 mm) or through the thickness of the deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 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.

Reason: ASTM F1667-18 requires that when gage is used as a diameter for nails, a decimal equivalent must also be shown. This requirement was put in place because of the multiple and conflicting wire gage tables that are used in the manufacturing of nails.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not change the cost of production. It only provides clarification required by ASTM F1667-18

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The proposal provides consistent requirements with the latest reference standard.

Assembly Action: **None**

Final Action

S28-19	**AS**

R9518/S31-19

27

Date Submitted	3/3/2021	**Section**	1507.12	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1507.12, 1507.12.1, 1507.12.2, TABLE 1507.12.2 (New), 1507.12.3, 1507.13, 1507.13.1, 1507.13.2, 1507.13.3

Summary of Modification

This code change proposal is intended to clarify and streamline the code's requirements applicable to single-ply membrane roof systems.

Rationale

This code change proposal is intended to clarify and streamline the code's requirements applicable to single-ply membrane roof systems.

The code currently addresses thermoset (i.e., EPDM, CSPE) single-ply membrane roofs in Section 1507.12 and thermosplastic (i.e., PVC, KEE, TPO) single-ply membrane roofs in Section 1507.13. Other than the references to specific ASTM material standards, the other requirements in Section 1507.12 and Section 1507.13 are identical.

This code change proposal combines the requirements for single-ply membrane roof systems into one subsection, Section 1507.12-Single-ply Roofs. Also, the ASTM material standards references are provided in a new table, Table 1507.12.2-Single-ply Roofing Material Standards; this type of material standards table is similar in formt to Table 1507.10.2-Built-up Roofing Material Standards, et. al.

No changes to the technical requirements for single-ply membrane roof systems are included in this code change proposal.

Comment Period History

R9518-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC’s recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1507.12 ~~Thermoset single-ply~~ Single-ply roofing. The installation of ~~thermoset~~ single-ply roofing shall comply with the provisions of this section.

1507.12.1 Slope. ~~Thermoset single-ply~~ Single-ply membrane roofs shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope) for drainage.

1507.12.2 Material standards. ~~Thermoset single-ply~~ Single-ply roof coverings shall comply with ~~ASTM D4637 or ASTM D5019~~.the material standards in Table 1507.12.2.

Add new text as follows:

-

TABLE 1507.12.2
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 Chloride (PVC)	ASTM D4434
Thermoplastic polyolfin (TPO)	ASTM D6878

Revise as follows:

1507.12.3 Ballasted ~~thermoset~~ low-slope roofs. Ballasted ~~thermoset~~ low-slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D448 or ASTM D7655.

Delete without substitution

~~**1507.13 Thermoplastic single-ply roofing.**The installation of thermoplastic single-ply roofing shall comply with the provisions of this section.~~

-

~~**1507.13.1 Slope.** Thermoplastic single-ply membrane roofs shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope).~~

-

~~**1507.13.2 Material standards.**Thermoplastic single-ply roof coverings shall comply with ASTM D4434, ASTM D6754 or ASTM D6878.~~

~~**1507.13.3 Ballasted thermoplastic low-slope roofs.** Ballasted thermoplastic low-slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D448 or ASTM D7655.~~

Modified Proposal:

Modify proposal as follows:

TABLE 1507.12.2

SINGLE-PLY ROOFING MATERIAL STANDARDS

MATERIAL	MATERIAL STANDARD
Chlorosulfonated polyethylene (CSPE) or polyisobutylene (PIB)	ASTM D5019
Ethylene propylene diene monomer (EPDM)	ASTM D4637
Ketone Ethylene Ester (KEE)	ASTM D6754
Polyvinyl Chloride (PVC) or (PVC/KEE)	ASTM D4434
Thermoplastic polyolfin (TPO)	ASTM D6878

Code Change No: S31-19

Original Proposal

Section(s): 1507.12, 1507.12.1, 1507.12.2, TABLE 1507.12.2 (New), 1507.12.3, 1507.13, 1507.13.1, 1507.13.2, 1507.13.3

Proponents: Mark Graham, National Roofing Contractors Association (NRCA), representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

Revise as follows:

1507.12 ~~Thermoset single-ply~~ Single-ply roofing. The installation of ~~thermoset~~ single-ply roofing shall comply with the provisions of this section.

1507.12.1 Slope. ~~Thermoset single-ply~~ Single-ply membrane roofs shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope) for drainage.

1507.12.2 Material standards. ~~Thermoset single-ply~~ Single-ply roof coverings shall comply with ~~ASTM D4637 or ASTM D5019.~~the material standards in Table 1507.12.2.

Add new text as follows:

TABLE 1507.12.2
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 Chloride (PVC)	ASTM D4434
Thermoplastic polyolfin (TPO)	ASTM D6878

Revise as follows:

1507.12.3 Ballasted ~~thermoset~~ low-slope roofs. Ballasted ~~thermoset~~ low-slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D448 or ASTM D7655.

Delete without substitution

~~**1507.13 Thermoplastic single-ply roofing.** The installation of thermoplastic single-ply roofing shall comply with the provisions of this section.~~

~~**1507.13.1 Slope.** Thermoplastic single-ply membrane roofs shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope).~~

~~**1507.13.2 Material standards.** Thermoplastic single-ply roof coverings shall comply with ASTM D4434, ASTM D6754 or ASTM D6878.~~

~~**1507.13.3 Ballasted thermoplastic low-slope roofs.** Ballasted thermoplastic low-slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D448 or ASTM D7655.~~

Reason: This code change proposal is intended to clarify and streamline the code's requirements applicable to single-ply membrane roof systems.

The code currently addresses thermoset (i.e., EPDM, CSPE) single-ply membrane roofs in Section 1507.12 and thermosplastic (i.e., PVC, KEE, TPO) single-ply membrane roofs in Section 1507.13. Other than the references to specific ASTM material standards, the other requirements in Section 1507.12 and Section 1507.13 are identical.

This code change proposal combines the requirements for single-ply membrane roof systems into one subsection, Section 1507.12-Single-ply Roofs. Also, the ASTM material standards references are provided in a new table, Table 1507.12.2-Single-ply Roofing Material Standards; this type of material standards table is similar in formt to Table 1507.10.2-Built-up Roofing Material Standards, et. al.

No changes to the technical requirements for single-ply membrane roof systems are included in this code change proposal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal only reformats and rearranges the code's current requirements.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1507.12.2
SINGLE-PLY ROOFING MATERIAL STANDARDS

MATERIAL	MATERIAL STANDARD
Chlorosulfonated polyethylene (CSPE) or polyisobutylene (PIB)	ASTM D5019
Ethylene propylene diene monomer (EPDM)	ASTM D4637
Ketone Ethylene Ester (KEE)	ASTM D6754
Polyvinyl Chloride (PVC) or (PVC/KEE)	ASTM D4434
Thermoplastic polyolfin (TPO)	ASTM D6878

Committee Reason: This code change proposal is intended to clarify and streamline the code's requirements applicable to single-ply membrane roof systems. The code currently addresses thermoset (i.e., EPDM, CSPE) single-ply membrane roofs in Section 1507.12 and thermoplastic (i.e., PVC, KEE, TPO) single-ply membrane roofs in Section 1507.13. Other than the references to specific ASTM material standards, the other requirements in Section 1507.12 and Section 1507.13 are identical. Modification fixed the spelling of 'chlorosulfonated' and added PVC/KEE. (Vote: 14-0)

Assembly Action: **None**

Final Action

S31-19 **AM**

R9519/S32-19

28

Date Submitted 3/3/2021	**Section** 1507.15.2	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1507.15.2

Summary of Modification

This code change proposal is intended to clarify the code's intent regarding the use of liquid-applied roof coverings.

Rationale

This code change proposal is intended to clarify the code's intent regarding the use of liquid-applied roof coverings.
Currently, the material standards included in Section 1507.15.2 incorrectly include a combination of liquid-applied roof coverings and roof coating products. This proposal intends to remove the material standards for roof coating products from Section 1507.15-Liquid-applied Roofing to facilitate adding a new dedicated roof coating section in a separate code change proposal.
ASTM C836 (liquid-applied waterproofing membrane), ASTM C957 (liquid-applied waterproofing membrane with wearing surface) and ASTM D3468 (neoprene and CSPE used in roofing and waterproofing) are specific liquid-applied roof coverings. These three material standards are intended to remain in this section.
ASTM D1227 (asphaltic emulsion coating) and ASTM D6083 (acrylic roof coating) are specific roof coatings products, not liquid-applied roof coverings. These two standards are proposed to be removed from this section and be added to a new dedicated roofing coating section in a separate code change proposal.
Also, ASTM D6694 and ASTM D6947 are proposed to be removed from this section. ASTM D6694 (silicone for use in SPF roof systems) and ASTM D6947 (polyurethane for use in SPF roof systems) are specific roof coating products intended for use in SPF roof systems and are already included in Section 1507.14-Spray Polyurethane Foam Roofing.

Comment Period History

R9519-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

1507.15 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.15.1 Slope. Liquid-applied roofing shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope).

Revise as follows:

1507.15.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957~~, ASTM D1227~~ or ASTM ~~D3468, ASTM D6083, ASTM D6694 or ASTM D6947~~ D3468.

Code Change No: S32-19

Original Proposal

Section(s): 1507.15.2

Proponent: Mark Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

1507.15 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.15.1 Slope. Liquid-applied roofing shall have a design slope of not less than one-fourth unit vertical in 12 units horizontal (2-percent slope).

Revise as follows:

1507.15.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957~~, ASTM D1227~~ or ASTM ~~D3468, ASTM D6083, ASTM D6694 or ASTM D6947~~ D3468.

Reason: This code change proposal is intended to clarify the code's intent regarding the use of liquid-applied roof coverings.

Currently, the material standards included in Section 1507.15.2 incorrectly include a combination of liquid-applied roof coverings and roof coating products. This proposal intends to remove the material standards for roof coating products from Section 1507.15-Liquid-applied Roofing to facilitate adding a new dedicated roof coating section in a separate code change proposal.

ASTM C836 (liquid-applied waterproofing membrane), ASTM C957 (liquid-applied waterproofing membrane with wearing surface) and ASTM D3468 (neoprene and CSPE used in roofing and waterproofing) are specific liquid-applied roof coverings. These three material standards are intended to remain in this section.

ASTM D1227 (asphaltic emulsion coating) and ASTM D6083 (acrylic roof coating) are specific roof coatings products, not liquid-applied roof coverings. These two standards are proposed to be removed from this section and be added to a new dedicated roofing coating section in a separate code change proposal.

Also, ASTM D6694 and ASTM D6947 are proposed to be removed from this section. ASTM D6694 (silicone for use in SPF roof systems) and ASTM D6947 (polyurethane for use in SPF roof systems) are specific roof coating products intended for use in SPF roof systems and are already included in Section 1507.14-Spray Polyurethane Foam Roofing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a rearrangement of the code's current requirements regarding liquid-applied roof covering and roof coating products.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This code change proposal is intended to clarify the code's intent regarding the use of liquid-applied roof coverings. Currently, the material standards included in Section 1507.15.2 incorrectly include a combination of liquid-applied roof coverings and roof coating products. This proposal intends to remove the material standards for roof coating products from Section 1507.15-Liquid-applied Roofing to facilitate adding a new dedicated roof coating section in a separate code change proposal. (Vote: 14-0)

Assembly Action: **None**

Final Action

S32-19 **AS**

R9520/S33-19 Part I

29

Date Submitted	3/3/2021	**Section**	1507.17.6	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

1507.17.6, 1507.17.8, 1507.18.5, 1507.18.7, Reference Standards UL.

Original text of this code change is not consistent with that of the 2020 FBC-B.

Summary of Modification

Proposal. Adding standard, UL 7103, to address electrical, fire, wind resistance, impact resistance and durability of Photovoltaic Roof Coverings.

Rationale

BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance in the following areas: testing such as:

1. Fire testing (UL 790 or ASTM E108)
2. Impact testing
3. Wind resistance (ASTM D3161 or UL 1897)
4. Wind driven rain
5. Environmental conditions
6. Electrical (UL 1703)
7. Materials (UL 1703)

Having one standard, UL 7103, to address electrical, fire, wind resistance, impact resistance and durability of this new type of building material make's it far easier to determine compliance with all the minimum code requirements. The standard includes all the marking requirements for the ratings (fire classification, wind resistance, and electrical) and the minimum content for the installation instructions.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1507.17.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL ~~1703.~~7103.

1507.17.8 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table 1504.1.1 for the appropriate maximum nominal design wind speed. ~~*Photovoltaic shingle* packaging shall bear a *label* to indicate compliance with the procedures in ASTM D3161 and the required classification from Table 1504.1.1.~~

1507.18.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL ~~1703.~~7103.

Delete without substitution:

~~1507.18.7 Wind resistance. BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.~~

Add new standard(s) as follows:

UL

7103-19: Outline of Investigation for Building-Integrated Photovoltaic Roof Coverings

Modified Proposal:

Modify proposal as follows:

TABLE 1504.1.1

CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1)-(8) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}, FROM TABLE 1609.3.1 (mph)	ASTM D7158[a] CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Code Change No: S33-19 Part I

Original Proposal

Section(s): 1507.17.6, 1507.17.8, 1507.18.5, 1507.18.7, UL Chapter 35

Proponents: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2018 International Building Code

Revise as follows:

1507.17.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL ~~1703.~~7103.

1507.17.8 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table 1504.1.1 for the appropriate maximum nominal design wind speed. ~~*Photovoltaic shingle* packaging shall bear a *label* to indicate compliance with the procedures in ASTM D3161 and the required classification from Table 1504.1.1.~~

1507.18.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL ~~1703.~~7103.

Delete without substitution:

~~**1507.18.7 Wind resistance.** BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.~~

Add new standard(s) as follows:

UL

7103-19: Outline of Investigation for Building-Integrated Photovoltaic Roof Coverings

Reason: BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance in the following areas: testing such as:

1. Fire testing (UL 790 or ASTM E108)
2. Impact testing
3. Wind resistance (ASTM D3161 or UL 1897)
4. Wind driven rain
5. Environmental conditions
6. Electrical (UL 1703)
7. Materials (UL 1703)

Having one standard, UL 7103, to address electrical, fire, wind resistance, impact resistance and durability of this new type of building material make's it far easier to determine compliance with all the minimum code requirements. The standard includes all the marking requirements for the ratings (fire classification, wind resistance, and electrical) and the minimum content for the installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements remain the same. This proposal is simply editorial by providing a different format in order to assist in determining code compliance.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 7103-19, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1504.1.1
CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1)-(8) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd}, FROM TABLE 1609.3.1 (mph)	ASTM D7158[a] CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

For SI: 1 foot = 304.8 mm; 1 mph = 0.447 m/s.

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Committee Reason: The proposal combines all the applicable standards into one place for simplicity. The modifications added clarification. (Vote: 11-3)

Assembly Action: **None**

Final Action

S33-19 Part I **AM**

R9522/S34-19 Part I

30

Date Submitted 3/3/2021	**Section** 1510.7.2	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Overlap

Comments

General Comments **No**

Related Modifications

[BG] 1510.7.2, 1507.17.6, 1507.18.5, 3111.3.1, UL Chapter

Original text for this code change (ss.1510.7.2, 1507.17.6 and 1507.18.5) is not consistent with that of the 2020 FBC-B.

Summary of Modification

UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Rationale

UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Approved as Submitted

2018 International Building Code

Revise as follows:

[BG] 1510.7.2 Photovoltaic panels and modules. Rooftop-mounted *photovoltaic panels* and *modules* shall be *listed* and labeled in accordance with UL 1703, or with both UL 61730-1 and UL 61730-2, and shall be installed in accordance with the manufacturer's instructions.

1507.17.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

1507.18.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

3111.3.1 Equipment. 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.

Add new standard(s) as follows:

UL

61730-1-2017: Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction

61730-2-2017: Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing

Code Change No: S34-19 Part I

Original Proposal

Section(s): IBC: [BG] 1510.7.2, 1507.17.6, 1507.18.5, 3111.3.1, UL Chapter 35

Proponent: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2018 International Building Code

Revise as follows:

[BG] 1510.7.2 Photovoltaic panels and modules. Rooftop-mounted *photovoltaic panels* and *modules* shall be *listed* and labeled in accordance with UL 1703, or with both UL 61730-1 and UL 61730-2, and shall be installed in accordance with the manufacturer's instructions.

1507.17.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

1507.18.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

3111.3.1 Equipment. 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.

Add new standard(s) as follows:

UL
61730-1-2017: Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction
61730-2-2017: Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing

Reason: UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact because this simply provides alternative standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 61730-1-2017 and 61730-2-2017, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703. Hence, the proposal currently provides an alternate compliance option. Committee action is consistent with the IRC action on Part II.
(Vote: 14-0)

Assembly Action: **None**

Final Action

S34-19 Part I **AS**

R9524/S35-19

31

Date Submitted	3/3/2021	**Section**	1509.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1509.1 (New), 1509.2 (New), TABLE 1509.2 (New)

Summary of Modification

This proposed code change is intended to provide specific requirements regarding the use of roof coating materials.

Rationale

: This proposed code change is intended to provide specific requirements regarding the use of roof coating materials.
The term "roof coating" is already defined in Chapter 2-Definitions and is used in Section 1511.3.1.4; however, the code currently provides little guidance or requirements relating to the use of roof coatings.
The new section proposed here provides a requirement that roof coatings be tested as a part of a fire-classified roof assembly/covering in accordance with Section 1505-Fire Classification and comply with applicable material standards.

Comment Period History

R9524-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

Add new text as follows:

SECTION 1509
ROOF COATINGS

1509.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section 1505 and this section.

1509.2 Material standards. Roof coating materials shall comply with the standards in Table 1509.2.

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227

Modified Proposal:

Modify proposal as follows:

TABLE 1509.2

ROOF COATING MATERIAL STANDARDS

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

Code Change No: S35-19

Original Proposal

Section(s): 1509.1 (New), 1509.2 (New), TABLE 1509.2 (New)

Proponents: Mark Graham, National Roofing Contractors Association (NRCA), representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

Add new text as follows:

SECTION 1509
ROOF COATINGS

1509.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section 1505 and this section.

1509.2 Material standards. Roof coating materials shall comply with the standards in Table 1509.2.

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227

Reason: This proposed code change is intended to provide specific requirements regarding the use of roof coating materials.

The term "roof coating" is already defined in Chapter 2-Definitions and is used in Section 1511.3.1.4; however, the code currently provides little guidance or requirements relating to the use of roof coatings.

The new section proposed here provides a requirement that roof coatings be tested as a part of a fire-classified roof assembly/covering in accordance with Section 1505-Fire Classification and comply with applicable material standards

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal does not increase or decrease the stringency of the code; it reformats the code's existing requirements for roof coatings.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

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

R9524 Rationale

Moisture-cured polyurethane coating	ASTM D6947

Committee Reason: The proposal clarifies and put in one place the requirements for the ease of both code officials and designers. The modification adds additional references to complete the table and on the floor the correct spelling of 'Asphaltic' was noted. (Vote: 14-0)

Assembly Action: **None**

Final Action

S35-19 **AM**

R9526/S39-19

32

Date Submitted 3/3/2021	**Section** 1603.1.4	**Proponent** Mo Madani
Chapter 16	**Affects HVHZ** No	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1603.1.4

Summary of Modification

Adding a description of the roof pressure coefficient zones to Section 1603-Construction Document's requirements for reporting wind design data (Section 1603.1.4) will add some clarity and should assist in proper roof assembly/covering application.

Rationale

In educational sessions conducted by NRCA on IBC's 2018 roofing-related requirements, participants appear to be notably unclear on ASCE 7-16's new roof pressure coefficient zones. Adding a description of the roof pressure coefficient zones to Section 1603-Construction Document's requirements for reporting wind design data (Section 1603.1.4) will add some clarity and should assist in proper roof assembly/covering application.

Comment Period History

R9526-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

1603.1.4 Wind design data. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:

1. Basic design wind speed, V, miles per hour and allowable stress design wind speed, Vasd, as determined in accordance with Section 1609.3.1.
2. Risk category.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures to be used for exterior component and cladding materials not specifically designed by the registered design professional responsible for the design of the structure, psf (kN/m2).
6. Roof pressure coefficient (G_{Cp}) zones locations and dimensions.

Modified Proposal:

Modify proposal as follows:

1603.1.4 Wind design data. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:

1. Basic design wind speed, *V*, miles per hour and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, psf (kN/m^2).
6. ~~Roof pressure coefficient (GC_p) zones locations and dimensions.~~

Code Change No: S39-19

Original Proposal

Section(s): 1603.1.4

Proponents: Mark Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2018 International Building Code

Revise as follows:

1603.1.4 Wind design data. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:

1. Basic design wind speed, V, miles per hour and allowable stress design wind speed, Vasd, as determined in accordance with Section 1609.3.1.
2. Risk category.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures to be used for exterior component and cladding materials not specifically designed by the registered design professional responsible for the design of the structure, psf (kN/m2).
6. Roof pressure coefficient (GC_p) zones locations and dimensions.

Reason: In educational sessions conducted by NRCA on IBC's 2018 roofing-related requirements, participants appear to be notably unclear on ASCE 7-16's new roof pressure coefficient zones. Adding a description of the roof pressure coefficient zones to Section 1603-Construction Document's requirements for reporting wind design data (Section 1603.1.4) will add some clarity and should assist in proper roof assembly/covering application.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The stringency of the code is not increased or decreased.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

1603.1.4 Wind design data. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:

1. Basic design wind speed, *V*, miles per hour and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, psf (kN/m^2).
6. ~~Roof pressure coefficient (GC_p) zones locations and dimensions.~~

Committee Reason: Adding a description of the roof pressure coefficient zones to Section 1603-Construction Document's requirements for reporting wind design data (Section 1603.1.4) will add some clarity and should assist in proper roof assembly/covering application. The proposal improves guidance to contractors. The modification improves the language to provide clear guidance. (Vote: 14-0)

R9526 Rationale

Assembly Action: None

Final Action

S39-19 AM

R9556/S79-19

33

Date Submitted	3/5/2021	**Section**	1611.1	**Proponent**	Mo Madani
Chapter	16	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1611.1, 1611.2

Summary of Modification

The proposed changes to secondary (overflow) system design harmonized the roof load design for the structure with the expectations for the design of the roof drainage system. This proposal coordinates the IBC with ASCE 7.

Rationale

This proposed change to Section 1611 will harmonize the provision in the IBC with the currently referenced loading standard ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7).

The proposed changes to secondary (overflow) system design harmonized the roof load design for the structure with the expectations for the design of the roof drainage system. This proposal coordinates the IBC with ASCE 7, which was updated to be consistent with the International Plumbing Code (IPC) provisions. The changes provide a basis for the design mean reoccurrence interval and duration for determining the Hydraulic Head (dh). Currently the IBC requires the calculation of dh; however, the code does not state the design storm (mean reoccurrence interval and duration) for determining the design rain load (depth of water on the undeflected roof) and it has led to some confusion. Typical design values for plumbing systems have been between 15 minute and 60 minutes; the 1995 IPC first used the 100-year/60-minute duration for the design of the primary drainage system and twice the flow rate from the 100-year/60-minute duration storm for the secondary drainage system.

Note that the use of twice the flow rate of the 60-minute duration is close to the design intensity for the 15-minute duration storm. The IPC also used a 15-minute duration rainfall event for the design of roof drainage systems. Therefore, by adding this as an alternative the data within Figure 1611.1 is permitted to be used.

(Please see the uploaded mod S79-19 for the complete text)

Comment Period History

R9556-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Building Code

SECTION 1611
RAIN LOADS

Revise as follows:

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the load of rainwater ~~that will accumulate on it if the primary drainage system for that portion is blocked plus the uniform load caused by water that rises above the inlet of the secondary drainage system at its design flow~~ as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year ~~hourly rainfall rate indicated in Figure 1611.1~~ 15-minute duration event, or on other rainfall rates determined from *approved* local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figure 1611.1 shall be permitted.

(Please see the uploaded mod S79-19 for the Equation Image)

(Equation 16-35)

where:

d_h = Additional depth of water on the undeflected roof above the inlet of secondary drainage system at its design flow (in other words, the hydraulic head), in inches (mm).

d_s = Depth of water on the undeflected roof up to the inlet of secondary drainage system when the primary drainage system is blocked (in other words, the static head), in inches (mm).

R = Rain load on the undeflected roof, in psf (kN/m^2). Where the phrase “undeflected roof” is used, deflections from loads (including dead loads) shall not be considered when determining the amount of rain on the roof.

For SI: $R = 0.0098(d_s + d_h)$

1611.2 Ponding instability. Susceptible bays of roofs shall be evaluated for ponding instability in accordance with ~~Section 8.4~~ Chapter 7 and Chapter 8 of ASCE 7.

Code Change No: S79-19

Original Proposal

Section(s): 1611.1, 1611.2

Proponent: Jennifer Goupil, American Society of Civil Engineers (ASCE), representing American Society of Civil Engineers (ASCE) (jgoupil@asce.org)

2018 International Building Code

SECTION 1611
RAIN LOADS

Revise as follows:

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the load of rainwater ~~that will accumulate on it if the primary drainage system for that portion is blocked plus the uniform load caused by water that rises above the inlet of the secondary drainage system at its design flow~~ as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year ~~hourly rainfall rate indicated in Figure 1611.1~~ 15-minute duration event, or on other rainfall rates determined from *approved* local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figure 1611.1 shall be permitted.

$$R = 5.2(d_s + d_h)$$ **(Equation 16-35)**

where:

d_h = Additional depth of water on the undeflected roof above the inlet of secondary drainage system at its design flow (in other words, the hydraulic head), in inches (mm).

d_s = Depth of water on the undeflected roof up to the inlet of secondary drainage system when the primary drainage system is blocked (in other words, the static head), in inches (mm).

R = Rain load on the undeflected roof, in psf (kN/m^2). Where the phrase "undeflected roof" is used, deflections from loads (including dead loads) shall not be considered when determining the amount of rain on the roof.

For SI: $R = 0.0098(d_s + d_h)$

1611.2 Ponding instability. Susceptible bays of roofs shall be evaluated for ponding instability in accordance with ~~Section 8.4~~ Chapter 7 and Chapter 8 of ASCE 7.

Reason: This proposed change to Section 1611 will harmonize the provision in the IBC with the currently referenced loading standard ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7).

The proposed changes to secondary (overflow) system design harmonized the roof load design for the structure with the expectations for the design of the roof drainage system. This proposal coordinates the IBC with ASCE 7, which was updated to be consistent with the International Plumbing Code (IPC) provisions. The changes provide a basis for the design mean reoccurrence interval and duration for determining the Hydraulic Head (dh). Currently the IBC requires the calculation of dh; however, the code does not state the design storm (mean reoccurrence interval and duration) for determining the design rain load (depth of water on the undeflected roof) and it has led to some confusion. Typical design values for plumbing systems have been between 15 minute and 60 minutes; the 1995 IPC first used the 100-year/60-minute duration for the design of the primary drainage system and twice the flow rate from the 100-year/60-minute duration storm for the secondary drainage system.

Note that the use of twice the flow rate of the 60-minute duration is close to the design intensity for the 15-minute duration storm. The IPC also used a 15-minute duration rainfall event for the design of roof drainage systems. Therefore, by adding this as an alternative the data within Figure 1611.1 is permitted to be used.

The basis for the use of a 60-minute duration storm is unclear - the critical duration for most roof geometries is closer to 15 minutes. Graber (2009) provides guidance for determining the critical duration and the paper advises against the use of the 60-minute storm for the design of the primary and secondary drainage systems in hopes of handling the critical short-duration rainfall event.

NOTE that ASCE 7 does not provide rainfall data or maps for determine the rainfall rate. The best source currently is the National Oceanic and Atmospheric Administration (NOAA) National Weather Service Precipitation Frequency Data Server - Hydrometeorological Design Studies Center (http://hdsc.nws.noaa.gov/hdsc/pfds/index.html) for precipitation intensity (inches per hour) based on the 100-year mean reoccurrence interval.

Graber, S.D. (2009). "Rain loads and flow attenuation on roofs." J. Architectural Eng., 15(3), 91-101.

Cost Impact: The code change proposal will increase the cost of construction
The proposed changes may impact the design of roofs where the secondary (overflow) system was previously based on an unconservative hydraulic head from a lower rainfall intensity. The changes harmonize the roof load design for the structure with the expectations for the design of the roof drainage system. This proposal coordinates the IBC with the referenced loading standard ASCE 7, which was updated in the 2016 edition to be consistent with the International Plumbing Code provisions for secondary drainage systems.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposed change to Section 1611 will harmonize the provision in the IBC with the currently referenced loading standard ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7). (Vote: 14-0)

Assembly Action: **None**

Final Action

S79-19 **AS**

R9558/S81-19

34

Date Submitted 3/5/2021	**Section** 1612.4	**Proponent** Mo Madani
Chapter 16	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Flood Requirements

Comments

General Comments **Yes**

Related Modifications

1612.4

Directly correlated.

Summary of Modification

This proposal specifies that construction documents include certification of engineered openings when used in breakaway walls in coastal high hazard areas and coastal A zones.

Rationale

For construction in flood hazard areas, the 2018 IBC refers to the 2014 edition of ASCE 24, Flood Resistant Design and Construction. ASCE 24 requires openings in breakaway walls in all flood hazard areas (as does the IRC, in Section R322.2.2 and R322.3.6). Flood openings may be non-engineered (providing 1 square inch of net open area for each square foot of enclosure area) or engineered. Certification of engineered openings is a requirement of the NFIP (and IRC Section R322.2.2). Currently, Section 1612.4 only requires certification of engineered openings in flood hazard areas other than coastal high hazard areas or coastal A Zones (Item 1 of Section 1612.4).

This proposal specifies that construction documents include certification of engineered openings when used in breakaway walls in coastal high hazard areas and coastal A zones.

Comment Period History

R9558-G1

Proponent Rebecca Quinn obo F **Submitted** 6/18/2021 **Attachments** No

Comment:

Retain this change. Certification of engineered openings is necessary to determine compliance. This is similar to what is already in 1612.5 (1.2).

Approved as Submitted

2018 International Building Code

Revise as follows:

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in flood hazard areas other than coastal high hazard areas or coastal A zones:
   1.1. The elevation of the lowest floor, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.11.1.
   1.2. For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.
   1.3. For dry floodproofed nonresidential buildings, construction documents shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.
2. For construction in coastal high hazard areas and coastal A zones:
   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.11.1.
   2.2. Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of Chapter 16.
   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m2) determined using allowable stress design, construction documents shall include a statement that the breakaway wall is designed in accordance with ASCE 24.
   2.4. For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Code Change No: S81-19

Original Proposal

Section(s): 1612.4

Proponent: Gregory Wilson, representing Federal Emergency Management Agency (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, on behalf of Federal Emergency Management Agency, representing Federal Emergency Management Agency (rcquinn@earthlink.net)

2018 International Building Code

Revise as follows:

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in flood hazard areas other than coastal high hazard areas or coastal A zones:
   1.1. The elevation of the lowest floor, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.11.1.
   1.2. For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.
   1.3. For dry floodproofed nonresidential buildings, construction documents shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.
2. For construction in coastal high hazard areas and coastal A zones:
   2.1. The elevation of the bottom of the lowest horizontal structural member as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.11.1.
   2.2. Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of Chapter 16.
   2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m2) determined using allowable stress design, construction documents shall include a statement that the breakaway wall is designed in accordance with ASCE 24.
   2.4. For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Reason: For construction in flood hazard areas, the 2018 IBC refers to the 2014 edition of ASCE 24, *Flood Resistant Design and Construction*. ASCE 24 requires openings in breakaway walls in all flood hazard areas (as does the IRC, in Section R322.2.2 and R322.3.6). Flood openings may be non-engineered (providing 1 square inch of net open area for each square foot of enclosure area) or engineered. Certification of engineered openings is a requirement of the NFIP (and IRC Section R322.2.2). Currently, Section 1612.4 only requires certification of engineered openings in flood hazard areas other than coastal high hazard areas or coastal A Zones (Item 1 of Section 1612.4).

This proposal specifies that construction documents include certification of engineered openings when used in breakaway walls in coastal high hazard areas and coastal A zones.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No additional cost because certification of engineered openings has always been required by the NFIP.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: For construction in flood hazard areas, the 2018 IBC refers to the 2014 edition of ASCE 24, Flood Resistant Design and Construction. ASCE 24 requires openings in breakaway walls in all flood hazard areas (as does the IRC, in Section R322.2.2 and R322.3.6). Flood openings may be non-engineered (providing 1 square inch of net open area for each square foot of enclosure area) or engineered. Certification of engineered openings is a requirement of the NFIP (and IRC Section R322.2.2). Currently, Section 1612.4 only requires certification of engineered openings in flood hazard areas other than coastal high hazard areas or coastal A Zones (Item 1 of Section 1612.4).

This proposal specifies that construction documents include certification of engineered openings when used in breakaway walls in coastal high hazard areas and coastal A zones.
(Vote: 14-0)

Assembly Action: **None**

Final Action

S81-19 **AS**

R9454/G151-18

35

Date Submitted	3/2/2021	**Section**	3114	**Proponent**	Mo Madani
Chapter	31	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **No**

Related Modifications

3101.1, 3114 (New), 3114.1 (New), 3114.2 (New), 3114.3 (New), 3114.4 (New), 3114.5 (New), 3114.6 (New), 3114.7 (New), 3114.8 (New), 3114.8.1 (New), 3114.8.3 (New), 3114.8.4, 3114.8.5 (New), 3114.8.5.1 (New), 3114.8.5.2 (New), 3114.8.5.3 (New), Reference Standards

Summary of Modification

This code change purpose is to introduce intermodal shipping containers into the International Building Code based on requests by code officials in the U.S.

Rationale

This code change purpose is to introduce intermodal shipping containers into the International Building Code based on requests by code officials in the U.S. Prior to this proposal, several jurisdictions had created their own individual regulations or ordinances, or had administered additional requirements beyond the code (e.g. Section 104.11 “Alternative materials, design and methods of construction and equipment”) so as to be comfortable to ensure a safe structure. This code change proposal is in response to those requests to develop a set of consistent code provisions which cover the minimum safety requirements, but which do not duplicate existing code provisions.

This proposal covers:

- Creation of a new definition in order to separate the container from other I-code sections which refer to, but intentionally do not define, shipping containers,
- Creating exceptions so to differentiate the intermodal shipping container from other code sections which could be interpreted as applying to intermodal shipping containers under other applications (e.g. temporary storage, relocatable buildings, energy storage facilities, and listed equipment),
- Verification of containers construction, condition, and structural integrity to assist the structural engineer in the evaluation for building construction,

(Please see the uploaded mod G151-18 for the complete text)

Approved as Modified by Public Comment 1,2

Original Proposal:

2018 International Building Code

Add new definition as follows:

INTERMODAL SHIPPING CONTAINER. A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

Revise as follows:

3101.1 Scope. The provisions of this chapter shall govern special building construction including *membrane structures*, temporary structures, *pedestrian walkways* and tunnels, automatic vehicular gates, awnings and *canopies*, marquees, signs, towers, antennas, relocatable buildings, swimming pool enclosures and safety devices, ~~and~~ solar energy ~~systems.~~systems and intermodal shipping containers.

Add new text as follows:

SECTION 3114

INTERMODAL SHIPPING CONTAINERS

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

-

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.

2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.

3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.

4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:

   4.1. Such units shall be single stand-alone units supported at grade level and used only for occupancies as specified under Risk Category I in Table 1604.5;.

   4.2. Such units are located a minimum of 8 feet from adjacent structures, and are not connected to a fuel gas system or fuel gas utility; and

   4.3. In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16.

-

3114.2 Construction Documents. The construction documents shall contain information to verify the dimensions and establish the physical properties of the steel components, and wood floor components, of the intermodal shipping container in addition to the information required by Sections 107 and 1603.

-

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

-

1. Manufacturer's name or identification number

2. Date manufactured.

3. Safety approval number.

4. Identification number.

5. Maximum operating gross mass or weight (kg) (Lbs)

6. Allowable stacking load for 1.8G (kg) (lbs)

7. Transverse racking test force (Newtons)

8. Valid maintenance examination date

Where approved by the building official, the markings and existing data plateare permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3114.4 Protection against decay and termites. Wood structural floors of intermodal shipping containers shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3114.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any intermodal shipping container, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3114.6 Roof assemblies. Intermodal shipping container roof assemblies shall comply with the applicable requirements of Chapter 15.

-

Exception: Single-unit stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3114.7 Joints and voids. Joints and voids that create concealed spaces between intermodal shipping containers, that are connected or stacked, at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system in accordance with Section 715.

3114.8 Structural. Intermodal shipping containers which conform to ISO 1496-1 that are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16 and this section.

3114.8.1 Foundations. Intermodal shipping containers repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23 of this code.

Add new text as follows:

3114.8.1.1 Anchorage. Intermodal shipping containers shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental loads in accordance with Chapter 16.

3114.8.2 Welds. All new welds and connections shall be equal to or greater than the original connections.

3114.8.3 Structural design. The structural design for the intermodal shipping containers repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section 3114.8.4 or 3114.8.5.

3114.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the building official to demonstrate the structural adequacy of the intermodal shipping containers.

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Exception: Intermodal shipping containers designed in accordance with Section 3114.8.5.

3114.8.4.1 Material properties. Structural material properties for existing intermodal shipping container steel components shall be established by material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.

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3114.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

-

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.

2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or

3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

3114.8.4.3 Allowable shear value. The allowable shear values for the intermodal shipping container corrugated steel sheet panel side walls and end walls shall be demonstrated by testing and analysis

accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

3114.8.5 Simplified structural design of single-unit containers. Single-unit intermodal shipping containers conforming to the limitations of Section 3114.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3114.8.5.

3114.8.5.1 Limitations. Use of Section 3114.8.5 is subject to all the following limitations:

-

1. The intermodal shipping container shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.

2. The intermodal shipping container top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.

3. The intermodal shipping container shall be erected in a level and horizontal position with the floor located at the bottom.

4. The intermodal shipping container shall be located in Seismic Design Category A, B, C or D.

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3114.8.5.2 Simplified structural design. Where permitted by Section 3114.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the corrugated steel shear walls:

-

1. The appropriate detailing requirements contained in Chapters 16 through 23.

2. Response modification coefficient, R=2,

3. Overstrength factor, ?0=2.5,

4. Deflection amplification factor, Cd = 2, and

5. Limits on structural height, hn = 9.5 feet (2,900 mm).

3114.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and for seismic design using the coefficients of Section 3114.8.5.2 shall be in accordance with Table 3114.8.5.3 provided that all of the following conditions are met:

-

1. The total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls, as shown in Figure 3114.8.5.3(1).

2. Any full height wall length, or portion thereof, less than 4 feet (305 mm) long shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3114.8.5.3(2).

3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3114.8.5.3(3).

4. Where openings are made in container walls, floors, or roofs for doors, windows and other openings:

   4.1. The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 22.

   4.2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than a 6-inch (152 mm) diameter hole for conduits, pipes, tubes or vents, or not greater than 16 square inches (10,322 sq mm) for electrical boxes, is permitted for each individual 8 foot length (2,438 mm) lateral force resisting wall. Penetrations located in walls that are not part of the wall lateral force resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).

6. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

(Please see the uploaded mod G151-18 for the Images)

FIGURE 3114.8.5.3(1)
BRACING UNIT DISTRIBUTION--MAXIMUM LINEAR LENGTH

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FIGURE 3114.8.5.3(2)
BRACING UNIT DISTRIBUTION -- MINIMUM LINEAR LENGTH
FIGURE 3114.8.5.3(3)
BRACING UNIT DISTRIBUTION -- BOUNDARY ELEMENTS

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FIGURE 3114.8.5.3(4)
BRACING UNIT DISTRIBUTION -- PENETRATION LIMITATIONS

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Add new text as follows:

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TABLE 3114.8.5.3
ALLOWABLE STRENGTH VALUES FOR INTERMODAL SHIPPING CONTAINER CORRUGATED STEEL SIDING SHEAR WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION	CONTAINER DIMENSION (Nominal Height)	ALLOWABLE SHEAR VALUES (PLF)[a,c]

	(Nominal Length)			
			Side Wall	End Wall
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843
1EE		8.6 feet (2591 mm)		
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84	
1AA		8.5 feet (2592 mm)		
1A		8.0 feet (2438 mm)		
1AX		< 8.0 feet (2438 mm)		
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112	
1BB		8.5 feet (2591 mm)		
1B		8.0 feet (2438 mm)		
1BX		< 8.0 feet (2438 mm)		
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168	
1C		8.0 feet (2438 mm)		
1CX		< 8.0 feet (2438 mm)		
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337	
1DX		< 8.0 feet (2438 mm)		

a. The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
b. Container designation type is derived from ISO 668.
c. Limitations of Sections 3114.8.5.1 shall apply

Add new standard(s) follows:

ISO
ISO 668: 2013: Series 1 Freight Containers - Classifications, dimensions and ratings
ISO 1496-1: 2013: Series 1 Freight Containers - Specification and Testing - Part 1: General Cargo Containers for General Purposes
ISO 6346: 1995, with Amendment 3: 2012: Freight Containers - Coding, Identification and marking

Modified Proposal PC1:

2018 International Building Code

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.

3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.

4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:

4.1. Such units shall be single stand-alone units supported at grade level and used as experimental equipment or apparatuses, only for occupancies as specified under Risk Category I in Table 1604.5;

4.2. Such units are located a minimum of 8 feet from adjacent structures, and are not connected to a fuel gas system or fuel gas utility; and

4.3 .In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16

Modified Proposal PC2:

2018 International Building Code

TABLE 3114.8.5.3

ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER CORRUGATED STEEL ~~SIDING SHEAR~~ WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION (Nominal Length)	CONTAINER DIMENSION (Nominal Height)	ALLOWABLE SHEAR VALUES (PLF)[a, c]		
			Side Wall	End Wall	
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843	
1EE		8.6 feet (2591 mm)			
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84		
1AA		8.5 feet (2592 mm)			
1A		8.0 feet (2438 mm)			
1AX					
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112		
1BB		8.5 feet (2591 mm)			
1B		8.0 feet (2438 mm)			
1BX					
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168		
1C		8.0 feet (2438 mm)			
1CX					
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337		
1DX					

a. The allowable shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.

b. Container designation type is derived from ISO 668.

c. Limitations of Sections 3114.8.5.1 shall apply

3114.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials,

2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or

3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

(Please see uploaded mod G151-18 for the Images)

FIGURE 3114.8.5.3(1)

BRACING UNIT DISTRIBUTION--MAXIMUM LINEAR LENGTH

3114.8.5.3(2)

Bracing Unit Distribution -- Minimum Linear Length

FIGURE 3114.8.5.3(3)

BRACING UNIT DISTRIBUTION -- BOUNDARY ELEMENTS

FIGURE 3114.8.5.3(4)

BRACING UNIT DISTRIBUTION -- PENETRATION LIMITATIONS

Code Change No: G151-18

Original Proposal

Section(s): 3101.1, 3114 (New), 3114.1 (New), 3114.2 (New), 3114.3 (New), 3114.4 (New), 3114.5 (New), 3114.6 (New), 3114.7 (New), 3114.8 (New), 3114.8.1 (New), 3114.8.1.1 (New), 3114.8.2 (New), 3114.8.3 (New), 3114.8.4 (New), 3114.8.4.1 (New), 3114.8.4.2 (New), 3114.8.4.3 (New), 3114.8.5 (New), 3114.8.5.1 (New), 3114.8.5.2 (New), 3114.8.5.3 (New), 3114.8.5.3(1) (New), 3114.8.5.3(2) (New), 3114.8.5.3(4) (New), 3114.8.5.3(3) (New), 3114.8.5.3 (New), Chapter 35

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2018 International Building Code

Add new definition as follows:

INTERMODAL SHIPPING CONTAINER. A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

Revise as follows:

3101.1 Scope. The provisions of this chapter shall govern special building construction including *membrane structures*, temporary structures, *pedestrian walkways* and tunnels, automatic vehicular gates, awnings and *canopies*, marquees, signs, towers, antennas, relocatable buildings, swimming pool enclosures and safety devices, ~~and~~ solar energy ~~systems.~~systems and intermodal shipping containers.

Add new text as follows:

SECTION 3114
INTERMODAL SHIPPING CONTAINERS

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:
   - 4.1. Such units shall be single stand-alone units supported at grade level and used only for occupancies as specified under Risk Category I in Table 1604.5;.
   - 4.2. Such units are located a minimum of 8 feet from adjacent structures, and are not connected to a fuel gas system or fuel gas utility; and

4.3. In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16.

3114.2 Construction Documents. The construction documents shall contain information to verify the dimensions and establish the physical properties of the steel components, and wood floor components, of the intermodal shipping container in addition to the information required by Sections 107 and 1603.

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

1. Manufacturer's name or identification number
2. Date manufactured.
3. Safety approval number.
4. Identification number.
5. Maximum operating gross mass or weight (kg) (Lbs)
6. Allowable stacking load for 1.8G (kg) (lbs)
7. Transverse racking test force (Newtons)
8. Valid maintenance examination date

Where approved by the building official, the markings and existing data plateare permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3114.4 Protection against decay and termites. Wood structural floors of intermodal shipping containers shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3114.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any intermodal shipping container, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3114.6 Roof assemblies. Intermodal shipping container roof assemblies shall comply with the applicable requirements of Chapter 15.

Exception: Single-unit stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3114.7 Joints and voids. Joints and voids that create concealed spaces between intermodal shipping containers, that are connected or stacked, at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system in accordance with Section 715.

3114.8 Structural. Intermodal shipping containers which conform to ISO 1496-1 that are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16 and this section.

3114.8.1 Foundations. Intermodal shipping containers repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23 of this code.

Add new text as follows:

3114.8.1.1 Anchorage. Intermodal shipping containers shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental loads in accordance with Chapter 16.

3114.8.2 Welds. All new welds and connections shall be equal to or greater than the original connections.
3114.8.3 Structural design. The structural design for the intermodal shipping containers repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section 3114.8.4 or 3114.8.5.

3114.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the building official to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3114.8.5.

3114.8.4.1 Material properties. Structural material properties for existing intermodal shipping container steel components shall be established by material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.

3114.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials,
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

3114.8.4.3 Allowable shear value. The allowable shear values for the intermodal shipping container corrugated steel sheet panel side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

3114.8.5 Simplified structural design of single-unit containers. Single-unit intermodal shipping containers conforming to the limitations of Section 3114.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3114.8.5.

3114.8.5.1 Limitations. Use of Section 3114.8.5 is subject to all the following limitations:

1. The intermodal shipping container shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.
2. The intermodal shipping container top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.
3. The intermodal shipping container shall be erected in a level and horizontal position with the floor located at the bottom.
4. The intermodal shipping container shall be located in Seismic Design Category A, B, C or D.

3114.8.5.2 Simplified structural design. Where permitted by Section 3114.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the corrugated steel shear walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R=2,

3. **Overstrength factor, Ω0=2.5,**
4. Deflection amplification factor, Cd = 2, and
5. Limits on structural height, hn = 9.5 feet (2,900 mm).

3114.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and for seismic design using the coefficients of Section 3114.8.5.2 shall be in accordance with Table 3114.8.5.3 provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls, as shown in Figure 3114.8.5.3(1).
2. Any full height wall length, or portion thereof, less than 4 feet (305 mm) long shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3114.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3114.8.5.3(3).
4. Where openings are made in container walls, floors, or roofs for doors, windows and other openings:
   4.1. The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 22.
   4.2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than a 6-inch (152 mm) diameter hole for conduits, pipes, tubes or vents, or not greater than 16 square inches (10,322 sq mm) for electrical boxes, is permitted for each individual 8 foot length (2,438 mm) lateral force resisting wall. Penetrations located in walls that are not part of the wall lateral force resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).
6. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

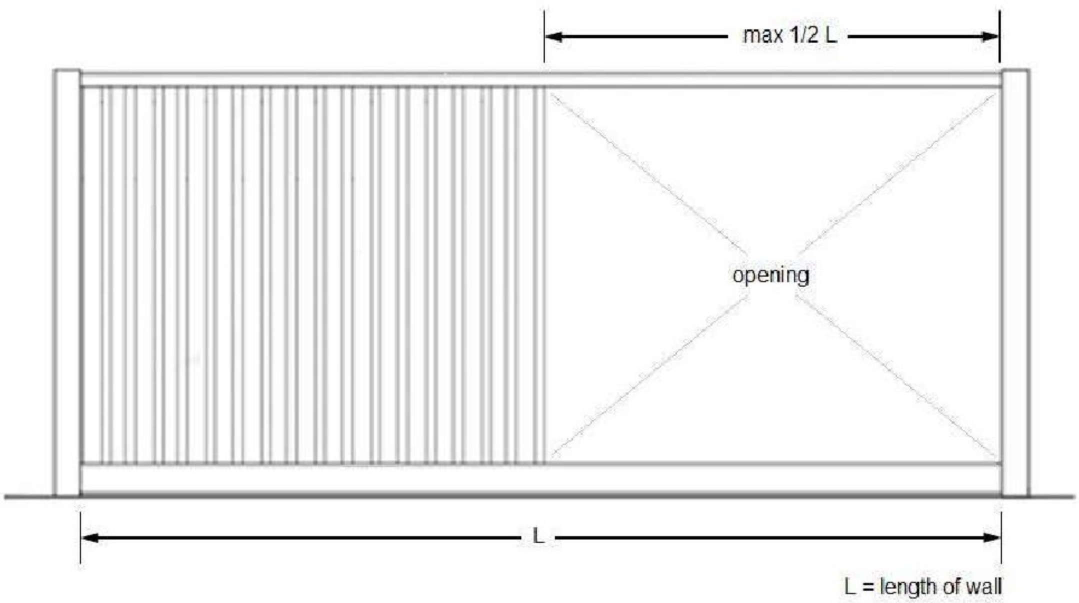


FIGURE 3114.8.5.3(1)
BRACING UNIT DISTRIBUTION--MAXIMUM LINEAR LENGTH

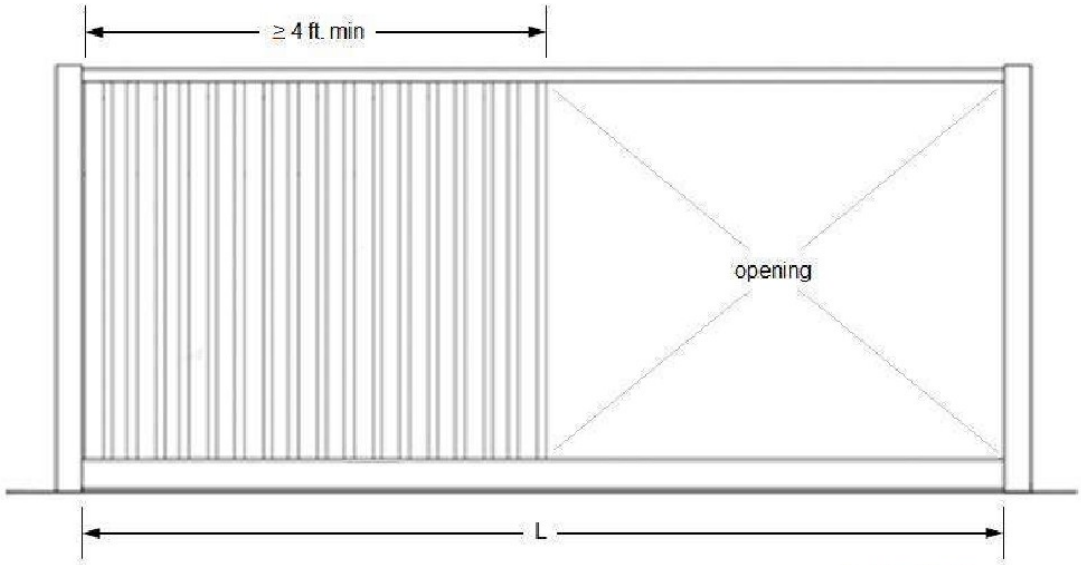


FIGURE 3114.8.5.3(2)
BRACING UNIT DISTRIBUTION -- MINIMUM LINEAR LENGTH

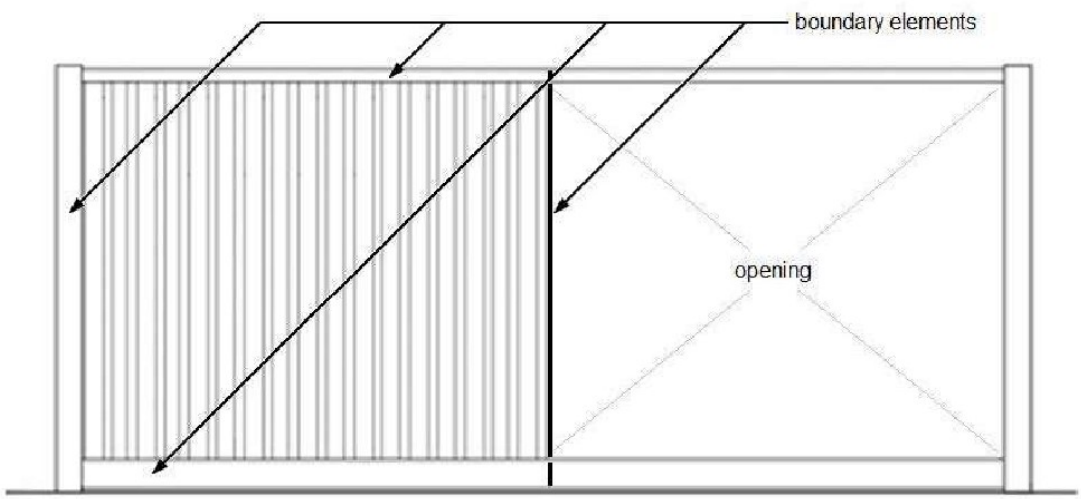


FIGURE 3114.8.5.3(3)
BRACING UNIT DISTRIBUTION -- BOUNDARY ELEMENTS

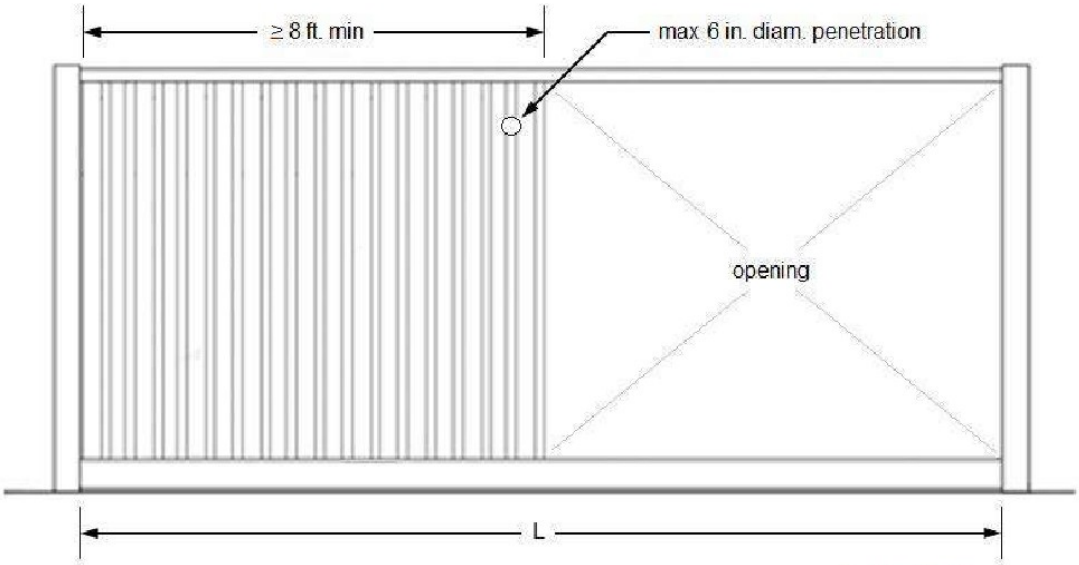


FIGURE 3114.8.5.3(4)
BRACING UNIT DISTRIBUTION -- PENETRATION LIMITATIONS

Add new text as follows:

TABLE 3114.8.5.3
ALLOWABLE STRENGTH VALUES FOR INTERMODAL SHIPPING CONTAINER CORRUGATED STEEL SIDING SHEAR WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	CONTAINER DIMENSION (Nominal Length)	CONTAINER DIMENSION (Nominal Height)	ALLOWABLE SHEAR VALUES (PLF)[a,c]	
			Side Wall	End Wall
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843
1EE		8.6 feet (2591 mm)		
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84	
1AA		8.5 feet (2592 mm)		
1A		8.0 feet (2438 mm)		
1AX		< 8.0 feet (2438 mm)		
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112	
1BB		8.5 feet (2591 mm)		
1B		8.0 feet (2438 mm)		
1BX		< 8.0 feet (2438 mm)		
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168	
1C		8.0 feet (2438 mm)		
1CX		< 8.0 feet (2438 mm)		
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337	
1DX		< 8.0 feet (2438 mm)		

a. The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
b. Container designation type is derived from ISO 668.
c. Limitations of Sections 3114.8.5.1 shall apply

Add new standard(s) follows:

ISO

ISO 668: 2013:	**Series 1 Freight Containers - Classifications, dimensions and ratings**
ISO 1496-1: 2013:	**Series 1 Freight Containers - Specification and Testing - Part 1: General Cargo Containers for General Purposes**
ISO 6346:	**1995, with Amendment 3: 2012: Freight Containers - Coding, Identification and marking**

Reason: This code change purpose is to introduce intermodal shipping containers into the International Building Code based on requests by code officials in the U.S. Prior to this proposal, several jurisdictions had created their own individual regulations or ordinances, or had administered additional requirements beyond the code (e.g. Section 104.11 "Alternative materials, design and methods of construction and equipment") so as to be comfortable to ensure a safe structure. This code change proposal is in response to those requests to develop a set of consistent code provisions which cover the minimum safety requirements, but which do not duplicate existing code provisions.

This proposal covers:

- Creation of a new definition in order to separate the container from other I-code sections which refer to, but intentionally do not define, shipping containers,
- Creating exceptions so to differentiate the intermodal shipping container from other code sections which could be interpreted as applying to intermodal shipping containers under other applications (e.g. temporary storage, relocatable buildings, energy storage facilities, and listed equipment),
- Verification of containers construction, condition, and structural integrity to assist the structural engineer in the evaluation for building construction,
- References to other sections concerning foundations, decay and termite control, crawlspace ventilation, roof assemblies, interior finishes, and joints/intersections.
- Introduction of structural provisions unique to intermodal shipping containers and which do not duplicate the existing structural requirements, and
- Addition of three ISO standards for reference.

Chapter 2 - New definition - A new definition has been created in order that these provisions can be adequately enforced and not confused the other multiple varieties of definitions of containers currently in the market.

Section 3114.1 – This represents the charging statement that outlines the requirements for containers, and list the appropriate exceptions with the I-codes in order to coordinate with other provisions that may appear similar in nature and where intermodal shipping containers could possibly be used in those other applications.

Section 3114.2 –Construction documents – These provision emphasize the material requirements as specified in this section.

Section 3114.3 – Verification - These provisions focus on the characteristics of the intermodal shipping container prior to it being repurposed. In this case the provisions require a straight forward inspection by an approved agency, and verification of the data plate which is normally found on intermodal shipping containers. There was an intent not to specify who the approved agency would be for two reasons; 1) so as to allow the code official or state law(s) to handle this aspect recognizing that in each jurisdiction their requirements may be different, and 2) to avoid dictating an international agreement onto jurisdictions that are currently employed by the shipping and container manufacturers worldwide today. In this case, the standards are regulated by the International Convention of Safe Containers (CSC) that have policies and procedures for inspecting containers worldwide. These procedures include policies for Approved Continuous Examination Program (ACEP) at the time the container is used in production, and policies for third party inspection agencies. The list shown in this section is a extract from the ISO standard and serves as a reference of items to be verified in order to validate the type of container.

3114.4 through 3114.6 – While we have strived to focus on only those provisions that recognize the unique aspects of intermodal shipping containers, we felt that some direction references were appropriate. In this case specific pointers are provided to foundations, decay and termite control, crawlspace ventilation, and roof requirements addressing drainage and weather protection.

3114.7 – Joints and voids – This provision is provided to address the interstitial spaces that may be created when multiple intermodal shipping containers are connected or stacked, whereby that concealed space between the containers is protected to prevent fire and hot gasses from passing between containers.

Section 3114.8 – Structural - The structural provisions are divided into multiple categories, as follows: 1) the general characteristics for all containers; 2) engineered structural design; and 3) simplified method for single-unit stand-alone container.

3114.8.1 – Foundations or supports – Provisions have been included to outline the two options for securing the container; a foundation or the connection to another structure. This provision makes it clear that the load path anchorage is required for all containers and to ensure the designed performance provided by the remainder of the structural provisions.

3114.8.2 – Welds – An additional provision has been added to require that any new welds be designed and installed with welds of greater structural capabilities.

Section 3114.8.4 – Detailed structural analysis - The detailed analysis engineering approach represents the general engineering practice allowed for all other types of building constructions. For this section the engineer of record is allowed to practice as they normally would for any other building type. As may be noted much of this section requires submission through the alternative means and methods provisions in order to obtain a permit as information about intermodal shipping containers is not readily listed in the IBC provisions or referenced standards.

Section 3114.8.5 – Simplified analysis - The concept for the single container approach is to make the design and construction process simpler. The provisions include a strict listing of limitations for use of these provisions. The proposal also provides structural

design information, and pre-established shear wall information that is contained in the ISO 1496-1 standard, which is used to design and construct intermodal shipping containers. The shear wall values were obtained from the ISO 1496-1 standard through engineering analysis using a factor of safety of 5. In addition, a provision was installed to limit the number and size of openings and service holes within the container, as well as to prevent building owners or designers from embellishing the size to something most engineers would define as an opening. This method is intended to address the simple structure approach and provide available information for use by the structural engineer to supplement their work.

Chapter 35 – Referenced Standards – Included with this proposal are three ISO standards which are relevant to the intermodal shipping container's construction. These standards are part of the industry standards regulated by the International Convention of Safe Containers (CSC) that have policies and procedures for inspecting containers worldwide.

BCAC - The International Code Council's Building Code Action Committee (BCAC) was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The ICC Building Code Action Committee created a task group to facilitate the development of this proposal. Members of the assigned task group included representatives from: City of Long Beach, CA; County of Mecklenburg, NC; Modular Building Institute; American Iron and Steel Institute; Underwriters Laboratories; and the Portland Cement Association. Additional contacts included the State of California (Division of State Architect, Housing and Community Development), City of San Diego; City of Los Angeles, CA; City of Seattle; Clark County, NV; Falcon Structures, RADCO a Twining Company, SEABOX Company, FEMA ATC Seismic Code Support Committee, and other guests who provided their individual expertise.

Cost Impact:

The code change proposal will decrease the cost of construction

The code change proposal will decrease the cost of construction. This new code section will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

Analysis: A review of the standards proposed for inclusion in the code, ISO 668, ISO 1496-1 and ISO 6346, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Report of Committee Action Hearings

Errata: This proposal includes published errata
The proposed table has been corrected.

Committee Action: **Approved as Modified**

Committee Modification:

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
4. Intermodal shipping containers used as experimental equipment or apparatuses.

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

1. Manufacturer's name or identification number
2. Date manufactured.
3. Safety approval number.
4. Identification number.
5. Maximum operating gross mass or weight (kg) (Lbs)
6. Allowable stacking load for 1.8G (kg) (lbs)
7. Transverse racking test force (Newtons)
8. Valid maintenance examination date

Where approved by the building official, the markings and existing data are permitted to be removed from the intermodal shipping

containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3114.8.4.2 Seismic design parameters. ~~The appropriate detailing requirements of ASCE 7; response modification coefficient, R; overstrength factor; deflection amplification factor, Cd; and limits on structural height, hn, for the corrugated shear wall is permitted to be developed in accordance with generally accepted procedures where approved by the building official in accordance with Section 104.11.~~ The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

3114.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and for seismic design using the coefficients of Section 3114.8.5.2 shall be ~~permitted to have the allowable shear values set forth in~~ in accordance with Table 3114.8.5.3 provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls, as shown in Figure 3114.8.5.3(1).
2. Any full height wall length, or portion thereof, less than 4 feet (305 mm) long shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3114.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3114.8.5.3(3).
4. Where openings are made in container walls, floors, or roofs for doors, windows and other openings: 4.1. The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 4.2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than a 6-inch (152 mm) diameter hole for conduits, pipes, tubes or vents, or not greater than 16 square inches (10,322 sq mm) for electrical boxes, is permitted for each individual 8 foot length (2,438 mm) lateral force resisting wall. Penetrations located in walls that are not part of the wall lateral force resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).
6. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE 3114.8.5.3
ALLOWABLE ~~STRENGTH~~ SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER CORRUGATED STEEL SIDING SHEAR WALLS FOR WIND OR SEISMIC LOADING

(No changes to body of table)

a. The allowable ~~strength~~ shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
b. Container designation type is derived from ISO 668.
c. Limitations of Sections 3114.8.5.1 shall apply

(Portions of proposal not shown are not modified)

Committee Reason: The modifications add clarifications that will help the approval process go smoothly, but the committee would like to see a public comment to change the term "corrugated" container to "intermodal" container to be consistent with other language in the proposal. Other discrepancies in the modifications are minor and could also be cleaned up in the public comment process. The proposal addresses a need for guidance regarding the approval of intermodal shipping containers in the context of the building code. (Vote: 14-0)

Assembly Action: None

Public Comments

Public Comment 1:

Ed Kullik, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2018 International Building Code

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:
   4.1. Such units shall be single stand-alone units supported at grade level and used as experimental equipment or apparatuses, only for occupancies as specified under Risk Category I in Table 1604.5;
   4.2. Such units are located a minimum of 8 feet from adjacent structures, and are not connected to a fuel gas system or fuel gas utility; and
   4.3. .In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16

Commenter's Reason: Without scoping limits, this exception could permit varying uses and locations in which the container could pose substantial earthquake safety hazard to surrounding structures and persons. This could include containers located in or on structures, where container shifting could damage the structure, or fall and injure persons in the vicinity. This could also include fire hazard if a container shifts and gas lines are damaged.

This safety concern is addressed by the public comment language which provides scoping limits defining conditions under which risk is minimal such that regulation of the structural design and anchorage is not needed. The proposed language addresses:

- Occupancies that represent low risk to human life,
- Supported at grade where the risk of damage or injury due to falling is minimal,
- Eight foot distance to surrounding structures provides a zone for container shifting without causing damage to other structures,
- Prohibition of fuel gas intends to avoid fire ignition hazards should the container shift under seismic or wind loading,
- For hurricane prone and flood hazard areas, Chapter 16 will trigger requirements to reduce hazard.

These are believed to be scoping limits that can be readily screened for, permitting true low-hazard uses to occur with minimal regulation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The resulting new provisions will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

Public Comment 2:

Ed Kullik, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2018 International Building Code

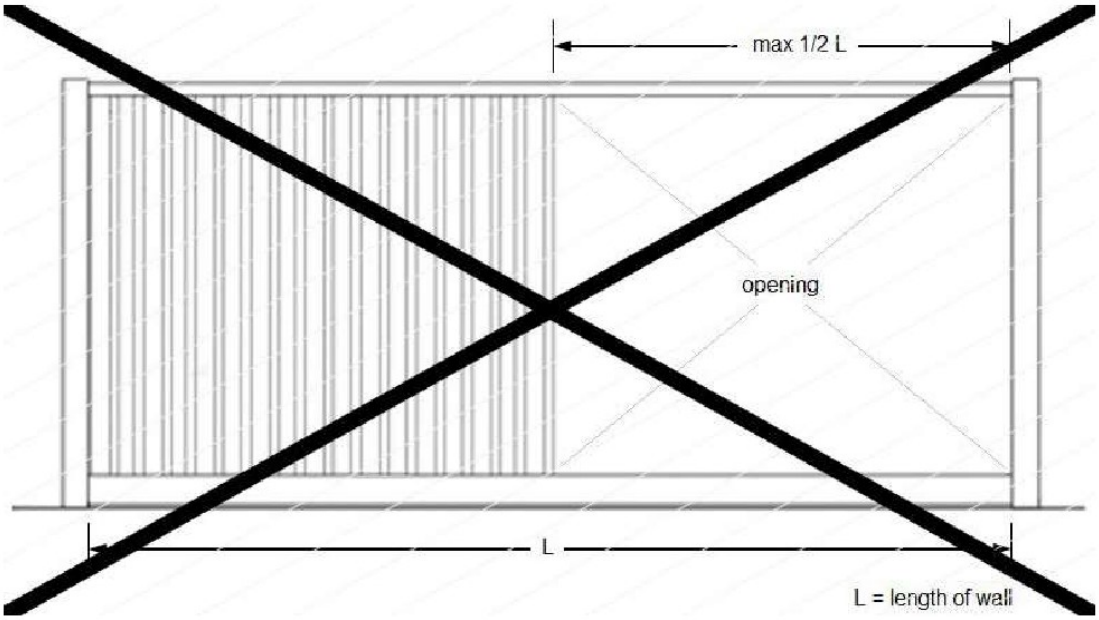
TABLE 3114.8.5.3
ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER CORRUGATED STEEL ~~SIDING SHEAR~~ WALLS FOR WIND OR SEISMIC LOADING

CONTAINER DESIGNATION[b]	**CONTAINER DIMENSION (Nominal Length)**	**CONTAINER DIMENSION (Nominal Height)**	**ALLOWABLE SHEAR VALUES (PLF)[a, c]**		
			Side Wall	End Wall	
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843	
1EE		8.6 feet (2591 mm)			
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84		
1AA		8.5 feet (2592 mm)			
1A		8.0 feet (2438 mm)			
1AX					
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112		
1BB		8.5 feet (2591 mm)			
1B		8.0 feet (2438 mm)			
1BX					
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168		
1C		8.0 feet (2438 mm)			
1CX					
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337		
1DX					

a. The allowable shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
b. Container designation type is derived from ISO 668.
c. Limitations of Sections 3114.8.5.1 shall apply

3114.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials,
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.



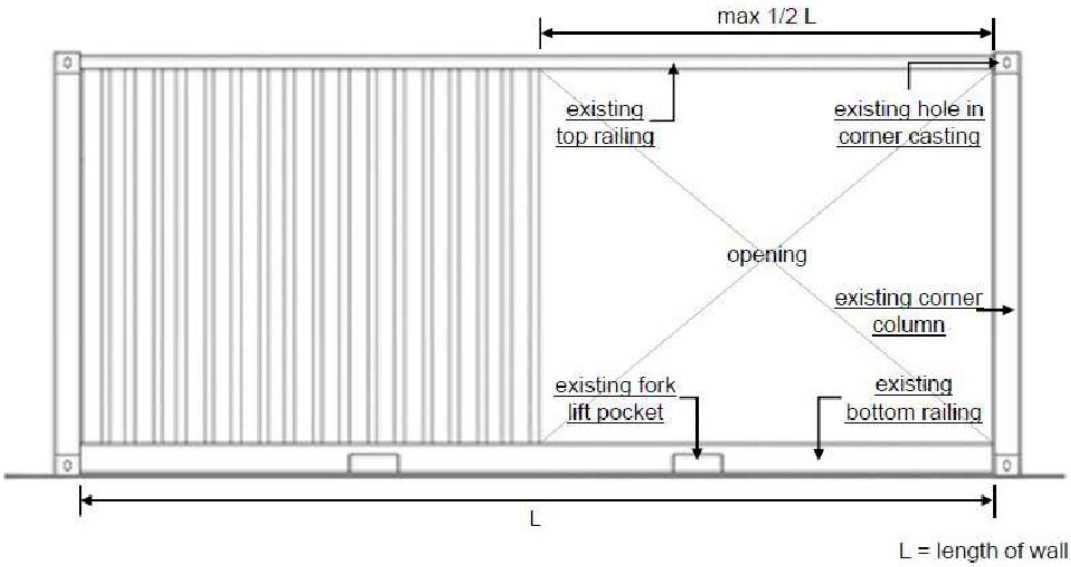
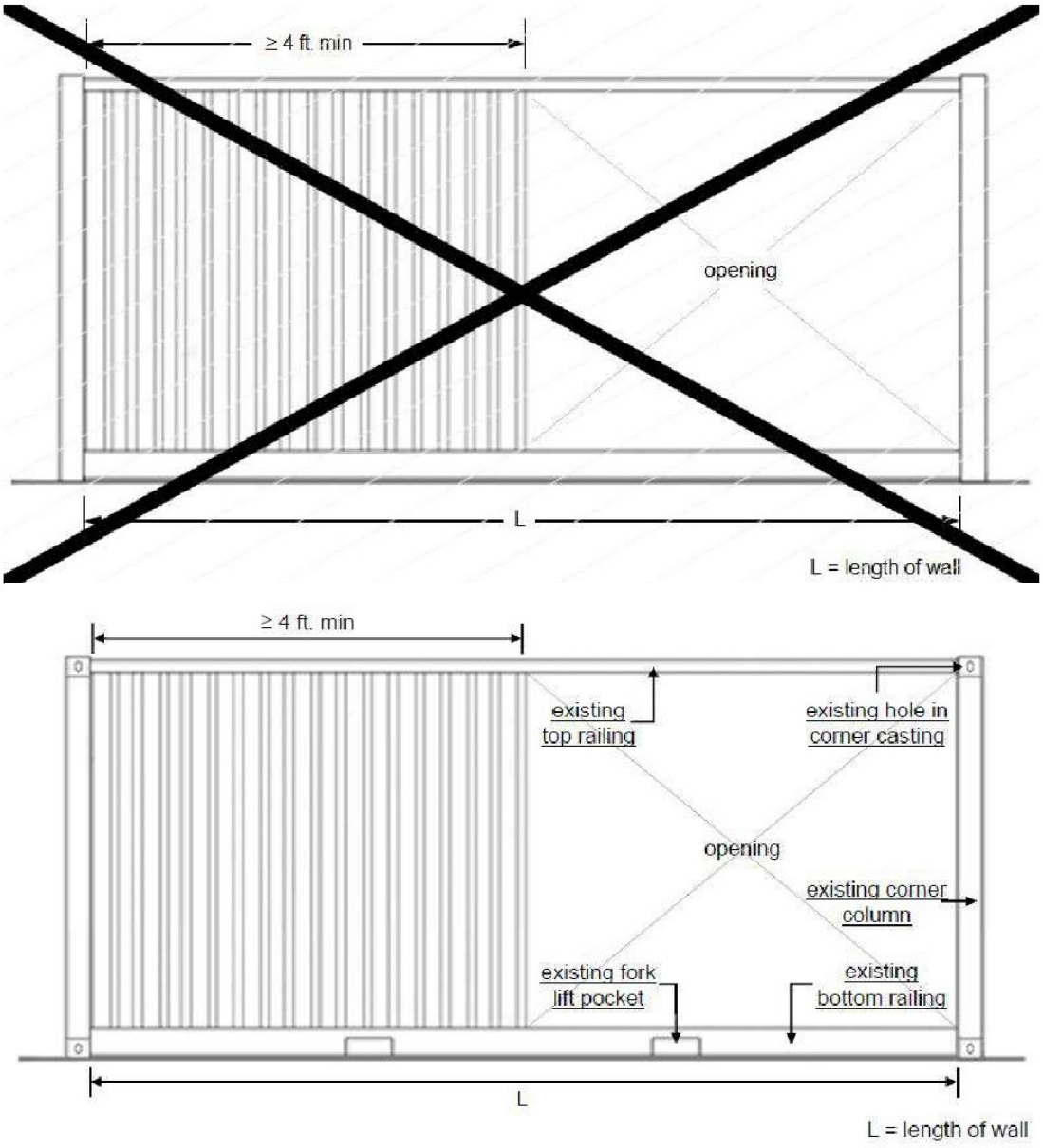
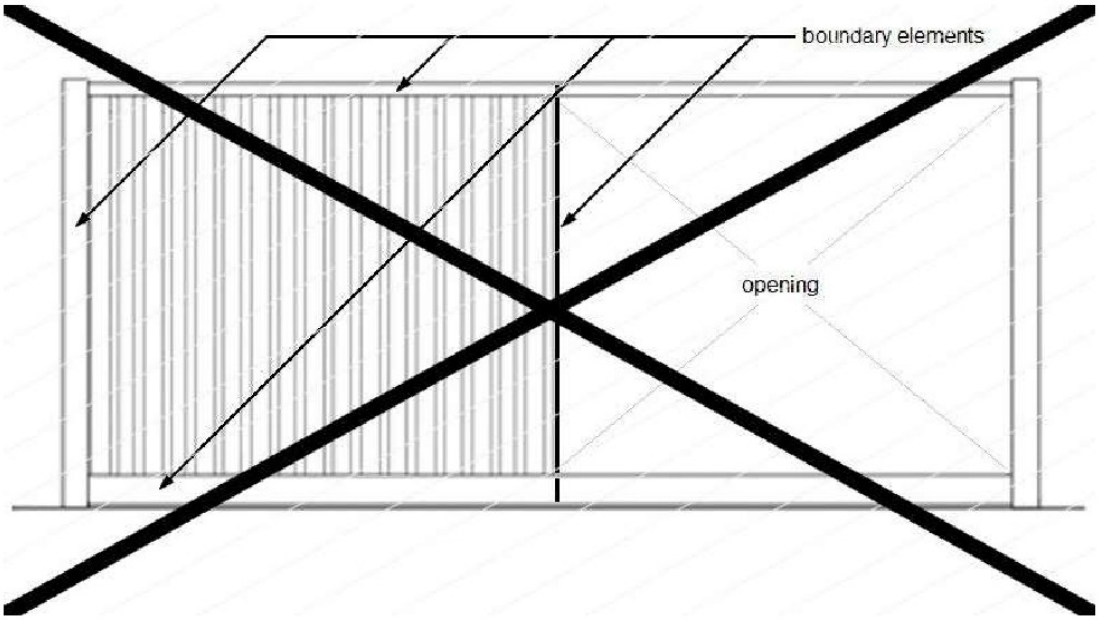


FIGURE 3114.8.5.3(1)
BRACING UNIT DISTRIBUTION–MAXIMUM LINEAR LENGTH



3114.8.5.3(2)
Bracing Unit Distribution -- Minimum Linear Length



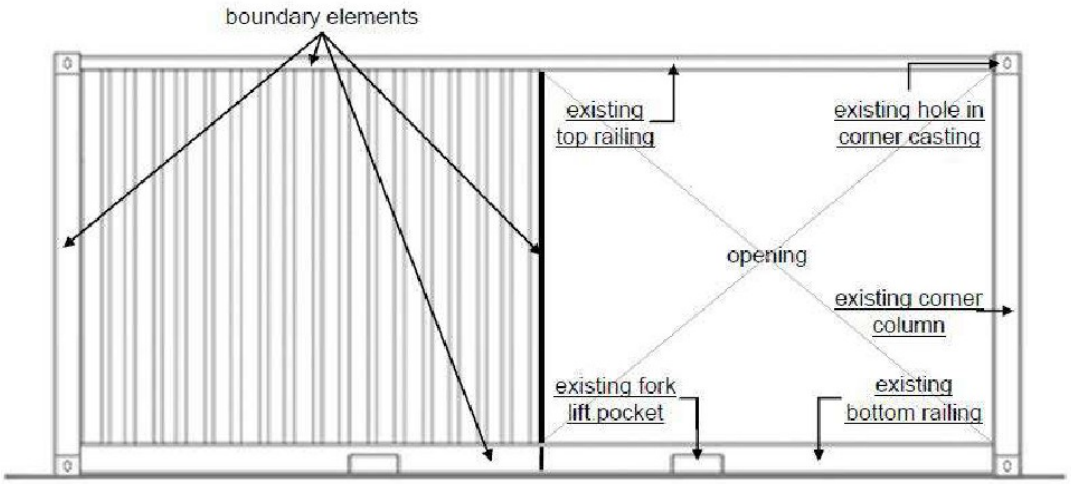
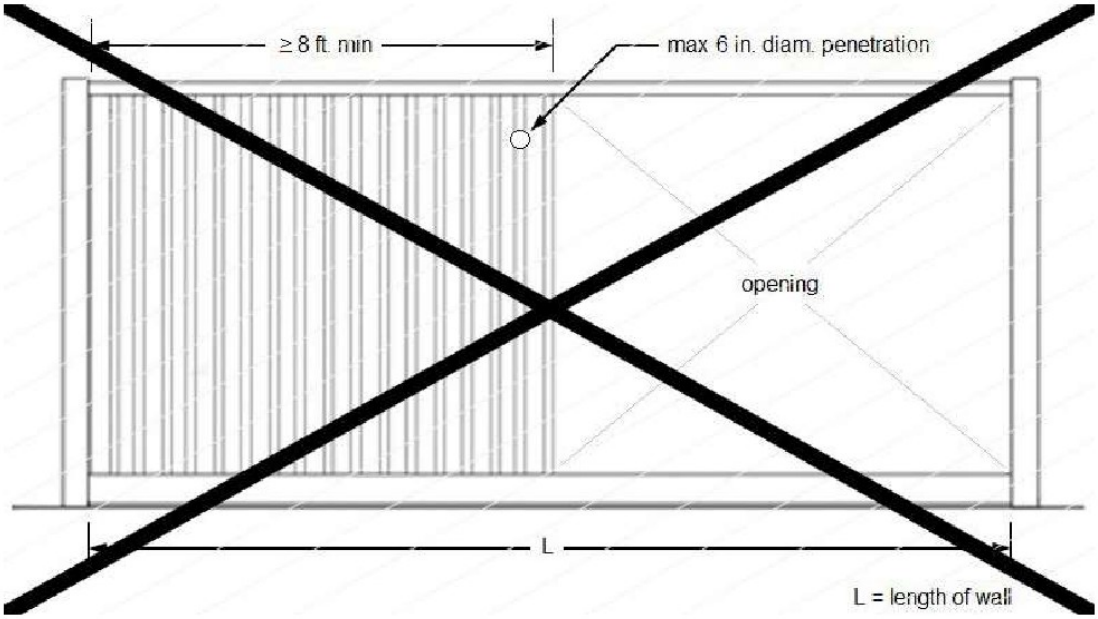


FIGURE 3114.8.5.3(3)
BRACING UNIT DISTRIBUTION -- BOUNDARY ELEMENTS



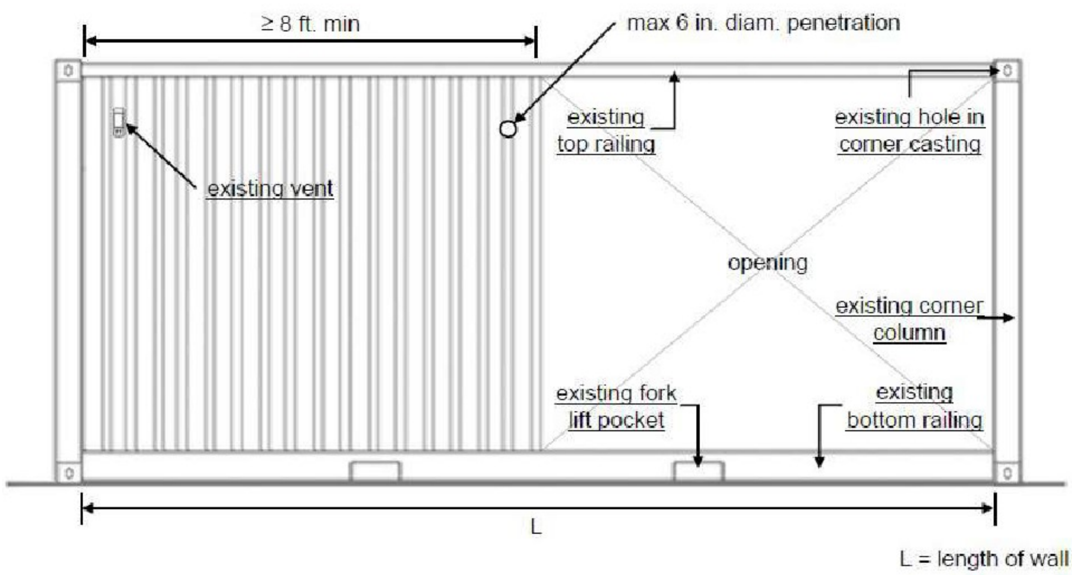


FIGURE 3114.8.5.3(4)
BRACING UNIT DISTRIBUTION – PENETRATION LIMITATIONS

Commenter's Reason: Section 3114.8.4.2 – This is an editorial correction in order to cite the correct section number.

Table 3114.8.5.3 title - This represents a change to heading to delete "siding shear". The change is based on public testimony and comments received during the committee action hearing to keep terms consistent throughout the code change proposal.

Figures 3114.8.5.3 (1) through (4) – It was brought to our attention that it may be beneficial to identify parts of the intermodal shipping container more clearly rather than use a simple line drawing figure. This is for the benefit of the user to more readily recognize existing conditions versus the permissible cut-aways as allowed by Section 3114.8.5.3. In response we are proposing to add identifying text (the rails, lift slots, and holes) to illustrate those existing elements that are part of the manufacture of intermodal shipping containers.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The resulting new provisions will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

Final Action

G151-18	**AMPC1, 2**

R9124/ADM47-16

36

Date Submitted	2/18/2021	**Section**	101	**Proponent**	Mo Madani
Chapter	35	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

Standards update as applicable to all sub-codes.

Summary of Modification

Updates Referenced standards

Rationale

The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2018, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standards developers.

Comment Period History

R9124-G1

Proponent Joseph Belcher **Submitted** 7/1/2021 **Attachments** No

Comment:

The Florida Home Builders Association (FHBA) joins the Leading Builders of America in requesting denial of the NEC 2020 Article 210.8(F) adopted by this proposed code change. Specifically, the requirement for GFCI on outdoor outlets [Article 210.8(F)] is leading to the shutdown of HVAC systems in many locations that have adopted the NEC 2020. Numerous occurrences of field tripping of the GFCI breaker on ductless mini splits, units containing power conversion equipment, and many single-stage units have been reported. Due to this issue, ten states (WA, OR, CO, ND, SD, MN, IA, TX, GA, MA) have already taken steps to delete, modify or delay enforcement of the requirement. Another six states (UT, NC, WV, CT, NH, ME) all plan to adopt the 2020 NEC with modifications to section 210.8(F). This issue poses a serious health risk to Floridians. We are open to resolving the issue with modifications if an interested party submits a change during Phase II.

R9124 Text Modification

Please see attachment

Code Change No: ADM47-16

Original Proposal

The following table provides a comprehensive list of all standards that the respective standards promulgators have indicated have been, or will be, updated from the listing in the 2018 Editions of the International Codes. According to Section 4.5.1 of ICC Council Policy #CP 28, Code Development Policy, the updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee. Therefore, referenced standards that are to beupdated for the 2020 edition of any of the I-Codes are listed in this single code change proposal. Note that the table below indicates the change to the standard, and the code or codes in which each standard appears. The list includes standards that the promulgators have already updated or will have updated by December 1, 2020.

AA — Aluminum Association

Standard Reference Number	Title	Referenced In Code(s):	
~~ADM1—2015~~ ADM1—2020	Aluminum Design Manual: Part ~~1—A Specification~~ 1—Specification for Aluminum Structures	IBC®	

AAMA — American Architectural Manufacturers Association

Standard Reference Number	Title	Referenced in Code(s):	
~~711—16~~ 711—20	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IBC®	IRC®
~~714—15~~ 714—20	Voluntary Specification for Liquid Applied Flashing Used to Create a Water-resistive Seal around Exterior Wall Openings in Buildings	IBC®	IRC®

ACI — American Concrete Institute

Standard Reference Number	Title	Referenced in Code(s):	
~~318—14~~ 318—19	Building Code Requirements for Structural Concrete	IBC®	IRC®

AISI — American Iron and Steel Institute

Standard Reference Number	Title	Referenced in Code(s):	
AISI S100—16/S1-18	North American Specification for the Design of Cold-formed Steel Structural Members, 2016, with Supplement 1, dated 2018	IBC®	IRC®
AISI ~~S202—15~~ S202—20	Code of Standard Practice for Cold-formed Steel Structural Framing, ~~2015~~ 2020	IBC®	
AISI ~~S220—15~~ S220—20	North American Standard for Cold-formed Steel Framing—Nonstructural Members, ~~2015~~ 2020	IBC®	IRC®
AISI ~~S230—15~~ S230—18	Standard for Cold-formed Steel Framing—Prescriptive Method for One- and Two-family Dwellings, ~~2015~~ 2018	IBC®	IRC®
AISI ~~S240—15~~ S240—20	North American Standard for Cold-Formed Steel Structuring Framing, ~~2015~~ 2020	IBC®	IRC®
AISI ~~S400—15/S1—16~~ S400—20	North American Standard for Seismic Design of Cold-formed Steel Structural Systems, ~~2015, with Supplement 1, dated 2016;~~ 2020	IBC®	

ANSI — American National Standards Institute

Standard Reference Number	Title	Referenced in Code(s):	
~~A13.1—2015~~ A13.1—2020	Scheme for the Identification of Piping Systems	IBC®	IFC®
~~A108.1A—16~~ A108.1A—17	Installation of Ceramic Tile in the Wet-set Method, with Portland Cement Mortar	IBC®	IRC®
~~A108.1B—99~~ A108.1B—17	Installation of Ceramic Tile, Quarry Tile on a Cured Portland Cement Mortar Setting Bed with Dry-set or Latex-Portland Mortar	IBC®	IRC®
~~A108.4—99~~ A108.4—09	Installation of Ceramic Tile with Organic Adhesives or Water-cleanable Tile-setting Epoxy Adhesive	IBC®	IRC®

~~A108.5—99~~ A108.5—19	Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar	IBC®	IRC®
~~A108.6—99~~ A108.6—19	Installation of Ceramic Tile with Chemical-resistant, Water Cleanable Tile-setting and -grouting Epoxy	IBC®	IRC®
~~A108.8—99~~ A108.8—19	Installation of Ceramic Tile with Chemical-resistant Furan Resin Mortar and Grout	IBC®	
~~A108.9—99~~ A108.9—19	Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout	IBC®	
~~A108.10—99~~ A108.10—17	Installation of Grout in Tilework	IBC®	
~~A118.1—16~~ A118.1—18	American National Standard Specifications for Dry-set Portland Cement Mortar	IBC®	IRC®
~~A118.3—13~~ A118.3—20	American National Standard Specifications for Chemical-resistant, Water-cleanable Tile-setting and -grouting Epoxy and Water Cleanable Tile-setting Epoxy Adhesive	IBC®	IRC®
~~A118.4—16~~ A118.4—18	American National Standard Specifications for Modified Dry-set Cement Mortar	IBC®	IRC®
~~A118.6—18~~ A118.6—19	American National Standard Specifications for Cement Grouts for Tile Installation	IBC®	
~~A136.1—08~~ A136.1—19	American National Standard Specifications for the Installation of Ceramic Tile	IBC®	IRC®
~~A137.1—17~~ A137.1—19	American National Standard Specifications for Ceramic Tile	IBC®	IRC®

APA — APA - Engineered Wood Association

Standard Reference Number	Title	Referenced In Code(s):
ANSI ~~117—15~~ 117—2020	Standard Specification for Structural Glued Laminated Timber of Softwood Species	IBC®
ANSI/APA ~~A190.1—17~~ A190.1—2017	Structural Glued Laminated Timber	IBC®
ANSI/APA PRP ~~210—14~~ 210—2019	Standard for Performance-Rated Engineered Wood Siding	IBC®
APA ~~PDS—12~~ PDS—20	Panel Design Specification	IBC®
ANSI/APA PRG ~~320—17~~ 320—2019	Standard for Performance-rated Cross-laminated Timber	IBC®
APA ~~R540—13~~ R540—19	~~Builders~~ Builder Tips: Proper Storage and Handling of Glulam Beams	IBC®
APA ~~S475—16~~ S475—20	Glued Laminated Beam Design Tables	IBC®
APA ~~S560—14~~ S560—20	Field Notching and Drilling of Glued Laminated Timber Beams	IBC®
APA ~~X450—01~~ X450—18	Glulam in Residential ~~Construction—Western Edition~~ Building—Construction Guide	IBC®

ASABE — American Society of Agricultural and Biological Engineers

Standard Reference Number	Title	Referenced In Code(s):
EP 484.3 ~~MON2016~~ DEC2017	Diaphragm Design of Metal-clad, Wood-frame Rectangular Buildings	IBC®
EP ~~486.2 OCT 2012ED~~ 486.3 SEP2017	Shallow-post and Pier Foundation Design	IBC®
EP ~~559.2 MON2016~~ 559.1 W/Corr. AUG2010 (R2014)	Design Requirements and Bending Properties for Mechanically Laminated Wood Assemblies	IBC®

ASCE/SEI — American Society of Civil EngineersStructural Engineering Institute

Standard Reference Number	Title	Referenced in Code(s):	
7—16 with Supplement 1	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	IBC® IRC®	IEBC®

~~84—14~~ 24—20	Flood Resistant Design and Construction	IBC®	IRC®
~~29—17~~ 29—19	Standard Calculation Methods for Structural Fire Protection	IBC®	
~~49—07~~ 49—12	Wind Tunnel Testing for Buildings and Other Structures	IBC®	

ASME — American Society of Mechanical Engineers

Standard Reference Number	Title	Referenced in Code(s):	
ASME/~~A17.1—2016~~ A17.1—2019/CSA ~~B44—16~~ B44—19	Safety Code for Elevators and Escalators	IBC®	
A17.7—2007/CSA B44—07(~~R2012~~ R2019)	Performance-based Safety Code for Elevators and Escalators	IBC®	
~~A18.1—2014~~ A18.1—2020	Safety Standard for Platform Lifts and Stairway Chairlifts	IBC® IRC®	IEBC®
~~A90.1—2015~~ A90.1—2020	Safety Standard for Belt Manlifts	IBC®	
~~B16.18—2012~~ B16.18—2018	Cast Copper Alloy Solder Joint Pressure Fittings	IBC® IMC® IRC®	IFC® IPC®
~~B16.22—2013~~ B16.22—2018	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings	IBC® IMC® IRC®	IFC® IPC®
~~B20.1—2015~~ B20.1—2021	Safety Standard for Conveyors and Related Equipment	IBC®	
~~B31.3—2016~~ B31.3—2020	Process Piping	IBC® IFGC®	IFC®

ASSE — American Society of Safety Engineers

Standard Reference Number	Title	Referenced In Code(s):	
ANSI/~~ASSE Z359.1—2016~~ ASSP Z359.1—2019	~~Requirements for the ANSI/ASSE Z359~~ The Fall Protection Code	IBC® IMC®	IFC®

ASTM — ASTM International

Standard Reference Number	Title	Referenced in Code(s):	
A6/~~A6M—14~~ A6M—2017A	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling	IBC®	
A153/~~A153M—09~~ A153M—2016A	Specification for Zinc Coating (Hot-dip) on Iron and Steel Hardware	IBC®	IRC®
A240/~~A240M—15a~~ A240M—17	Standard Specification for Chromium and Chromium-nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications	IBC® ISPSC®	IRC®
~~A252—10~~ A252—2010(2018)	Specification for Welded and Seamless Steel Pipe Piles	IBC®	
A283/~~A283M—13~~ A283M—2018	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates	IBC®	
A416/~~A416M—15~~ A416M—2017A	Specification for Steel Strand, Uncoated Seven-wire for Prestressed Concrete	IBC®	
A572/~~A572M—15~~ A572M—2018	Specification for High-strength Low-alloy Columbium-Vanadium Structural Steel	IBC®	
A653/~~A653M—15~~ A653M—2017	Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process	IBC®	IRC®

A690/A690M—13a(2018)	Standard Specification for High-strength Low-alloy Nickel, Copper, Phosphorus Steel H-piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments	IBC®	
~~A706/A706M—15~~ A706M—2016	Specification for Low-alloy Steel Deformed and Plain Bars for Concrete Reinforcement	IBC®	IRC®
~~A722/A722M—15~~ A722M—2018	Specification for High-strength Steel Bars for Prestressed Concrete	IBC®	
~~A755/A755M—15~~ A755M—2016E1	Specification for Steel Sheet, Metallic-coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC®	
~~A924/A924M—14~~ A924M—2017A	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IBC®	IRC®
~~B88—14~~ B88—2016	Specification for Seamless Copper Water Tube	IBC® IFGC® IPC® IRC®	IFC® IMC® IPSDC® ISPSC®
~~B251—10~~ B251/B251M—2017	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube	IBC® IMC® IPSDC®	IFC® IPC® IRC®
~~B280—13~~ B280—2018	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	IBC® IFGC®	IFC® IMC®
~~B695—04~~ B695—2004(~~2009~~ 2016)	Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel Strip for Building Construction	IBC®	IRC®
~~C5—18~~ C5—2018	Specification for Quicklime for Structural Purposes	IBC®	IRC®
~~C27—98~~ C27—1998(~~2013~~ 2018)	Specification for Classification of Fireclay and High-alumina Refractory Brick	IBC®	IRC®
C31/~~C31M—15~~ C31M—2018B	Practice for Making and Curing Concrete Test Specimens in the Field	IBC®	
C33/~~C33M—13~~ C33M—2018	Specification for Concrete Aggregates	IBC®	IRC®
~~C55—2014e~~ C55—2017	Specification for Concrete Building Brick	IBC®	IRC®
~~C62—13a~~ C62—2017	Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C67—14~~ C67/C67M—2018	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC®	
~~C73—14~~ C73—2017	Specification for Calcium Silicate Brick (Sand-lime Brick)	IBC®	IRC®
~~C90—14~~ C90—2016A	Specification for Loadbearing Concrete Masonry Units	IBC® IRC®	IECC
C91/~~C91M—12~~ C91M—2018	Specification for Masonry Cement	IBC®	IRC®
C94/~~C94M—15a~~ C94M—2017A	Specification for Ready-mixed Concrete	IBC® IRC®	IEBC®
C140/~~C140M—15~~ C140M—2018	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC®	
C150/~~C150M—15~~ C150M—2018	Specification for Portland Cement	IBC®	IRC®
C172/~~C172M—14a~~ C172M—2017	Practice for Sampling Freshly Mixed Concrete	IBC®	
~~C199—84~~ C199—1984(~~2011~~ 2016)	Test Method for Pier Test for Refractory Mortars	IBC®	IRC®
~~C208—12~~ C208—2012(2017)E1	Specification for Cellulosic Fiber Insulating Board	IBC®	IRC®
~~C216—15~~ C216—2017A	Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C315—07~~ C315—2007(~~2011~~ 2016)	Specification for Clay Flue Liners and Chimney Pots	IBC® IMC®	IFGC® IRC®

C317/~~C317M—00~~ C317M—2000(2015)	Specification for Gypsum Concrete	IBC®	
C330/~~C330M—14~~ C330M—2017A	Specification for Lightweight Aggregates for Structural Concrete	IBC®	
C331/~~C331M—14~~ C331M—2017	Specification for Lightweight Aggregates for Concrete Masonry Units	IBC®	
~~C473—15~~ C473—2017	Test Methods for Physical Testing of Gypsum Panel Products	IBC®	
C475/~~C475M—15~~ C475M—2017	Specification for Joint Compound and Joint Tape for Finishing Gypsum Board	IBC®	IRC®
~~C516—08~~ C516—2008(~~2014~~ 2013)~~e1~~ E1	Specifications for Vermiculite Loose Fill Thermal Insulation	IBC®	
~~C547—15~~ C547—2017	Specification for Mineral Fiber Pipe Insulation	IBC®	
C549—06(2012)	Specification for Perlite Loose Fill Insulation	IBC®	
~~C552—15~~ C552—2017E1	Standard Specification for Cellular Glass Thermal Insulation	IBC®	IRC®
~~C557—03~~ C557—2003(~~2009~~ 2017)~~e01~~	Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing	IBC®	IRC®
~~C578—15~~ C578—2018	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC®	IRC®
~~C587—04~~ C587—2004(~~2014~~ 2018)	Specification for Gypsum Veneer Plaster	IBC®	IRC®
C595/~~C595M—14e1~~ C595M—2018	Specification for Blended Hydraulic Cements	IBC®	IRC®
C635/~~C635M—13a~~ C635M—2017	Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings	IBC®	
~~C652—15~~ C652—2017A	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C726—12~~ C726—2017	Standard Specification for Mineral Wool Roof Insulation Board	IBC®	IRC®
~~C728—15~~ C728—2017A	Standard Specification for Perlite Thermal Insulation Board	IBC®	IRC®
~~C744—14~~ C744—2016	Specification for Prefaced Concrete and Calcium Silicate Masonry Units	IBC®	IRC®
~~C754—15~~ C754—2018	Specification for Installation of Steel Framing Members to Receive Screw-attached Gypsum Panel Products	IBC®	
C836/~~C836M—15~~ C836M—2018	Specification for High-solids Content, Cold Liquid-applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course	IBC®	IRC®
~~C840—13~~ C840—2018A	Specification for Application and Finishing of Gypsum Board	IBC®	
~~C841—03~~ C841—2003(~~2013~~ 2018)	Specification for Installation of Interior Lathing and Furring	IBC®	IRC®
~~C843—99(2012)~~ C843—2017	Specification for Application of Gypsum Veneer Plaster	IBC®	IRC®
~~C847—14a~~ C847—2018	Specification for Metal Lath	IBC®	IRC®
~~C920—14a~~ C920—2018	Standard for Specification for Elastomeric Joint Sealants	IBC®	IRC®
~~C926—15b~~ C926—2018B	Specification for Application of Portland Cement-based Plaster	IBC®	IRC®
~~C933—14~~ C933—2018	Specification for Welded Wire Lath	IBC®	IRC®
~~C946—10~~ C946—2018	Specification for Construction of Dry-stacked, Surface-bonded Walls	IBC®	IRC®
~~C954—15~~ C954—2018	Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch (0.84 mm) to 0.112 inch (2.84 mm) in Thickness	IBC®	IRC®
C957/~~C957M—15~~ C957M—2017	Specification for High-solids Content, Cold Liquid-applied Elastomeric Waterproofing Membrane with Integral Wearing Surface	IBC®	IRC®
~~C1002—14~~ C1002—2018	Specification for Steel Self-piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	IBC®	IRC®
~~C1032—14~~ C1032—2018	Specification for Woven Wire Plaster Base	IBC®	IRC®
~~C1047—14a~~ C1047—2018	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IBC®	IRC®
	Specification for Installation of Lathing and Furring to Receive Interior and Exterior		

~~C1063—15a~~ C1063—2018B	Portland Cement-based Plaster	IBC®	IRC®
~~C1088—14~~ C1088—2018	Specification for Thin Veneer Brick Units Made from Clay or Shale	IBC®	IRC®
C1157/~~C1157M—11~~ C1157M—2017	Standard Performance Specification for Hydraulic Cement	IBC®	
~~C1167—11~~ C1167—2011(2017)	Specification for Clay Roof Tiles	IBC®	IRC®
C1177/~~C1177M—13~~ C1177M—2017	Specification for Glass Mat Gypsum Substrate for Use as Sheathing	IBC®	IRC®
C1178/~~C1178M—13~~ C1178M—2018	Specification for Coated Mat Water-resistant Gypsum Backing Panel	IBC®	IRC®
~~C1186—08~~ C1186—2008(~~2012~~ 2016)	Specification for Flat Fiber Cement Sheets	IBC®	IRC®
~~C1261—13~~ C1261—2013(2017)E1	Specification for Firebox Brick for Residential Fireplaces	IBC®	IRC®
C1278/~~C1278M—07a(2011)~~ C1278M—2017	Specification for Fiber-reinforced Gypsum Panel	IBC®	IRC®
~~C1283—11~~ C1283—2015	Practice for Installing Clay Flue Lining	IBC®	IRC®
~~C1288—14~~ C1288—2017	Standard Specification for Discrete Nonasbestos Fiber-cement Interior Substrate Sheets	IBC®	IRC®
~~C1289—15~~ C1289—2018	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC®	IRC®
~~C1325—14~~ C1325—2018	Standard Specification for Nonasbestos Fiber-mat Reinforced Cement Backer Units	IBC®	IRC®
~~C1364—18B~~ C1364—2017	Standard Specification for Architectural Cast Stone	IBC®	IRC®
C1396/~~C1396M—14a~~ C1396M—2017	Specification for Gypsum Board	IBC®	
~~C1492—03~~ C1492—2003(~~2009~~ 2016)	Standard Specification for Concrete Roof Tile	IBC®	IRC®
C1600/~~C1600M—11~~ C1600M—2017	Standard Specification for Rapid Hardening Hydraulic Cement	IBC®	
C1629/~~C1629M—15~~ C1629M—2018A	Standard Classification for Abuse-resistant Nondecorated Interior Gypsum Panel Products and Fiber-reinforced Cement Panels	IBC®	
C1658/~~C1658M—13~~ C1658M—2018	Standard Specification for Glass Mat Gypsum Panels	IBC®	IRC®
~~C1670—16~~ C1670/C1670M—2018	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IBC®	
~~C1766—13~~ C1766—2015	Standard Specification for Factory-laminated Gypsum Panel Products	IBC®	IRC®
~~D25—12~~ D25—2012(2017)	Specification for Round Timber Piles	IBC®	
D41/~~D41M—11~~ D41M—2011(2016)	Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing	IBC®	
D43/~~D43M—00~~ D43M—2000(~~2012~~ 2018)~~e1~~	Specification for Coal Tar Primer Used in Roofing, Dampproofing and Waterproofing	IBC®	
~~D56—05(2010)~~ D56—2016A	Test Method for Flash Point by Tag Closed Cup Tester	IBC® IMC®	IFC®
~~D86—15~~ D86—2017	Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	IBC®	IFC®
~~D93—15~~ D93—2018	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	IBC® IMC®	IFC®
D226/~~D226M—09~~ D226M—2017	Specification for Asphalt-saturated Organic Felt Used in Roofing and Waterproofing	IBC®	IRC®
D227/~~D227M—03~~ D227M—2003(~~2011~~ 2018)~~e1~~	Specification for Coal-tar-saturated Organic Felt Used in Roofing and Waterproofing	IBC®	IRC®
D312/~~D312M—15~~ D312M—			

~~2016M~~ D448—2012(2017)	Specification for Asphalt Used in Roofing Standard Classification for Sizes of Aggregate for Road and Bridge Construction	IBC® IBC®	
D450/~~D450M—07~~ D450M—2017(~~2013~~ 2018)~~e1~~	Specification for Coal-tar Pitch Used in Roofing, Dampproofing and Waterproofing	IBC®	IRC®
D1143/~~D1143M—07~~ D1143M—2007(2013) E1	Test Methods for Deep Foundations Under Static Axial Compressive Load	IBC®	
D1863/~~D1863M—05~~ D1863M—2005(~~2011~~ 2018)~~e1~~	Specification for Mineral Aggregate Used on Built-up Roofs	IBC®	IRC®
D1970/~~D1970M—15a~~ D1970M—2017A	Specification for Self-adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC®	
D2178/~~D2178M—15~~ D2178M—15A	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	IBC®	IRC®
~~D2487—11~~ D2487—2017	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC®	
D2822/~~D2822M—05~~ D2822M—2005(2011)~~e1~~	Specification for Asphalt Roof Cement, Asbestos Containing	IBC®	IRC®
D2824/~~D2824M—13~~ D2824M—2018	Standard Specification for Aluminum-pigmented Asphalt Roof Coatings, Nonfibered and Fibered without Asbestos	IBC®	
~~D2859—16~~ D2859—2016	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC®	IFC®
~~D2898—10~~ D2898—2010(2017)	Test Methods for Accelerated Weathering of Fire-retardant-treated Wood for Fire Testing	IBC® IWUIC®	IRC®
~~D3019—08~~ D3019/D3019M—2017	Specification for Lap Cement Used with Asphalt Roll Roofing, Nonfibered, Asbestos Fibered and Nonasbestos Fibered	IBC®	IRC®
D3161/~~D3161M—15~~ D3161M—2016A	Test Method for Wind Resistance of Steep Slope Roofing Products (Fan Induced Method)	IBC®	IRC®
~~D3200—74~~ D3200—1974(~~2012~~ 2017)	Standard Specification and Test Method for Establishing Recommended Design Stresses for Round Timber Construction Poles	IBC®	
D3462/~~D3462M—10a~~ D3462M—2016	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IBC®	IRC®
~~D3679—13~~ D3679—2017	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC®	IRC®
~~D3737—12~~ D3737—2018E1	Practice for Establishing Allowable Properties for Structural Glued Laminated Timber (Glulam)	IBC®	
~~D3746—85~~ D3746/D3746M—1985(~~2008~~ 2015) E1	Test Method for Impact Resistance of Bituminous Roofing Systems	IBC®	
~~D3957—09~~ D3957—2009(2015)	Standard Practices for Establishing Stress Grades for Structural Members Used in Log Buildings	IBC®	
~~D4318—10e1~~ D4318—2017E1	Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils	IBC®	IRC®
D4434/~~D4434M—12~~ D4434M—2015	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC®	IRC®
D4479/~~D4479M—07~~ D4479M—2007(~~2012~~ 2018)~~e1~~	Specification for Asphalt Roof Coatings—Asbestos-free	IBC®	IRC®
D4586/~~D4586M—07~~ D4586M—2007(~~2012~~ 2018)~~e1~~	Specification for Asphalt Roof Cement—Asbestos-free	IBC®	IRC®
D4637/~~D4637M—14e1~~ D4637M—2015	Specification for EPDM Sheet Used in Single-ply Roof Membrane	IBC®	IRC®
D4869/~~D4869M—15~~ D4869M—2016A	Specification for Asphalt-saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC®	IRC®
D4897/~~D4897M—01(2009)~~			

~~D4897M—2016~~ ~~D4945—12~~ D4945—2017	Specification for Asphalt-coated Glass Fiber Venting Base Sheet Used in Roofing Test Method for High-strain Dynamic Testing of Deep Foundations	IBC® IBC®	IRC®
~~D5055—13e1~~ D5055—2016	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-joists	IBC®	IRC®
~~D5456—14b~~ D5456—2018	Specification for Evaluation of Structural Composite Lumber Products	IBC®	IRC®
~~D5516—09~~ D5516—2018	Test Method of Evaluating the Flexural Properties of Fire-retardant Treated Softwood Plywood Exposed to Elevated Temperatures	IBC®	IRC®
D5643/~~D5643M—06~~ D5643M—2006(~~2012~~ 2018)~~e1~~	Specification for Coal Tar Roof Cement, Asbestos-free	IBC®	IRC®
~~D5664—10~~ D5664—2017	Standard Test Method for Evaluating the Effects of Fire-retardant Treatment and Elevated Temperatures on Strength Properties of Fire-retardant Treated Lumber	IBC®	IRC®
~~D6083—05e01~~ D6083/D6083M—2018	Specification for Liquid Applied Acrylic Coating Used in Roofing	IBC®	IRC®
D6162/~~D6162M—00a(2015)e1~~ D6162M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC®	
D6163/~~D6163M—00(2015)e1~~ D6163M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements	IBC®	
D6164/~~D6164M—11~~ D6164M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Metal Materials Using Polyester Reinforcements	IBC®	IRC®
D6222/~~D6222M—11~~ D6222M—2016	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements	IBC®	IRC®
D6223/~~D6223M—02(2009)e1~~ D6223M—2016	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC®	IRC®
~~D6298—13~~ D6298/D6298M—2016	Specification for Fiberglass Reinforced Styrene-butadiene-styrene (SBS) Modified Bituminous Sheets with a Factory Applied Metal Surface	IBC®	IRC®
D6380/~~D6380M—03~~ D6380M—2003(~~2013~~ 2018)~~e1~~	Standard Specification for Asphalt Roll Roofing (Organic) Felt	IBC®	
~~D6464—03a~~ D6464—2003A(~~2009~~ 2017)~~e1~~	Standard Specification for Expandable Foam Adhesives for Fastening Gypsum Wallboard to Wood Framing	IBC®	IRC®
D6509/~~D6509M—09(2015)~~ D6509M—2016	Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Base Sheet Materials Using Glass Fiber Reinforcements	IBC®	
D6754/~~D6754M—10~~ D6754M—2015	Standard Specification for Ketone Ethylene Ester Based Sheet Roofing	IBC®	IRC®
~~D6757—2013~~ D6757/D6757M—2018	Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep Slope Roofing	IBC®	IRC®
~~D6841—08~~ D6841—2016	Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-retardant Treated Lumber	IBC®	IRC®
D6878/~~D6878M—13~~ D6878M—2017	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC®	IRC®
D6947/~~D6947M—07(2013)e1~~ D6947M—2016	Standard Specification for Liquid Applied Moisture Cured Polyurethane Coating Used in Spray Polyurethane Foam Roofing System	IBC®	IRC®
~~D7032—14~~ D7032—2017	Standard Specification for Establishing Performance Ratings for Wood, Plastic Composite Deck Boards and Guardrail Systems (Guards or Rails)	IBC® IWUIC®	IRC®
~~D7147—11~~ D7147—2011(2018)	Specification for Testing and Establishing Allowable Loads of Joist Hangers	IBC®	
D7158/~~D7158M—16~~ D7158M—2019	Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC®	
~~D7254—15~~ D7254—2017	Standard Specification for Polypropylene (PP) Siding	IBC®	IRC®
D7655/~~D7655M—12~~ D7655M—2012(2017)	Standard Classification for Size of Aggregate Used as Ballast for Roof Membrane Systems	IBC®	

~~D7672—14~~ D7672—14E1	Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies	IBC®	IRC®
~~E84—16~~ E84—2018B	Standard Test Methods for Surface Burning Characteristics of Building Materials	IBC®	
~~E90—09~~ E90—2009(2016)	Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	IBC®	
~~E96/E96M—15~~ E96M—2016	Standard Test Methods for Water Vapor Transmission of Materials	IBC®	
~~E108—16~~ E108—2017	Standard Test Methods for Fire Tests of Roof Coverings	IBC® IWUIC®	IEBC®
~~E119—16~~ E119—2018B	Standard Test Methods for Fire Tests of Building Construction and Materials	IBC®	
~~E136—16~~ E136—2016A	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IBC® IFGC® IWUIC®	IEBC® IMC®
~~E283—04~~ E283—2004(2012)	Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences across the Specimen	IBC® IECC	IECC IRC®
~~E331—00~~ E331—2000(~~2009~~ 2016)	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference	IBC®	IRC®
~~E492—09~~ E492—2009(2016)E1	Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-ceiling Assemblies Using the Tapping Machine	IBC®	
~~E648—15c1~~ E648—2017A	Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source	IBC®	IFC®
E736/~~E736M—00(2015)e1~~ E736M—2017	Test Method for Cohesion/Adhesion of Sprayed Fire-resistive Materials Applied to Structural Members	IBC®	
E814—2013A(2017)	Test Method for Fire Tests of Penetration Firestop Systems	IBC®	IRC®
~~E970—14~~ E970—2017	Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source	IBC®	IRC®
~~E1300—12ae1~~ E1300—2016	Practice for Determining Load Resistance of Glass in Buildings	IBC®	
~~E1354—16~~ E1354—17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	IBC®	
~~E1592—05~~ E1592—2005(~~2012~~ 2017)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference	IBC®	
~~E1602—03~~ E1602—2003(~~2010~~ 2017)e1	Guide for Construction of Solid Fuel-burning Masonry Heaters	IBC®	IRC®
~~E1886—13A~~ E1886—2013A	Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials	IBC®	IRC®
~~E1996—14a~~ E1996—2017	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC®	
~~E2174—14b~~ E2174—2018	Standard Practice for On-site Inspection of Installed Fire Stops	IBC®	
~~E2273—03(2011)~~ E2273—2018	Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies	IBC®	IRC®
~~E2307—15b~~ E2307—15BE1	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using the Intermediate-scale, Multistory Test Apparatus	IBC®	
~~E2353—14~~ E2353—2016	Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards and Balustrades	IBC®	
~~E2404—15a~~ E2404—2017	Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) and Wood Wall or Ceiling Coverings, Facing and Veneers to Assess Surface Burning Characteristics	IBC®	IFC®
E2556/~~E2556M—10~~ E2556M—2010(2016)	Standard Specification for Vapor Permeable Flexible Sheet Water-resistive Barriers Intended for Mechanical Attachment	IBC®	
~~E2568—09e1~~ E2568—	Standard Specification for PB Exterior Insulation and Finish Systems	IBC®	IRC®

2017A E2570/E2570M—07(2014)e1	Standard Test Method for Evaluating Water-resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) for EIFS with Drainage	IBC®	IRC®
~~E2573—12~~ E2573—2017	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IBC®	IFC®
~~E2579—13~~ E2579—2015	Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics	IBC®	IFC®
~~E2599—15~~ E2599—2018	Standard Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics	IBC®	
~~E2634—11(2015)~~ E2634—2018	Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems	IBC®	IRC®
E2751/~~E2751M—13~~ E2751M—2017A	Practice for Design and Performance of Supported Laminated Glass Walkways	IBC®	
~~F547—06(2012)~~ F547—2017	Terminology of Nails for Use with Wood and Wood-base Materials	IBC®	
~~F1667—15~~ F1667—2018	Specification for Driven Fasteners: Nails, Spikes and Staples	IBC®	IRC®
~~F2200—14~~ F2200—2017	Standard Specification for Automated Vehicular Gate Construction	IBC®	IFC®
~~G154—12a~~ G154—2016A	Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials	IBC®	

AWC — American Wood Council

Standard Reference Number	Title	Referenced In Code(s):	
AWC ~~STJR—2015~~ STJR—2021	Span Tables for Joists and Rafters	IBC®	IRC®
ANSI/AWC ~~PWF—2015~~ PWF—2021	Permanent Wood Foundation Design Specification	IBC®	IRC®
ANSI/AWC ~~SDPWS—2015~~ SDPWS—2021	Special Design Provisions for Wind and Seismic	IBC®	

AWPA — American Wood Protection Association

Standard Reference Number	Title	Referenced In Code(s):	
~~M4—16~~ M4—15	Standard for the Care of Preservative-treated Wood Products	IBC®	IRC®
~~U1—16~~ U1—20	USE CATEGORY SYSTEM: User Specification for Treated Wood Except Commodity Specification H	IBC®	IRC®

AWS — American Welding Society

Standard Reference Number	Title	Referenced in Code(s):
D1.4/~~D1.4M—2017~~ D1.4M—2018	Structural Welding ~~Code—Reinforcing Steel Including Metal Inserts and Connections in Reinforced Concrete Construction~~ Code—Steel Reinforcing Bars	IBC®

BHMA — Builders Hardware Manufacturers' Association

Standard Reference Number	Title	Referenced In Code(s):
A ~~156.10—2011~~ 156.10—2017	Power Operated Pedestrian Doors	IBC®

A ~~156.19—2013~~ 156.19—2020	Standard for Power Assist and Low Energy Power Operated Doors	IBC®
A ~~156.27—2011~~ 156.27—2019	Power and Manual Operated Revolving Pedestrian Doors	IBC®
A ~~156.38—2014~~ 156.38—2020	Low Energy Power Operated Sliding and Folding Doors	IBC®

CSA — Canadian Standards Association

Standard Reference Number	Title	Referenced In Code(s):
ASME ~~A17.1—2016~~ A17.1—2019/CSA ~~B44—16~~ B44—19	Safety Code for Elevators and Escalators	IBC®
ASME A17.7—2007/CSA B44.7—07(R2017)	Performance-based Safety Code for Elevators and Escalators	IBC®

DASMA — Door & Access Systems Manufacturers Association International

Standard Reference Number	Title	Referenced in Code(s):
ANSI/DASMA ~~115—2016~~ 115—2017	Standard Method for Testing Sectional Garage Doors, Rolling Doors and Flexible Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind Pressure	IBC®

DOC — U.S. Department of Commerce

Standard Reference Number	Title	Referenced In Code(s):	
PS ~~1—09~~ 1—19	Structural Plywood	IBC®	IRC®
PS ~~2—10~~ 2—18	Performance Standard for ~~Wood-based Structural-use~~ Wood Structural Panels	IBC®	IRC®
PS 20—05	American Softwood Lumber Standard	IBC®	IRC®

FM — FM Approvals

Standard Reference Number	Title	Referenced in Code(s):
~~4880—2015~~ 4880—2017	~~Approval~~ American National Standard for ~~Class 1 Fire Rating of Building Panels or~~ Evaluating the Fire Performance Insulated Building Panel Assemblies and Interior Finish Materials	IBC®

GA — Gypsum Association

Standard Reference Number	Title	Referenced in Code(s):
GA ~~216—2016~~ 216—2018	Application and Finishing of Gypsum Panel Products	IBC®
GA ~~600—2015~~ 600—2018	Fire-resistance and Sound Control Design Manual, ~~21st~~ 22nd Edition	IBC®

NAAMM — National Association of Architectural Metal Manufacturers

Standard Reference Number	Title	Referenced in Code(s):
FP ~~1001—17~~ 1001—18	Guide Specifications for Design of Metal Flag Poles	IBC®

NCMA	National Concrete Masonry Association	
Standard Reference Number	**Title**	**Referenced In Code(s):**
TEK ~~5—84(1996~~ 2005)	Details for Concrete Masonry Fire Walls	IBC®

NFPA	National Fire Protection Association		
Standard Reference Number	**Title**	**Referenced In Code(s):**	
~~10—18~~ 10—21	Standard for Portable Fire Extinguishers	IBC®	IFC®
11—16	Standard for ~~Low~~ Low-, Medium, and High Expansion Foam	IBC®	IFC®
~~12A—15~~ 12A—18	Standard on Halon 1301 Fire Extinguishing Systems	IBC® IPMC®	IFC®
~~13—16~~ 13—19	Standard for Installation of Sprinkler Systems	IBC® IRC®	IFC®
~~13D—16~~ 13D—19	Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes	IBC® IRC®	IFC®
~~13R—16~~ 13R—19	Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies	IBC® IRC®	IFC®
~~14—16~~ 14—19	Standard for the Installation of Standpipe and Hose System	IBC®	IFC®
~~16—15~~ 16—19	Standard for the Installation of Foam-water Sprinkler and Foam-water Spray Systems	IBC®	IFC®
~~17—17~~ 17—20	Standard for Dry Chemical Extinguishing Systems	IBC® IPMC®	IFC®
~~17A—17~~ 17A—20	Standard for Wet Chemical Extinguishing Systems	IBC® IPMC®	IFC®
~~20—16~~ 20—19	Standard for the Installation of Stationary Pumps for Fire Protection	IBC®	IFC®
~~30—18~~ 30—21	Flammable and Combustible Liquids Code	IBC®	IFC®
~~30A—18~~ 30A—21	Code for Motor Fuel Dispensing Facilities and Repair Garages	IBC® IFGC®	IFC® IMC®
~~31—16~~ 31—20	Standard for the Installation of Oil-burning Equipment	IBC® IMC®	IFC® IRC®
32—16	Standard for ~~Dry Cleaning Plants~~ Drycleaning Facilities	IBC®	IFC®
~~40—16~~ 40—19	Standard for the Storage and Handling of Cellulose Nitrate Film	IBC®	IFC®
~~45—15~~ 45—19	Standard on Fire Protection Laboratories Using Chemicals (2015 Edition)	IBC®	IFC®
~~58—17~~ 58—20	Liquefied Petroleum Gas Code	IBC® IFGC® IRC®	IFC® IMC®
~~61—17~~ 61—20	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Product Facilities	IBC®	IFC®
~~72—16~~ 72—19	National Fire Alarm and Signaling Code	IBC® IMC® IRC®	IFC® IPMC®
~~80—16~~ 80—19	Standard for Fire Doors and Other Opening Protectives	IBC® IPMC®	IFC®
~~82—14~~ 82—19	Standard on Incinerators and Waste and Linen Handling Systems and Equipment	IBC® IMC®	IFGC®
~~85—15~~ 85—19	Boiler and Combustion System Hazards Code	IBC® IFGC® IRC®	IFC® IMC®
~~92—15~~ 92—18	Standard for Smoke Control Systems	IBC® IMC®	IFC®

~~99—18~~ 99—21	Health Care Facilities Code	IBC® IPC®	IFC®
~~101—18~~ 101—21	Life Safety Code	IBC®	IFC®
~~105—16~~ 105—19	Standard for Smoke Door Assemblies and Other Opening Protectives	IBC® IPMC®	IFC®
~~110—16~~ 110—19	Standard for Emergency and Standby Power Systems	IBC®	IFC®
~~111—13~~ 111—19	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IBC®	IFC®
~~120—15~~ 120—20	Standard for Fire Prevention and Control in Coal Mines	IBC®	IFC®
~~211—16~~ 211—19	Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances	IBC® IFGC® IRC®	IFC® IMC®
~~221—18~~ 221—21	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls	IBC®	
~~253—15~~ 253—19	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC®	IFC®
~~265—15~~ 265—19	Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls	IBC®	IFC®
~~286—15~~ 286—19	Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IBC® IMC®	IFC® IRC®
~~276—15~~ 276—19	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components	IBC®	
~~289—18~~ 289—19	Standard Method of Fire Test for Individual Fuel Packages	IBC®	IFC®
~~484—18~~ 484—19	Standard for Combustible Metals	IBC®	
~~652—16~~ 652—19	Standard on the Fundamentals of Combustible Dust	IBC®	IFC®
~~654—17~~ 654—20	Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids	IBC®	IFC®
~~664—17~~ 664—20	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities	IBC®	IFC®
~~701—15~~ 701—19	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	IBC®	IFC®
~~750—15~~ 750—19	Standard on Water Mist Fire Protection Systems	IBC®	IFC®
~~2001—15~~ 2001—18	Standard on Clean Agent Fire Extinguishing Systems	IBC® IPMC®	IFC®
~~2010—15~~ 2010—20	Standard for Fixed Aerosol Fire-extinguishing Systems	IBC®	IFC®

PCI — Precast Prestressed Concrete Institute

Standard Reference Number	Title	Referenced In Code(s):
~~MNL-124—11~~ PCI 124—18	~~Design~~ Specification for Fire Resistance of Precast / Prestressed Concrete	IBC®
~~MNL-128—01~~ PCI 128—19	~~Recommended Practice~~ Specification for Glass Fiber Reinforced Concrete Panels	IBC®

PTI — Post-Tensioning Institute

Standard Reference Number	Title	Referenced In Code(s):
PTI ~~DC—10.5-12~~ DC—10.5-19	Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive and Stable Soils	IBC®

SBCA — Structural Building Components Association

Standard Reference Number	Title	Referenced in Code(s):
ANSI/FS 100-12(R2018)	Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating	IBC®

	Sheathing Used in Exterior Wall Covering Assemblies	

SPRI — Single-Ply Roofing Institute

Standard Reference Number	Title	Referenced In Code(s):
ANSI/SPRI/FM ~~4435-ES-1—11~~ 4435 ES-1—17	Wind Test Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC®
ANSI/SPRI ~~RP-4—13~~ RP-4—18	Wind Design Guide for Ballasted Single-ply Roofing Systems	IBC®
ANSI/SPRI ~~VF-1—16~~ VF-1—17	External Fire Design Standard for Vegetative Roofs	IBC®

TIA — Telecommunications Industry Association

Standard Reference Number	Title	Referenced In Code(s):
~~222-H—2016~~ ANSI/TIA 222-H—2017	Structural ~~Standards~~ Standard for Antenna Supporting Structures ~~and Antennas~~ , Antennas and Small Wind Turbine Support Structures	IBC®

TMS — The Masonry Society

Standard Reference Number	Title	Referenced In Code(s):
~~302—2012~~ 302—2018	Standard Method for Determining the Sound Transmission Class Rating for Masonry Walls	IBC®

UL — UL LLC

Standard Reference Number	Title	Referenced in Code(s):	
10A—2009	Tin Clad Fire Doors—with Revisions through ~~December 2013~~ July 2018	IBC®	
~~10C—2009~~ 10C—2016	Positive Pressure Fire Tests of Door ~~Assemblies—with Revisions through February 2015~~ Assemblies	IBC®	
14B—2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors—with Revisions through ~~May 2013~~ July 2017	IBC®	
~~14C—06~~ 14C—2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs—with Revisions through ~~May 2013~~ July 2017	IBC®	
~~55A—04~~ 55A—2004	Materials for Built-up Roof Coverings	IBC®	IRC®
103—2010	Factory-built Chimneys, for Residential Type and Building Heating Appliances—with Revisions through ~~July 2012~~ March 2017	IBC® IMC®	IFGC® IRC®
127—2011	Factory-built Fireplaces—with Revisions through ~~May 2015~~ July 2016	IBC® IMC®	IFGC® IRC®
~~199E—04~~ 199E—2004	Outline of Investigation for Fire Testing of Sprinklers and Water Spray Nozzles for Protection of Deep Fat Fryers	IBC®	IFC®
~~217—06~~ 217—2015	Single and Multiple Station Smoke Alarms—with Revisions through ~~October 2015~~ November 2016	IBC® IRC®	IFC®
263—11	Fire Tests of Building Construction and Materials—with Revisions through ~~June 2015~~ March 2018	IBC®	
~~268—09~~ 268—2016	Smoke Detectors for Fire Alarm ~~Systems~~ Systems-with revisions through July 2016	IBC® IPMC®	IFC®
~~294—1999~~ 294—2018	Access Control System Units—with Revisions through ~~February 2015~~ October 2018	IBC®	IFC®
	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking		

~~300—05~~ 300—2005(R2010)	Equipment—with Revisions through December 2014	IBC®	IFC®
~~300A—06~~ 300A—2006	Outline of Investigation for Extinguishing System Units for Residential Range Top Cooking Surfaces	IBC®	IFC®
305—2012	Panic Hardware—with Revisions through ~~August 2014~~ March 2017	IBC®	IFC®
~~325—02~~ 325—2017	Door, Drapery, Gate, Louver and Window Operations and ~~Systems—with Revisions through May 2015~~ Systems	IBC® IRC®	IFC®
555—2006	Fire Dampers—with Revisions through ~~May 2014~~ October 2016	IBC®	
~~555C—2006~~ 555C—2014	Ceiling Dampers—with Revisions through ~~December 2014~~ May 2017	IBC®	
~~555S—99~~ 555S—2014	Smoke Dampers—with Revisions through ~~February 2014~~ October 2016	IBC®	IMC®
580—2006	Test for Uplift Resistance of Roof Assemblies—with Revisions through October ~~2013~~ 2018	IBC®	
641—2010	Type L Low-temperature Venting Systems—with Revisions through ~~June 2013~~ April 2018	IBC® IMC®	IFGC® IRC®
~~723—2008~~ 723—2018	Test for Surface Burning Characteristics of Building ~~Materials—with Revisions through August 2013~~ Materials	IBC® IWUIC®	IMC®
~~790—04~~ 790—2004	Standard Test Methods for Fire Tests of Roof Coverings—with Revisions through ~~July 2014~~ October 2018	IBC® IFC®	IEBC® IRC®
~~793—08~~ 793—2008	Automatically Operated Roof Vents for Smoke and Heat—with Revisions through ~~September 2011~~ March 2017	IBC®	IFC®
~~864—03~~ 864—2014	Control Units and Accessories for Fire Alarm Systems—with Revisions through ~~December 2014~~ March 2018	IBC®	IFC®
~~924—06~~ 924—2016	Safety Emergency Lighting and Power Equipment—with Revisions through ~~April 2014~~ May 2018	IBC®	IFC®
~~1040—96~~ 1040—1996	Fire Test of Insulated Wall Construction—with Revisions through ~~October 2012~~ April 2017	IBC®	IRC®
1256—02	Fire Test of Roof Deck Construction—with Revisions through ~~July 2013~~ August 2018	IBC®	IRC®
~~1479—03~~ 1479—2015	Fire Tests of Penetration ~~Firestops—with Revisions through June 2015~~ Firestops	IBC® IRC®	IMC®
~~1703—02~~ 1703—2002	Flat-plate Photovoltaic Modules and Panels—with Revisions through ~~October 2015~~ September 2018	IBC®	IRC®
1715—97	Fire Test of Interior Finish Material—with Revisions through ~~January 2013~~ April 2017	IBC®	IRC®
1741—2010	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through ~~January 2015~~ February 2018	IBC®	IRC®
1777—2007	Chimney Liners—with Revisions through ~~October 2015~~ April 2014	IBC® IMC®	IFGC®
~~1784—01~~ 1784—2015	Air Leakage Tests of Door ~~Assemblies—with Revisions through February 2015~~ Assemblies	IBC®	IECC
~~1897—12~~ 1897—2015	Uplift Tests for Roof Covering ~~Systems—with Revisions through September 2015~~ Systems	IBC®	IRC®
~~1994—04~~ 1994—2015	Luminous Egress Path Marking ~~Systems—with Revisions through May 2015~~ Systems	IBC®	IFC®
~~2034—2008~~ 2034—2017	Single- and Multiple-station Carbon Monoxide Alarms—with Revisions through ~~March 2015~~ September 2018	IBC®	
2075—2013	Standard for Gas and Vapor Detectors and ~~Sensors~~ Sensors-with revisions through December 2017	IBC® IMC®	IFC® IRC®
~~2079—04~~ 2079—2015	Tests for Fire Resistance of Building Joint ~~Systems—with Revisions through August 2015~~ Systems	IBC®	IFC®
~~2196—2001~~ 2196—2017	~~Tests~~ Standard for Fire ~~Resistive Cables—with Revisions through March 2012~~ Test for Circuit Integrity of Fire- Resistive Power, Instrumentation, Control and Data Cables	IBC®	IFC®
2200—2012	Stationary Engine Generator Assemblies—with Revisions through ~~July~~ October 2015	IBC® IFGC®	IFC® IMC®
2202—2009	Electric Vehicle (EV) Charging System ~~Equipment~~ Equipment-with revisions through February 2018	IBC®	

~~2594—2013~~ 2594—2016	Electric Vehicle Supply Equipment	IBC®
2703—2014	~~Outline of Investigation for~~ Mounting Systems, Mounting Devices, Clamping/Retention Devices and Ground Lugs for Use with Flat-plate Photovoltaic Modules and ~~Panels~~ Panels-with revisions through December 2019	IBC®

ULC	Underwriters Laboratories of Canada		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
CAN/ULC S ~~102.2—2010~~ 102.2—2018	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and ~~Assemblies—with 2000 Revisions~~ Assemblies	IBC®	IRC®

Reason: THIS IS THE ADMIN STANDARDS UPDATE CODE CHANGE FOR THE IBC.
The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2018, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

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

Proposal # 5823

ADM47-IBC-19

Code Change No: ADM47-16

Original Proposal

The following table provides a comprehensive list of all standards that the respective standards promulgators have indicated have been, or will be, updated from the listing in the 2018 Editions of the International Codes. According to Section 4.5.1 of ICC Council Policy #CP 28, Code Development Policy, the updating of standards referenced by the Codes shall be accomplished administratively by the Administrative code development committee. Therefore, referenced standards that are to beupdated for the 2020 edition of any of the I-Codes are listed in this single code change proposal. Note that the table below indicates the change to the standard, and the code or codes in which each standard appears. The list includes standards that the promulgators have already updated or will have updated by December 1, 2020.

AA — Aluminum Association

Standard Reference Number	Title	Referenced In Code(s):	
~~ADM1—2015~~ ADM1—2020	Aluminum Design Manual: Part ~~1—A Specification~~ 1—Specification for Aluminum Structures	IBC®	

AAMA — American Architectural Manufacturers Association

Standard Reference Number	Title	Referenced in Code(s):	
~~711—16~~ 711—20	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IBC®	IRC®
~~714—15~~ 714—20	Voluntary Specification for Liquid Applied Flashing Used to Create a Water-resistive Seal around Exterior Wall Openings in Buildings	IBC®	IRC®

ACI — American Concrete Institute

Standard Reference Number	Title	Referenced in Code(s):	
~~318—14~~ 318—19	Building Code Requirements for Structural Concrete	IBC®	IRC®

AISI — American Iron and Steel Institute

Standard Reference Number	Title	Referenced in Code(s):	
AISI S100—16/S1-18	North American Specification for the Design of Cold-formed Steel Structural Members, 2016, with Supplement 1, dated 2018	IBC®	IRC®
AISI ~~S202—15~~ S202—20	Code of Standard Practice for Cold-formed Steel Structural Framing, ~~2015~~ 2020	IBC®	
AISI ~~S220—15~~ S220—20	North American Standard for Cold-formed Steel Framing—Nonstructural Members, ~~2015~~ 2020	IBC®	IRC®
AISI ~~S230—15~~ S230—18	Standard for Cold-formed Steel Framing—Prescriptive Method for One- and Two-family Dwellings, ~~2015~~ 2018	IBC®	IRC®
AISI ~~S240—15~~ S240—20	North American Standard for Cold-Formed Steel Structuring Framing, ~~2015~~ 2020	IBC®	IRC®
AISI ~~S400—15/S1—16~~ S400—20	North American Standard for Seismic Design of Cold-formed Steel Structural Systems, ~~2015, with Supplement 1, dated 2016;~~ 2020	IBC®	

ANSI — American National Standards Institute

Standard Reference Number	Title	Referenced in Code(s):	
~~A13.1—2015~~ A13.1—2020	Scheme for the Identification of Piping Systems	IBC®	IFC®
~~A108.1A—16~~ A108.1A—17	Installation of Ceramic Tile in the Wet-set Method, with Portland Cement Mortar	IBC®	IRC®
~~A108.1B—99~~ A108.1B—17	Installation of Ceramic Tile, Quarry Tile on a Cured Portland Cement Mortar Setting Bed with Dry-set or Latex-Portland Mortar	IBC®	IRC®
~~A108.4—99~~ A108.4—09	Installation of Ceramic Tile with Organic Adhesives or Water-cleanable Tile-setting Epoxy Adhesive	IBC®	IRC®

~~A108.5—99~~ A108.5—19	Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar	IBC®	IRC®
~~A108.6—99~~ A108.6—19	Installation of Ceramic Tile with Chemical-resistant, Water Cleanable Tile-setting and -grouting Epoxy	IBC®	IRC®
~~A108.8—99~~ A108.8—19	Installation of Ceramic Tile with Chemical-resistant Furan Resin Mortar and Grout	IBC®	
~~A108.9—99~~ A108.9—19	Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout	IBC®	
~~A108.10—99~~ A108.10—17	Installation of Grout in Tilework	IBC®	
~~A118.1—16~~ A118.1—18	American National Standard Specifications for Dry-set Portland Cement Mortar	IBC®	IRC®
~~A118.3—13~~ A118.3—20	American National Standard Specifications for Chemical-resistant, Water-cleanable Tile-setting and -grouting Epoxy and Water Cleanable Tile-setting Epoxy Adhesive	IBC®	IRC®
~~A118.4—16~~ A118.4—18	American National Standard Specifications for Modified Dry-set Cement Mortar	IBC®	IRC®
~~A118.6—18~~ A118.6—19	American National Standard Specifications for Cement Grouts for Tile Installation	IBC®	
~~A136.1—08~~ A136.1—19	American National Standard Specifications for the Installation of Ceramic Tile	IBC®	IRC®
~~A137.1—17~~ A137.1—19	American National Standard Specifications for Ceramic Tile	IBC®	IRC®

APA — APA - Engineered Wood Association

Standard Reference Number	Title	Referenced In Code(s):
ANSI ~~117—15~~ 117—2020	Standard Specification for Structural Glued Laminated Timber of Softwood Species	IBC®
ANSI/APA ~~A190.1—17~~ A190.1—2017	Structural Glued Laminated Timber	IBC®
ANSI/APA PRP ~~210—14~~ 210—2019	Standard for Performance-Rated Engineered Wood Siding	IBC®
APA ~~PDS—12~~ PDS—20	Panel Design Specification	IBC®
ANSI/APA PRG ~~320—17~~ 320—2019	Standard for Performance-rated Cross-laminated Timber	IBC®
APA ~~R540—13~~ R540—19	~~Builders~~ Builder Tips: Proper Storage and Handling of Glulam Beams	IBC®
APA ~~S475—16~~ S475—20	Glued Laminated Beam Design Tables	IBC®
APA ~~S560—14~~ S560—20	Field Notching and Drilling of Glued Laminated Timber Beams	IBC®
APA ~~X450—01~~ X450—18	Glulam in Residential ~~Construction—Western Edition~~ Building—Construction Guide	IBC®

ASABE — American Society of Agricultural and Biological Engineers

Standard Reference Number	Title	Referenced In Code(s):
EP 484.3 ~~MON2016~~ DEC2017	Diaphragm Design of Metal-clad, Wood-frame Rectangular Buildings	IBC®
EP ~~486.2 OCT 2012ED~~ 486.3 SEP2017	Shallow-post and Pier Foundation Design	IBC®
EP ~~559.2 MON2016~~ 559.1 W/Corr. AUG2010 (R2014)	Design Requirements and Bending Properties for Mechanically Laminated Wood Assemblies	IBC®

ASCE/SEI — American Society of Civil EngineersStructural Engineering Institute

Standard Reference Number	Title	Referenced in Code(s):	
7—16 with Supplement 1	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	IBC® IRC®	IEBC®

~~84—14~~ 24—20	Flood Resistant Design and Construction	IBC®	IRC®
~~29—17~~ 29—19	Standard Calculation Methods for Structural Fire Protection	IBC®	
~~49—07~~ 49—12	Wind Tunnel Testing for Buildings and Other Structures	IBC®	

ASME — American Society of Mechanical Engineers

Standard Reference Number	Title	Referenced in Code(s):	
ASME/~~A17.1—2016~~ A17.1—2019/CSA ~~B44—16~~ B44—19	Safety Code for Elevators and Escalators	IBC®	
A17.7—2007/CSA B44—07(~~R2012~~ R2019)	Performance-based Safety Code for Elevators and Escalators	IBC®	
~~A18.1—2014~~ A18.1—2020	Safety Standard for Platform Lifts and Stairway Chairlifts	IBC® IRC®	IEBC®
~~A90.1—2015~~ A90.1—2020	Safety Standard for Belt Manlifts	IBC®	
~~B16.18—2012~~ B16.18—2018	Cast Copper Alloy Solder Joint Pressure Fittings	IBC® IMC® IRC®	IFC® IPC®
~~B16.22—2013~~ B16.22—2018	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings	IBC® IMC® IRC®	IFC® IPC®
~~B20.1—2015~~ B20.1—2021	Safety Standard for Conveyors and Related Equipment	IBC®	
~~B31.3—2016~~ B31.3—2020	Process Piping	IBC® IFGC®	IFC®

ASSE — American Society of Safety Engineers

Standard Reference Number	Title	Referenced In Code(s):	
ANSI/~~ASSE Z359.1—2016~~ ASSP Z359.1—2019	~~Requirements for the ANSI/ASSE Z359~~ The Fall Protection Code	IBC® IMC®	IFC®

ASTM — ASTM International

Standard Reference Number	Title	Referenced in Code(s):	
A6/~~A6M—14~~ A6M—2017A	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling	IBC®	
A153/~~A153M—09~~ A153M—2016A	Specification for Zinc Coating (Hot-dip) on Iron and Steel Hardware	IBC®	IRC®
~~A240/A240M—15a~~ A240M—17	Standard Specification for Chromium and Chromium-nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications	IBC® ISPSC®	IRC®
~~A252—10~~ A252—2010(2018)	Specification for Welded and Seamless Steel Pipe Piles	IBC®	
A283/~~A283M—13~~ A283M—2018	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates	IBC®	
A416/~~A416M—15~~ A416M—2017A	Specification for Steel Strand, Uncoated Seven-wire for Prestressed Concrete	IBC®	
A572/~~A572M—15~~ A572M—2018	Specification for High-strength Low-alloy Columbium-Vanadium Structural Steel	IBC®	
A653/~~A653M—15~~ A653M—2017	Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process	IBC®	IRC®

A690/A690M—13a(2018)	Standard Specification for High-strength Low-alloy Nickel, Copper, Phosphorus Steel H-piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments	IBC®	
~~A706/A706M—15~~ A706M—2016	Specification for Low-alloy Steel Deformed and Plain Bars for Concrete Reinforcement	IBC®	IRC®
~~A722/A722M—15~~ A722M—2018	Specification for High-strength Steel Bars for Prestressed Concrete	IBC®	
~~A755/A755M—15~~ A755M—2016E1	Specification for Steel Sheet, Metallic-coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC®	
~~A924/A924M—14~~ A924M—2017A	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IBC®	IRC®
~~B88—14~~ B88—2016	Specification for Seamless Copper Water Tube	IBC® IFGC® IPC® IRC®	IFC® IMC® IPSDC® ISPSC®
~~B251—10~~ B251/B251M—2017	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube	IBC® IMC® IPSDC®	IFC® IPC® IRC®
~~B280—13~~ B280—2018	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	IBC® IFGC®	IFC® IMC®
~~B695—04~~ B695—2004(~~2009~~ 2016)	Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel Strip for Building Construction	IBC®	IRC®
~~C5—18~~ C5—2018	Specification for Quicklime for Structural Purposes	IBC®	IRC®
~~C27—98~~ C27—1998(~~2013~~ 2018)	Specification for Classification of Fireclay and High-alumina Refractory Brick	IBC®	IRC®
C31/~~C31M—15~~ C31M—2018B	Practice for Making and Curing Concrete Test Specimens in the Field	IBC®	
C33/~~C33M—13~~ C33M—2018	Specification for Concrete Aggregates	IBC®	IRC®
~~C55—2014e~~ C55—2017	Specification for Concrete Building Brick	IBC®	IRC®
~~C62—13a~~ C62—2017	Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C67—14~~ C67/C67M—2018	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC®	
~~C73—14~~ C73—2017	Specification for Calcium Silicate Brick (Sand-lime Brick)	IBC®	IRC®
~~C90—14~~ C90—2016A	Specification for Loadbearing Concrete Masonry Units	IBC® IRC®	IECC
C91/~~C91M—12~~ C91M—2018	Specification for Masonry Cement	IBC®	IRC®
C94/~~C94M—15a~~ C94M—2017A	Specification for Ready-mixed Concrete	IBC® IRC®	IEBC®
C140/~~C140M—15~~ C140M—2018	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC®	
C150/~~C150M—15~~ C150M—2018	Specification for Portland Cement	IBC®	IRC®
C172/~~C172M—14a~~ C172M—2017	Practice for Sampling Freshly Mixed Concrete	IBC®	
~~C199—84~~ C199—1984(~~2011~~ 2016)	Test Method for Pier Test for Refractory Mortars	IBC®	IRC®
~~C208—12~~ C208—2012(2017)E1	Specification for Cellulosic Fiber Insulating Board	IBC®	IRC®
~~C216—15~~ C216—2017A	Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C315—07~~ C315—2007(~~2011~~ 2016)	Specification for Clay Flue Liners and Chimney Pots	IBC® IMC®	IFGC® IRC®

C317/~~C317M—00~~ C317M—2000(2015)	Specification for Gypsum Concrete	IBC®	
C330/~~C330M—14~~ C330M—2017A	Specification for Lightweight Aggregates for Structural Concrete	IBC®	
C331/~~C331M—14~~ C331M—2017	Specification for Lightweight Aggregates for Concrete Masonry Units	IBC®	
~~C473—15~~ C473—2017	Test Methods for Physical Testing of Gypsum Panel Products	IBC®	
C475/~~C475M—15~~ C475M—2017	Specification for Joint Compound and Joint Tape for Finishing Gypsum Board	IBC®	IRC®
~~C516—08~~ C516—2008(~~2014~~ 2013)~~e1~~ E1	Specifications for Vermiculite Loose Fill Thermal Insulation	IBC®	
~~C547—15~~ C547—2017	Specification for Mineral Fiber Pipe Insulation	IBC®	
C549—06(2012)	Specification for Perlite Loose Fill Insulation	IBC®	
~~C552—15~~ C552—2017E1	Standard Specification for Cellular Glass Thermal Insulation	IBC®	IRC®
~~C557—03~~ C557—2003(~~2009~~ 2017)~~e01~~	Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing	IBC®	IRC®
~~C578—15~~ C578—2018	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC®	IRC®
~~C587—04~~ C587—2004(~~2014~~ 2018)	Specification for Gypsum Veneer Plaster	IBC®	IRC®
C595/~~C595M—14e1~~ C595M—2018	Specification for Blended Hydraulic Cements	IBC®	IRC®
C635/~~C635M—13a~~ C635M—2017	Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings	IBC®	
~~C652—15~~ C652—2017A	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC®	IRC®
~~C726—12~~ C726—2017	Standard Specification for Mineral Wool Roof Insulation Board	IBC®	IRC®
~~C728—15~~ C728—2017A	Standard Specification for Perlite Thermal Insulation Board	IBC®	IRC®
~~C744—14~~ C744—2016	Specification for Prefaced Concrete and Calcium Silicate Masonry Units	IBC®	IRC®
~~C754—15~~ C754—2018	Specification for Installation of Steel Framing Members to Receive Screw-attached Gypsum Panel Products	IBC®	
C836/~~C836M—15~~ C836M—2018	Specification for High-solids Content, Cold Liquid-applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course	IBC®	IRC®
~~C840—13~~ C840—2018A	Specification for Application and Finishing of Gypsum Board	IBC®	
~~C841—03~~ C841—2003(~~2013~~ 2018)	Specification for Installation of Interior Lathing and Furring	IBC®	IRC®
~~C843—99(2012)~~ C843—2017	Specification for Application of Gypsum Veneer Plaster	IBC®	IRC®
~~C847—14a~~ C847—2018	Specification for Metal Lath	IBC®	IRC®
~~C920—14a~~ C920—2018	Standard for Specification for Elastomeric Joint Sealants	IBC®	IRC®
~~C926—15b~~ C926—2018B	Specification for Application of Portland Cement-based Plaster	IBC®	IRC®
~~C933—14~~ C933—2018	Specification for Welded Wire Lath	IBC®	IRC®
~~C946—10~~ C946—2018	Specification for Construction of Dry-stacked, Surface-bonded Walls	IBC®	IRC®
~~C954—15~~ C954—2018	Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch (0.84 mm) to 0.112 inch (2.84 mm) in Thickness	IBC®	IRC®
C957/~~C957M—15~~ C957M—2017	Specification for High-solids Content, Cold Liquid-applied Elastomeric Waterproofing Membrane with Integral Wearing Surface	IBC®	IRC®
~~C1002—14~~ C1002—2018	Specification for Steel Self-piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	IBC®	IRC®
~~C1032—14~~ C1032—2018	Specification for Woven Wire Plaster Base	IBC®	IRC®
~~C1047—14a~~ C1047—2018	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IBC®	IRC®
	Specification for Installation of Lathing and Furring to Receive Interior and Exterior		

~~C1063—15a~~ C1063—2018B	Portland Cement-based Plaster	IBC®	IRC®
~~C1088—14~~ C1088—2018	Specification for Thin Veneer Brick Units Made from Clay or Shale	IBC®	IRC®
C1157/~~C1157M—11~~ C1157M—2017	Standard Performance Specification for Hydraulic Cement	IBC®	
~~C1167—11~~ C1167—2011(2017)	Specification for Clay Roof Tiles	IBC®	IRC®
C1177/~~C1177M—13~~ C1177M—2017	Specification for Glass Mat Gypsum Substrate for Use as Sheathing	IBC®	IRC®
C1178/~~C1178M—13~~ C1178M—2018	Specification for Coated Mat Water-resistant Gypsum Backing Panel	IBC®	IRC®
~~C1186—08~~ C1186—2008(~~2012~~ 2016)	Specification for Flat Fiber Cement Sheets	IBC®	IRC®
~~C1261—13~~ C1261—2013(2017)E1	Specification for Firebox Brick for Residential Fireplaces	IBC®	IRC®
C1278/~~C1278M—07a(2011)~~ C1278M—2017	Specification for Fiber-reinforced Gypsum Panel	IBC®	IRC®
~~C1283—11~~ C1283—2015	Practice for Installing Clay Flue Lining	IBC®	IRC®
~~C1288—14~~ C1288—2017	Standard Specification for Discrete Nonasbestos Fiber-cement Interior Substrate Sheets	IBC®	IRC®
~~C1289—15~~ C1289—2018	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC®	IRC®
~~C1325—14~~ C1325—2018	Standard Specification for Nonasbestos Fiber-mat Reinforced Cement Backer Units	IBC®	IRC®
~~C1364—18B~~ C1364—2017	Standard Specification for Architectural Cast Stone	IBC®	IRC®
C1396/~~C1396M—14a~~ C1396M—2017	Specification for Gypsum Board	IBC®	
~~C1492—03~~ C1492—2003(~~2009~~ 2016)	Standard Specification for Concrete Roof Tile	IBC®	IRC®
C1600/~~C1600M—11~~ C1600M—2017	Standard Specification for Rapid Hardening Hydraulic Cement	IBC®	
C1629/~~C1629M—15~~ C1629M—2018A	Standard Classification for Abuse-resistant Nondecorated Interior Gypsum Panel Products and Fiber-reinforced Cement Panels	IBC®	
C1658/~~C1658M—13~~ C1658M—2018	Standard Specification for Glass Mat Gypsum Panels	IBC®	IRC®
~~C1670—16~~ C1670/C1670M—2018	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IBC®	
~~C1766—13~~ C1766—2015	Standard Specification for Factory-laminated Gypsum Panel Products	IBC®	IRC®
~~D25—12~~ D25—2012(2017)	Specification for Round Timber Piles	IBC®	
D41/~~D41M—11~~ D41M—2011(2016)	Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing	IBC®	
D43/~~D43M—00~~ D43M—2000(~~2012~~ 2018)~~e1~~	Specification for Coal Tar Primer Used in Roofing, Dampproofing and Waterproofing	IBC®	
~~D56—05(2010)~~ D56—2016A	Test Method for Flash Point by Tag Closed Cup Tester	IBC® IMC®	IFC®
~~D86—15~~ D86—2017	Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	IBC®	IFC®
~~D93—15~~ D93—2018	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	IBC® IMC®	IFC®
D226/~~D226M—09~~ D226M—2017	Specification for Asphalt-saturated Organic Felt Used in Roofing and Waterproofing	IBC®	IRC®
D227/~~D227M—03~~ D227M—2003(~~2011~~ 2018)~~e1~~	Specification for Coal-tar-saturated Organic Felt Used in Roofing and Waterproofing	IBC®	IRC®
D312/~~D312M—15~~ D312M—			

~~2016M~~ D448—2012(2017)	Specification for Asphalt Used in Roofing Standard Classification for Sizes of Aggregate for Road and Bridge Construction	IBC® IBC®	
D450/~~D450M—07~~ D450M—2017(~~2013~~ 2018)~~e1~~	Specification for Coal-tar Pitch Used in Roofing, Dampproofing and Waterproofing	IBC®	IRC®
D1143/~~D1143M—07~~ D1143M—2007(2013) E1	Test Methods for Deep Foundations Under Static Axial Compressive Load	IBC®	
D1863/~~D1863M—05~~ D1863M—2005(~~2011~~ 2018)~~e1~~	Specification for Mineral Aggregate Used on Built-up Roofs	IBC®	IRC®
D1970/~~D1970M—15a~~ D1970M—2017A	Specification for Self-adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC®	
D2178/~~D2178M—15~~ D2178M—15A	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	IBC®	IRC®
~~D2487—11~~ D2487—2017	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC®	
D2822/~~D2822M—05~~ D2822M—2005(2011)~~e1~~	Specification for Asphalt Roof Cement, Asbestos Containing	IBC®	IRC®
D2824/~~D2824M—13~~ D2824M—2018	Standard Specification for Aluminum-pigmented Asphalt Roof Coatings, Nonfibered and Fibered without Asbestos	IBC®	
~~D2859—16~~ D2859—2016	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC®	IFC®
~~D2898—10~~ D2898—2010(2017)	Test Methods for Accelerated Weathering of Fire-retardant-treated Wood for Fire Testing	IBC® IWUIC®	IRC®
~~D3019—08~~ D3019/D3019M—2017	Specification for Lap Cement Used with Asphalt Roll Roofing, Nonfibered, Asbestos Fibered and Nonasbestos Fibered	IBC®	IRC®
D3161/~~D3161M—15~~ D3161M—2016A	Test Method for Wind Resistance of Steep Slope Roofing Products (Fan Induced Method)	IBC®	IRC®
~~D3200—74~~ D3200—1974(~~2012~~ 2017)	Standard Specification and Test Method for Establishing Recommended Design Stresses for Round Timber Construction Poles	IBC®	
D3462/~~D3462M—10a~~ D3462M—2016	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IBC®	IRC®
~~D3679—13~~ D3679—2017	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC®	IRC®
~~D3737—12~~ D3737—2018E1	Practice for Establishing Allowable Properties for Structural Glued Laminated Timber (Glulam)	IBC®	
~~D3746—85~~ D3746/D3746M—1985(~~2008~~ 2015) E1	Test Method for Impact Resistance of Bituminous Roofing Systems	IBC®	
~~D3957—09~~ D3957—2009(2015)	Standard Practices for Establishing Stress Grades for Structural Members Used in Log Buildings	IBC®	
~~D4318—10e1~~ D4318—2017E1	Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils	IBC®	IRC®
D4434/~~D4434M—12~~ D4434M—2015	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC®	IRC®
D4479/~~D4479M—07~~ D4479M—2007(~~2012~~ 2018)~~e1~~	Specification for Asphalt Roof Coatings—Asbestos-free	IBC®	IRC®
D4586/~~D4586M—07~~ D4586M—2007(~~2012~~ 2018)~~e1~~	Specification for Asphalt Roof Cement—Asbestos-free	IBC®	IRC®
D4637/~~D4637M—14e1~~ D4637M—2015	Specification for EPDM Sheet Used in Single-ply Roof Membrane	IBC®	IRC®
D4869/~~D4869M—15~~ D4869M—2016A	Specification for Asphalt-saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC®	IRC®
D4897/~~D4897M—01(2009)~~			

~~D4897M—2016~~ ~~D4945—12~~ D4945—2017	Specification for Asphalt-coated Glass Fiber Venting Base Sheet Used in Roofing Test Method for High-strain Dynamic Testing of Deep Foundations	IBC® IBC®	IRC®
~~D5055—13e1~~ D5055—2016	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-joists	IBC®	IRC®
~~D5456—14b~~ D5456—2018	Specification for Evaluation of Structural Composite Lumber Products	IBC®	IRC®
~~D5516—09~~ D5516—2018	Test Method of Evaluating the Flexural Properties of Fire-retardant Treated Softwood Plywood Exposed to Elevated Temperatures	IBC®	IRC®
D5643/~~D5643M—06~~ D5643M—2006(~~2012~~ 2018)~~e1~~	Specification for Coal Tar Roof Cement, Asbestos-free	IBC®	IRC®
~~D5664—10~~ D5664—2017	Standard Test Method for Evaluating the Effects of Fire-retardant Treatment and Elevated Temperatures on Strength Properties of Fire-retardant Treated Lumber	IBC®	IRC®
~~D6083—05e01~~ D6083/D6083M—2018	Specification for Liquid Applied Acrylic Coating Used in Roofing	IBC®	IRC®
D6162/~~D6162M—00a(2015)e1~~ D6162M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC®	
D6163/~~D6163M—00(2015)e1~~ D6163M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements	IBC®	
D6164/~~D6164M—11~~ D6164M—2016	Specification for Styrene-butadiene-styrene (SBS) Modified Bituminous Sheet Metal Materials Using Polyester Reinforcements	IBC®	IRC®
D6222/~~D6222M—11~~ D6222M—2016	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements	IBC®	IRC®
D6223/~~D6223M—02(2009)e1~~ D6223M—2016	Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements	IBC®	IRC®
~~D6298—13~~ D6298/D6298M—2016	Specification for Fiberglass Reinforced Styrene-butadiene-styrene (SBS) Modified Bituminous Sheets with a Factory Applied Metal Surface	IBC®	IRC®
D6380/~~D6380M—03~~ D6380M—2003(~~2013~~ 2018)~~e1~~	Standard Specification for Asphalt Roll Roofing (Organic) Felt	IBC®	
~~D6464—03a~~ D6464—2003A(~~2009~~ 2017)~~e1~~	Standard Specification for Expandable Foam Adhesives for Fastening Gypsum Wallboard to Wood Framing	IBC®	IRC®
D6509/~~D6509M—09(2015)~~ D6509M—2016	Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Base Sheet Materials Using Glass Fiber Reinforcements	IBC®	
D6754/~~D6754M—10~~ D6754M—2015	Standard Specification for Ketone Ethylene Ester Based Sheet Roofing	IBC®	IRC®
~~D6757—2013~~ D6757/D6757M—2018	Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep Slope Roofing	IBC®	IRC®
~~D6841—08~~ D6841—2016	Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-retardant Treated Lumber	IBC®	IRC®
D6878/~~D6878M—13~~ D6878M—2017	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC®	IRC®
D6947/~~D6947M—07(2013)e1~~ D6947M—2016	Standard Specification for Liquid Applied Moisture Cured Polyurethane Coating Used in Spray Polyurethane Foam Roofing System	IBC®	IRC®
~~D7032—14~~ D7032—2017	Standard Specification for Establishing Performance Ratings for Wood, Plastic Composite Deck Boards and Guardrail Systems (Guards or Rails)	IBC® IWUIC®	IRC®
~~D7147—11~~ D7147—2011(2018)	Specification for Testing and Establishing Allowable Loads of Joist Hangers	IBC®	
D7158/~~D7158M—16~~ D7158M—2019	Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC®	
~~D7254—15~~ D7254—2017	Standard Specification for Polypropylene (PP) Siding	IBC®	IRC®
D7655/~~D7655M—12~~ D7655M—2012(2017)	Standard Classification for Size of Aggregate Used as Ballast for Roof Membrane Systems	IBC®	

~~D7672—14~~ D7672—14E1	Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies	IBC®	IRC®
~~E84—16~~ E84—2018B	Standard Test Methods for Surface Burning Characteristics of Building Materials	IBC®	
~~E90—09~~ E90—2009(2016)	Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	IBC®	
~~E96/E96M—15~~ E96M—2016	Standard Test Methods for Water Vapor Transmission of Materials	IBC®	
~~E108—16~~ E108—2017	Standard Test Methods for Fire Tests of Roof Coverings	IBC® IWUIC®	IEBC®
~~E119—16~~ E119—2018B	Standard Test Methods for Fire Tests of Building Construction and Materials	IBC®	
~~E136—16~~ E136—2016A	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IBC® IFGC® IWUIC®	IEBC® IMC®
~~E283—04~~ E283—2004(2012)	Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences across the Specimen	IBC® IECC	IECC IRC®
~~E331—00~~ E331—2000(~~2009~~ 2016)	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference	IBC®	IRC®
~~E492—09~~ E492—2009(2016)E1	Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-ceiling Assemblies Using the Tapping Machine	IBC®	
~~E648—15c1~~ E648—2017A	Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source	IBC®	IFC®
E736/~~E736M—00(2015)e1~~ E736M—2017	Test Method for Cohesion/Adhesion of Sprayed Fire-resistive Materials Applied to Structural Members	IBC®	
E814—2013A(2017)	Test Method for Fire Tests of Penetration Firestop Systems	IBC®	IRC®
~~E970—14~~ E970—2017	Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source	IBC®	IRC®
~~E1300—12ae1~~ E1300—2016	Practice for Determining Load Resistance of Glass in Buildings	IBC®	
~~E1354—16~~ E1354—17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	IBC®	
~~E1592—05~~ E1592—2005(~~2012~~ 2017)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference	IBC®	
~~E1602—03~~ E1602—2003(~~2010~~ 2017)e1	Guide for Construction of Solid Fuel-burning Masonry Heaters	IBC®	IRC®
~~E1886—13A~~ E1886—2013A	Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials	IBC®	IRC®
~~E1996—14a~~ E1996—2017	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC®	
~~E2174—14b~~ E2174—2018	Standard Practice for On-site Inspection of Installed Fire Stops	IBC®	
~~E2273—03(2011)~~ E2273—2018	Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies	IBC®	IRC®
~~E2307—15b~~ E2307—15BE1	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using the Intermediate-scale, Multistory Test Apparatus	IBC®	
~~E2353—14~~ E2353—2016	Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards and Balustrades	IBC®	
~~E2404—15a~~ E2404—2017	Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) and Wood Wall or Ceiling Coverings, Facing and Veneers to Assess Surface Burning Characteristics	IBC®	IFC®
E2556/~~E2556M—10~~ E2556M—2010(2016)	Standard Specification for Vapor Permeable Flexible Sheet Water-resistive Barriers Intended for Mechanical Attachment	IBC®	
~~E2568—09e1~~ E2568—	Standard Specification for PB Exterior Insulation and Finish Systems	IBC®	IRC®

~~2017A~~ E2570/E2570M—07(2014)e1	Standard Test Method for Evaluating Water-resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) for EIFS with Drainage	IBC®	IRC®
~~E2573—12~~ E2573—2017	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IBC®	IFC®
~~E2579—13~~ E2579—2015	Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics	IBC®	IFC®
~~E2599—15~~ E2599—2018	Standard Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics	IBC®	
~~E2634—11(2015)~~ E2634—2018	Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems	IBC®	IRC®
E2751/~~E2751M—13~~ E2751M—2017A	Practice for Design and Performance of Supported Laminated Glass Walkways	IBC®	
~~F547—06(2012)~~ F547—2017	Terminology of Nails for Use with Wood and Wood-base Materials	IBC®	
~~F1667—15~~ F1667—2018	Specification for Driven Fasteners: Nails, Spikes and Staples	IBC®	IRC®
~~F2200—14~~ F2200—2017	Standard Specification for Automated Vehicular Gate Construction	IBC®	IFC®
~~G154—12a~~ G154—2016A	Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials	IBC®	

AWC — American Wood Council

Standard Reference Number	Title	Referenced In Code(s):	
AWC ~~STJR—2015~~ STJR—2021	Span Tables for Joists and Rafters	IBC®	IRC®
ANSI/AWC ~~PWF—2015~~ PWF—2021	Permanent Wood Foundation Design Specification	IBC®	IRC®
ANSI/AWC ~~SDPWS—2015~~ SDPWS—2021	Special Design Provisions for Wind and Seismic	IBC®	

AWPA — American Wood Protection Association

Standard Reference Number	Title	Referenced In Code(s):	
~~M4—16~~ M4—15	Standard for the Care of Preservative-treated Wood Products	IBC®	IRC®
~~U1—16~~ U1—20	USE CATEGORY SYSTEM: User Specification for Treated Wood Except Commodity Specification H	IBC®	IRC®

AWS — American Welding Society

Standard Reference Number	Title	Referenced in Code(s):
D1.4/~~D1.4M—2017~~ D1.4M—2018	Structural Welding ~~Code—Reinforcing Steel Including Metal Inserts and Connections in Reinforced Concrete Construction~~ Code—Steel Reinforcing Bars	IBC®

BHMA — Builders Hardware Manufacturers' Association

Standard Reference Number	Title	Referenced In Code(s):
A ~~156.10—2011~~ 156.10—2017	Power Operated Pedestrian Doors	IBC®

A ~~156.19—2013~~ 156.19—2020	Standard for Power Assist and Low Energy Power Operated Doors	IBC®
A ~~156.27—2011~~ 156.27—2019	Power and Manual Operated Revolving Pedestrian Doors	IBC®
A ~~156.38—2014~~ 156.38—2020	Low Energy Power Operated Sliding and Folding Doors	IBC®

CSA — Canadian Standards Association

Standard Reference Number	Title	Referenced In Code(s):
ASME ~~A17.1—2016~~ A17.1—2019/CSA ~~B44—16~~ B44—19	Safety Code for Elevators and Escalators	IBC®
ASME A17.7—2007/CSA B44.7—07(R2017)	Performance-based Safety Code for Elevators and Escalators	IBC®

DASMA — Door & Access Systems Manufacturers Association International

Standard Reference Number	Title	Referenced in Code(s):
ANSI/DASMA ~~115—2016~~ 115—2017	Standard Method for Testing Sectional Garage Doors, Rolling Doors and Flexible Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind Pressure	IBC®

DOC — U.S. Department of Commerce

Standard Reference Number	Title	Referenced In Code(s):	
PS ~~1—09~~ 1—19	Structural Plywood	IBC®	IRC®
PS ~~2—18~~ 2—18	Performance Standard for ~~Wood-based Structural-use~~ Wood Structural Panels	IBC®	IRC®
PS 20—05	American Softwood Lumber Standard	IBC®	IRC®

FM — FM Approvals

Standard Reference Number	Title	Referenced in Code(s):
~~4880—2015~~ 4880—2017	~~Approval~~ American National Standard for ~~Class 1 Fire Rating of Building Panels or~~ Evaluating the Fire Performance Insulated Building Panel Assemblies and Interior Finish Materials	IBC®

GA — Gypsum Association

Standard Reference Number	Title	Referenced in Code(s):
GA ~~216—2016~~ 216—2018	Application and Finishing of Gypsum Panel Products	IBC®
GA ~~600—2015~~ 600—2018	Fire-resistance and Sound Control Design Manual, ~~21st~~ 22nd Edition	IBC®

NAAMM — National Association of Architectural Metal Manufacturers

Standard Reference Number	Title	Referenced in Code(s):
FP ~~1001—17~~ 1001—18	Guide Specifications for Design of Metal Flag Poles	IBC®

NCMA	National Concrete Masonry Association	
Standard Reference Number	**Title**	**Referenced In Code(s):**
TEK ~~5—84(1996~~ 2005)	Details for Concrete Masonry Fire Walls	IBC®

NFPA	National Fire Protection Association		
Standard Reference Number	**Title**	**Referenced In Code(s):**	
~~10—18~~ 10—21	Standard for Portable Fire Extinguishers	IBC®	IFC®
11—16	Standard for ~~Low~~ Low-, Medium, and High Expansion Foam	IBC®	IFC®
~~12A—15~~ 12A—18	Standard on Halon 1301 Fire Extinguishing Systems	IBC® IPMC®	IFC®
~~13—16~~ 13—19	Standard for Installation of Sprinkler Systems	IBC® IRC®	IFC®
~~13D—16~~ 13D—19	Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes	IBC® IRC®	IFC®
~~13R—16~~ 13R—19	Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies	IBC® IRC®	IFC®
~~14—16~~ 14—19	Standard for the Installation of Standpipe and Hose System	IBC®	IFC®
~~16—15~~ 16—19	Standard for the Installation of Foam-water Sprinkler and Foam-water Spray Systems	IBC®	IFC®
~~17—17~~ 17—20	Standard for Dry Chemical Extinguishing Systems	IBC® IPMC®	IFC®
~~17A—17~~ 17A—20	Standard for Wet Chemical Extinguishing Systems	IBC® IPMC®	IFC®
~~20—16~~ 20—19	Standard for the Installation of Stationary Pumps for Fire Protection	IBC®	IFC®
~~30—18~~ 30—21	Flammable and Combustible Liquids Code	IBC®	IFC®
~~30A—18~~ 30A—21	Code for Motor Fuel Dispensing Facilities and Repair Garages	IBC® IFGC®	IFC® IMC®
~~31—16~~ 31—20	Standard for the Installation of Oil-burning Equipment	IBC® IMC®	IFC® IRC®
32—16	Standard for ~~Dry Cleaning Plants~~ Drycleaning Facilities	IBC®	IFC®
~~40—16~~ 40—19	Standard for the Storage and Handling of Cellulose Nitrate Film	IBC®	IFC®
~~45—15~~ 45—19	Standard on Fire Protection Laboratories Using Chemicals (2015 Edition)	IBC®	IFC®
~~58—17~~ 58—20	Liquefied Petroleum Gas Code	IBC® IFGC® IRC®	IFC® IMC®
~~61—17~~ 61—20	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Product Facilities	IBC®	IFC®
~~72—16~~ 72—19	National Fire Alarm and Signaling Code	IBC® IMC® IRC®	IFC® IPMC®
~~80—16~~ 80—19	Standard for Fire Doors and Other Opening Protectives	IBC® IPMC®	IFC®
~~82—14~~ 82—19	Standard on Incinerators and Waste and Linen Handling Systems and Equipment	IBC® IMC®	IFGC®
~~85—15~~ 85—19	Boiler and Combustion System Hazards Code	IBC® IFGC® IRC®	IFC® IMC®
~~92—15~~ 92—18	Standard for Smoke Control Systems	IBC® IMC®	IFC®

~~99—18~~ 99—21	Health Care Facilities Code	IBC® IPC®	IFC®
~~101—18~~ 101—21	Life Safety Code	IBC®	IFC®
~~105—16~~ 105—19	Standard for Smoke Door Assemblies and Other Opening Protectives	IBC® IPMC®	IFC®
~~110—16~~ 110—19	Standard for Emergency and Standby Power Systems	IBC®	IFC®
~~111—13~~ 111—19	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IBC®	IFC®
~~120—15~~ 120—20	Standard for Fire Prevention and Control in Coal Mines	IBC®	IFC®
~~211—16~~ 211—19	Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances	IBC® IFGC® IRC®	IFC® IMC®
~~221—18~~ 221—21	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls	IBC®	
~~253—15~~ 253—19	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC®	IFC®
~~265—15~~ 265—19	Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls	IBC®	IFC®
~~286—15~~ 286—19	Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IBC® IMC®	IFC® IRC®
~~276—15~~ 276—19	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components	IBC®	
~~289—18~~ 289—19	Standard Method of Fire Test for Individual Fuel Packages	IBC®	IFC®
~~484—18~~ 484—19	Standard for Combustible Metals	IBC®	
~~652—16~~ 652—19	Standard on the Fundamentals of Combustible Dust	IBC®	IFC®
~~654—17~~ 654—20	Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids	IBC®	IFC®
~~664—17~~ 664—20	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities	IBC®	IFC®
~~701—15~~ 701—19	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	IBC®	IFC®
~~750—15~~ 750—19	Standard on Water Mist Fire Protection Systems	IBC®	IFC®
~~2001—15~~ 2001—18	Standard on Clean Agent Fire Extinguishing Systems	IBC® IPMC®	IFC®
~~2010—15~~ 2010—20	Standard for Fixed Aerosol Fire-extinguishing Systems	IBC®	IFC®

PCI — Precast Prestressed Concrete Institute

Standard Reference Number	Title	Referenced In Code(s):
~~MNL-124—11~~ PCI 124—18	~~Design~~ Specification for Fire Resistance of Precast / Prestressed Concrete	IBC®
~~MNL-128—01~~ PCI 128—19	~~Recommended Practice~~ Specification for Glass Fiber Reinforced Concrete Panels	IBC®

PTI — Post-Tensioning Institute

Standard Reference Number	Title	Referenced In Code(s):
PTI ~~DC—10.5-12~~ DC—10.5-19	Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive and Stable Soils	IBC®

SBCA — Structural Building Components Association

Standard Reference Number	Title	Referenced in Code(s):
ANSI/FS 100-12(R2018)	Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating	IBC®

Sheathing Used in Exterior Wall Covering Assemblies

SPRI	Single-Ply Roofing Institute	
Standard Reference Number	**Title**	**Referenced In Code(s):**
ANSI/SPRI/FM ~~4435-ES-1—11~~ 4435 ES-1—17	Wind Test Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC®
ANSI/SPRI ~~RP-4—13~~ RP-4—18	Wind Design Guide for Ballasted Single-ply Roofing Systems	IBC®
ANSI/SPRI ~~VF-1—16~~ VF-1—17	External Fire Design Standard for Vegetative Roofs	IBC®

TIA	Telecommunications Industry Association	
Standard Reference Number	**Title**	**Referenced In Code(s):**
~~222-H—2016~~ ANSI/TIA 222-H—2017	Structural ~~Standards~~ Standard for Antenna Supporting Structures ~~and Antennas~~ , Antennas and Small Wind Turbine Support Structures	IBC®

TMS	The Masonry Society	
Standard Reference Number	**Title**	**Referenced In Code(s):**
~~302—2012~~ 302—2018	Standard Method for Determining the Sound Transmission Class Rating for Masonry Walls	IBC®

UL	UL LLC		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
10A—2009	Tin Clad Fire Doors—with Revisions through ~~December 2013~~ July 2018	IBC®	
~~10C—2009~~ 10C—2016	Positive Pressure Fire Tests of Door ~~Assemblies—with Revisions through February 2015~~ Assemblies	IBC®	
14B—2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors—with Revisions through ~~May 2013~~ July 2017	IBC®	
~~14C—06~~ 14C—2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs—with Revisions through ~~May 2013~~ July 2017	IBC®	
~~55A—04~~ 55A—2004	Materials for Built-up Roof Coverings	IBC®	IRC®
103—2010	Factory-built Chimneys, for Residential Type and Building Heating Appliances—with Revisions through ~~July 2012~~ March 2017	IBC® IMC®	IFGC® IRC®
127—2011	Factory-built Fireplaces—with Revisions through ~~May 2015~~ July 2016	IBC® IMC®	IFGC® IRC®
~~199E—04~~ 199E—2004	Outline of Investigation for Fire Testing of Sprinklers and Water Spray Nozzles for Protection of Deep Fat Fryers	IBC®	IFC®
~~217—06~~ 217—2015	Single and Multiple Station Smoke Alarms—with Revisions through ~~October 2015~~ November 2016	IBC® IRC®	IFC®
263—11	Fire Tests of Building Construction and Materials—with Revisions through ~~June 2015~~ March 2018	IBC®	
~~268—09~~ 268—2016	Smoke Detectors for Fire Alarm ~~Systems~~ Systems-with revisions through July 2016	IBC® IPMC®	IFC®
~~294—1999~~ 294—2018	Access Control System Units—with Revisions through ~~February 2015~~ October 2018	IBC®	IFC®
	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking		

~~300—05~~ 300—2005(R2010)	Equipment—with Revisions through December 2014	IBC®	IFC®
~~300A—06~~ 300A—2006	Outline of Investigation for Extinguishing System Units for Residential Range Top Cooking Surfaces	IBC®	IFC®
305—2012	Panic Hardware—with Revisions through ~~August 2014~~ March 2017	IBC®	IFC®
~~325—02~~ 325—2017	Door, Drapery, Gate, Louver and Window Operations and ~~Systems—with Revisions through May 2015~~ Systems	IBC® IRC®	IFC®
555—2006	Fire Dampers—with Revisions through ~~May 2014~~ October 2016	IBC®	
~~555C—2006~~ 555C—2014	Ceiling Dampers—with Revisions through ~~December 2014~~ May 2017	IBC®	
~~555S—99~~ 555S—2014	Smoke Dampers—with Revisions through ~~February 2014~~ October 2016	IBC®	IMC®
580—2006	Test for Uplift Resistance of Roof Assemblies—with Revisions through October ~~2013~~ 2018	IBC®	
641—2010	Type L Low-temperature Venting Systems—with Revisions through ~~June 2013~~ April 2018	IBC® IMC®	IFGC® IRC®
~~723—2008~~ 723—2018	Test for Surface Burning Characteristics of Building ~~Materials—with Revisions through August 2013~~ Materials	IBC® IWUIC®	IMC®
~~790—04~~ 790—2004	Standard Test Methods for Fire Tests of Roof Coverings—with Revisions through ~~July 2014~~ October 2018	IBC® IFC®	IEBC® IRC®
~~793—08~~ 793—2008	Automatically Operated Roof Vents for Smoke and Heat—with Revisions through ~~September 2011~~ March 2017	IBC®	IFC®
~~864—03~~ 864—2014	Control Units and Accessories for Fire Alarm Systems—with Revisions through ~~December 2014~~ March 2018	IBC®	IFC®
~~924—06~~ 924—2016	Safety Emergency Lighting and Power Equipment—with Revisions through ~~April 2014~~ May 2018	IBC®	IFC®
~~1040—96~~ 1040—1996	Fire Test of Insulated Wall Construction—with Revisions through ~~October 2012~~ April 2017	IBC®	IRC®
1256—02	Fire Test of Roof Deck Construction—with Revisions through ~~July 2013~~ August 2018	IBC®	IRC®
~~1479—03~~ 1479—2015	Fire Tests of Penetration ~~Firestops—with Revisions through June 2015~~ Firestops	IBC® IRC®	IMC®
~~1703—02~~ 1703—2002	Flat-plate Photovoltaic Modules and Panels—with Revisions through ~~October 2015~~ September 2018	IBC®	IRC®
1715—97	Fire Test of Interior Finish Material—with Revisions through ~~January 2013~~ April 2017	IBC®	IRC®
1741—2010	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through ~~January 2015~~ February 2018	IBC®	IRC®
1777—2007	Chimney Liners—with Revisions through ~~October 2015~~ April 2014	IBC® IMC®	IFGC®
~~1784—01~~ 1784—2015	Air Leakage Tests of Door ~~Assemblies—with Revisions through February 2015~~ Assemblies	IBC®	IECC
~~1897—12~~ 1897—2015	Uplift Tests for Roof Covering ~~Systems—with Revisions through September 2015~~ Systems	IBC®	IRC®
~~1994—04~~ 1994—2015	Luminous Egress Path Marking ~~Systems—with Revisions through May 2015~~ Systems	IBC®	IFC®
~~2034—2008~~ 2034—2017	Single- and Multiple-station Carbon Monoxide Alarms—with Revisions through ~~March 2015~~ September 2018	IBC®	
2075—2013	Standard for Gas and Vapor Detectors and ~~Sensors~~ Sensors-with revisions through December 2017	IBC® IMC®	IFC® IRC®
~~2079—04~~ 2079—2015	Tests for Fire Resistance of Building Joint ~~Systems—with Revisions through August 2015~~ Systems	IBC®	IFC®
~~2196—2001~~ 2196—2017	~~Tests~~ Standard for Fire ~~Resistive Cables—with Revisions through March 2012~~ Test for Circuit Integrity of Fire- Resistive Power, Instrumentation, Control and Data Cables	IBC®	IFC®
2200—2012	Stationary Engine Generator Assemblies—with Revisions through ~~July~~ October 2015	IBC® IFGC®	IFC® IMC®
2202—2009	Electric Vehicle (EV) Charging System ~~Equipment~~ Equipment-with revisions through February 2018	IBC®	

~~2594—2013~~ 2594—2016	Electric Vehicle Supply Equipment	IBC®
2703—2014	~~Outline of Investigation for~~ Mounting Systems, Mounting Devices, Clamping/Retention Devices and Ground Lugs for Use with Flat-plate Photovoltaic Modules and ~~Panels~~ Panels-with revisions through December 2019	IBC®

ULC	Underwriters Laboratories of Canada		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
CAN/ULC S ~~102.2—2010~~ 102.2—2018	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and ~~Assemblies—with 2000 Revisions~~ Assemblies	IBC®	IRC®

Reason: THIS IS THE ADMIN STANDARDS UPDATE CODE CHANGE FOR THE IBC.
The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2018, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

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

Proposal # 5823

ADM47-IBC-19

Sub Code: Energy Conservation

R8967/RE9-19 Part I

37

Date Submitted	2/12/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R202 (IRC N1101.6)

This change is already part of the 2020 FBC-EC.

Summary of Modification

This simply changing the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C

Rationale

This simply changing the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C. Part II of the proposal would also change the definition in IRC Chapter 2 in the same manner so that all are uniform for better code compliance and enforcement.

Comment Period History

R8967-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Submitted

2018 International Energy Conservation Code

Revise as follows:

SECTION R202 (IRC N1101.6)
GENERAL DEFINITIONS

Revise as follows:

ROOF ~~RE-COVER~~ RECOVER. The process of installing an additional roof covering over ~~a prepared~~ an existing roof covering without removing the existing roof covering.

Code Change No: RE9-19 Part I

Original Proposal

Section(s): Part I: R202 (IRC N1101.6)

Proponent: Donald Sivigny, representing State of MN and Association of Minnesota Building Officials (don.sivigny@state.mn.us)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- RESIDENTIAL COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2018 International Energy Conservation Code

Revise as follows:

SECTION R202 (IRC N1101.6)
GENERAL DEFINITIONS

Revise as follows:

ROOF ~~RE-COVER~~ RECOVER. The process of installing an additional roof covering over ~~a prepared~~ an existing roof covering without removing the existing roof covering.

Reason: This simply changing the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C. Part II of the proposal would also change the definition in IRC Chapter 2 in the same manner so that all are uniform for better code compliance and enforcement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As this is only aligning a definition across multiple codes, there is no change in technical requirements. Thus, there is no impact to construction costs.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The definition change clarifies application. The change removes dated terminology. In addition, the committee cited the proponent's reason statement. (Vote: 11-0)

Assembly Action: **None**

Final Action

RE9-19 Part I	**AS**

R8968/RE9-19 Part II

38

Date Submitted	2/12/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R202 (IRC N1101.6)

Summary of Modification

Definition "Roof Recovery". This simply changes the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C.

Rationale

This simply changing the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C. Part II of the proposal would also change the definition in IRC Chapter 2 in the same manner so that all are uniform for better code compliance and enforcement.

Comment Period History

R8968-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

Approved as Submitted

2018 International Energy Conservation Code

Revise as follows:

[RB] ROOF RECOVER. The process of installing an additional *roof covering* over ~~a prepared~~ an existing roof covering without removing the existing roof covering.

Code Change No: RE9-19 Part II

Original Proposal

Section(s): Part I: R202 (IRC N1101.6)

Proponent: Donald Sivigny, representing State of MN and Association of Minnesota Building Officials (don.sivigny@state.mn.us)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- RESIDENTIAL COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2018 International Energy Conservation Code

Revise as follows:

[RB] ROOF RECOVER. The process of installing an additional *roof covering* over ~~a prepared~~ an existing roof covering without removing the existing roof covering.

Reason: This simply changing the language in the definition chapter of the IECC-R (and IRC Chapter 11) to be consistent with definition in IECC-C. Part II of the proposal would also change the definition in IRC Chapter 2 in the same manner so that all are uniform for better code compliance and enforcement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As this is only aligning a definition across multiple codes, there is no change in technical requirements. Thus, there is no impact to construction costs.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal removes unnecessary text and makes the definition clearer. (Vote: 10-1)

Assembly Action: **None**

Final Action

RE9-19 Part II **AS**

R8991/RE46-19

39

Date Submitted	2/15/2021	**Section**	402.2.4	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R402.2.4 (IRC N1102.2.4) (New), R402.2.4 (IRC N1102.2.4)

Summary of Modification

R402.2.4 includes both prescriptive provisions and non-tradeable installation specifications. This proposal does not add new requirements; rather, it separates the prescriptive and mandatory provisions into separate sections.

Rationale

R402.2.4 includes both prescriptive provisions (required insulation levels) and non-tradeable (mandatory) installation specifications. This proposal does not add new requirements; rather, it separates the prescriptive and mandatory provisions into separate sections. The insulation installation requirements of new Sec. R402.2.4.1 have no value or metric that can be used for modeling purposes; they are non-tradeable (mandatory).

Note that the SEHPCAC has a proposal to eliminate the use of the labels "prescriptive “and "mandatory" in favor of a tabular method of identifying non-tradeable requirements. If that proposal is successful, ICC staff have stated that sections being individually approved to be labeled as ‘mandatory’ will instead have their respective section numbers added to the new C407.2 table of requirements that are non-tradeable in the performance path.

This proposal is submitted by the ICC Sustainable, Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance International Codes with regard to sustainability, energy and high performance as it relates to the built environment included, but not limited to, how these criteria relate to the International Green Construction Code (IgCC) and the International Energy Conservation Code (IECC). In 2018-2019, the SEHPCAC has held five two- or three-day open meetings and numerous workgroup calls, to discuss and debate proposed changes and public comments. Attendees at the meetings and calls included members of the SEHPCAC as well as any interested parties. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx (http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx)

Comment Period History

R8991-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC’s recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Energy Conservation Code

Add new text as follows:

R402.2.4 (IRC N1102.2.4) Access hatches and doors. Access hatches and doors from conditioned to unconditioned spaces such as attics and crawlspaces shall be insulated to the same level required for the wall or ceiling R-value in Table R402.1.2 in which they are installed.

Exception: Vertical doors providing access from conditioned spaces to unconditioned spaces that comply with the fenestration requirements of Table R402.1.2 based on the applicable climate zone specified in Chapter 3

Revise as follows:

~~**R402.2.4 (IRC N1102.2.4)**~~ **R402.2.4.1 (IRC N1102.4.1) Access hatches and doors installation (Mandatory).** Access hatches and doors from *conditioned spaces* to *unconditioned spaces* such as attics and crawl spaces shall be ~~weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces.~~ weatherstripped. Access that prevents damaging or compressing the insulation shall be provided to all equipment. Where loose-fill insulation is installed, a wood-framed or equivalent baffle or retainer shall be installed to prevent the loose-fill insulation from spilling into the living space when the attic access is opened. The baffle or retainer shall provide a permanent means of maintaining the installed Rvalue of the loose-fill insulation.

~~**Exception:** Vertical doors providing access from *conditioned spaces* to *unconditioned spaces* that comply with the fenestration requirements of Table R402.1.2 based on the applicable *climate zone* specified in Chapter 3.~~

Code Change No: RE46-19

Original Proposal

Section(s): R402.2.4 (IRC N1102.2.4) (New), R402.2.4 (IRC N1102.2.4)

Proponent: David Collins, SEHPCAC, representing SEHPCAC (SEHPCAC@iccsafe.org); David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

2018 International Energy Conservation Code

Add new text as follows:

R402.2.4 (IRC N1102.2.4) Access hatches and doors. Access hatches and doors from conditioned to unconditioned spaces such as attics and crawlspaces shall be insulated to the same level required for the wall or ceiling R-value in Table R402.1.2 in which they are installed.

> **Exception:** Vertical doors providing access from conditioned spaces to unconditioned spaces that comply with the fenestration requirements of Table R402.1.2 based on the applicable climate zone specified in Chapter 3

Revise as follows:

~~R402.2.4 (IRC N1102.2.4)~~ R402.2.4.1 (IRC N1102.4.1) Access hatches and doors installation (Mandatory). Access hatches and doors from *conditioned spaces* to *unconditioned spaces* such as attics and crawl spaces shall be ~~weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces.~~ weatherstripped. Access that prevents damaging or compressing the insulation shall be provided to all equipment. Where loose-fill insulation is installed, a wood-framed or equivalent baffle or retainer shall be installed to prevent the loose-fill insulation from spilling into the living space when the attic access is opened. The baffle or retainer shall provide a permanent means of maintaining the installed Rvalue of the loose-fill insulation.

> ~~**Exception:** Vertical doors providing access from *conditioned spaces* to *unconditioned spaces* that comply with the fenestration requirements of Table R402.1.2 based on the applicable *climate zone* specified in Chapter 3.~~

Reason: R402.2.4 includes both prescriptive provisions (required insulation levels) and non-tradeable (mandatory) installation specifications.

This proposal does not add new requirements; rather, it separates the prescriptive and mandatory provisions into separate sections.

The insulation installation requirements of new Sec. R402.2.4.1 have no value or metric that can be used for modeling purposes; they are non-tradeable (mandatory).

Note that the SEHPCAC has a proposal to eliminate the use of the labels "prescriptive "and "mandatory" in favor of a tabular method of identifying non-tradeable requirements. If that proposal is successful, ICC staff have stated that sections being individually approved to be labeled as 'mandatory' will instead have their respective section numbers added to the new C407.2 table of requirements that are non-tradeable in the performance path.

This proposal is submitted by the ICC Sustainable, Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance International Codes with regard to sustainability, energy and high performance as it relates to the built environment included, but not limited to, how these criteria relate to the International Green Construction Code (IgCC) and the International Energy Conservation Code (IECC). In 2018-2019, the SEHPCAC has held five two- or three-day open meetings and numerous workgroup calls, to discuss and debate proposed changes and public comments. Attendees at the meetings and calls included members of the SEHPCAC as well as any interested parties. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx (http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx)

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

The code change may increase construction costs for a subset of buildings that may have been designed using the Total Building Performance or EIR compliance methods that included did not include weatherstripping or baffles around the applicable hatches and doors.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This clarifies prescriptive and mandatory requirements (Vote: 10-1)

Assembly Action: **None**

Final Action

RE46-19 **AS**

Sub Code: Existing Building

R8806/EB17-19

40

Date Submitted	2/10/2021	**Section**	301	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			**Staff Classification**	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments **Yes**

Related Modifications

301, 301.1, 302, 302.1, 503, and 503.1

Summary of Modification

The change provides an editorial correction to make sure the user understands that Section 305 also allows construction of alterations to a different and lesser technical requirement.

Rationale

To make provisions of Ch 3 IEBC applicable to all existing building work regardless of he compliance method. Also, see attached.

Comment Period History

R8806-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted (AS)

2018 International Existing Building Code

CHAPTER 3
PROVISIONS FOR ALL COMPLIANCE METHODS

Revise as follows:

SECTION 301
~~ADMINISTRATION~~ SCOPE

301.1 ~~General~~ Applicability. The *repair*, *alteration*, *change of occupancy*, *addition* or relocation of all *existing buildings* shall comply with Section 301.2, 301.3, or 301.4. The provisions of Sections 302 through 305 shall apply to all alterations, repairs, additions, relocation of structures and changes of occupancy regardless of compliance method.

SECTION 302
GENERAL PROVISIONS

Delete without substitution:

~~302.1 Applicability.The provisions of Section 302 apply to all *alterations*, *repairs*, *additions*, relocations of structures and *changes of occupancy* regardless of compliance method.~~

SECTION 503
ALTERATIONS

Revise as follows:

503.1 General.~~Except as provided by Section 302.4, 302.5 or this section,~~ *alterations* Alterations to any building or structure shall comply with the requirements of the International Building Code for new construction. *Alterations* shall be such that the *existing building* or structure is not less complying with the provisions of the International Building Code than the *existing building* or structure was prior to the *alteration*.

Exceptions:

1. An existing stairway shall not be required to comply with the requirements of Section 1011 of the International Building Code where the existing space and construction does not allow a reduction in pitch or slope.
2. Handrails otherwise required to comply with Section 1011.11 of the International Building Code shall not be required to comply with the requirements of Section 1014.6 of the International Building Code regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.
3. Where provided in below-grade transportation stations, existing and new escalators shall have a clear width of less than 32 inches (815 mm).

Code Change No: EB17-19

Original Proposal

Section(s): CHAPTER 3, SECTION 301, 301.1, SECTION 302, 302.1, SECTION 503, 503.1

Proponents: Gina Hilberry, Scoping Task Group of ICC/A117.1 Standard Development Committee, representing United Cerebral Palsy (gina@cohenhilberry.com); Rick Lupton, representing Self (sparkylupton@msn.com); Marsha Mazz, representing United Spinal Association (m.mazz@verizon.net); Gene Boecker, representing Code Consultants, Inc.(geneb@codeconsultants.com)

2018 International Existing Building Code

CHAPTER 3
PROVISIONS FOR ALL COMPLIANCE METHODS

Revise as follows:

SECTION 301
~~ADMINISTRATION~~ SCOPE

301.1 ~~General~~ Applicability. The *repair*, *alteration*, *change of occupancy*, *addition* or relocation of all *existing buildings* shall comply with Section 301.2, 301.3, or 301.4. The provisions of Sections 302 through 305 shall apply to all alterations, repairs, additions, relocation of structures and changes of occupancy regardless of compliance method.

SECTION 302
GENERAL PROVISIONS

Delete without substitution:

~~302.1 Applicability.~~ ~~The provisions of Section 302 apply to all *alterations*, *repairs*, *additions*, relocations of structures and *changes of occupancy* regardless of compliance method.~~

SECTION 503
ALTERATIONS

Revise as follows:

503.1 General. ~~Except as provided by Section 302.4, 302.5 or this section, *alterations*~~ Alterations to any building or structure shall comply with the requirements of the International Building Code for new construction. *Alterations* shall be such that the *existing building* or structure is not less complying with the provisions of the International Building Code than the *existing building* or structure was prior to the *alteration*.

Exceptions:

1. An existing stairway shall not be required to comply with the requirements of Section 1011 of the International Building Code where the existing space and construction does not allow a reduction in pitch or slope.

2. Handrails otherwise required to comply with Section 1011.11 of the International Building Code shall not be required to comply with the requirements of Section 1014.6 of the International Building Code regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.
3. Where provided in below-grade transportation stations, existing and new escalators shall have a clear width of less than 32 inches (815 mm).

Reason: An intent of the IEBC changes creating the 2018 edition was to make the provisions of Chapter 3 applicable to all existing building work regardless of the compliance method chosen. Our group's concern was that the route a code user must follow to get to requirements of Section 305 was unclear. Section 305 contains provisions which are 'exceptions' from compliance with the IBC and the ICC A117.1 standard; thus the text of 503.1 is incomplete because it doesn't like you to exceptions in Section 305. Section 305 is similar to 302.4 and 302.5 in that something less than full compliance with IBC is allowed. We noticed that the other compliance methods had no link within them to Chapter 3.

The real problem, and the solution, is in the beginning of Chapter 3 where it fails to clearly state its purpose except in the title to the chapter. Titles are not code. It is essential that Section 301.1 state that Chapter 3 applies to all compliance methods as the title states.

We further noticed that 302.1 had such language covering Section 302 – but the rest of the chapter has no such statement. This proposal fixes it. Once stated in Section 301.1, it isn't needed in 302. Once stated in 301, exceptions aren't needed in 503 or in any of the other compliance methods. We also recommend the title of 301 be changed to either Scope or Applicability. Administration is something for Chapter 1 and not appropriate here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change provides an editorial correction to make sure the user understands that Section 305 also allows construction of alterations to a different and lesser technical requirement. And to make sure that the text of the Chapter is corrected to reflect the title – provisions for All Compliance Methods.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The current language will get the code user to the correct sections but these revisions makes the links to the appropriate sections much cleaner. The provisions in Chapter 3 are intended to address all compliance methods. (Vote: 10-3)

Assembly Action: **None**

Final Action

EB17-19 **AS**

R9677/EB75-19

41

Date Submitted 3/11/2021	**Section** 1501.2.1	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes
TAC Recommendation Pending Review		
Commission Action Pending Review		**Staff Classification** Correlates Directly

Comments

General Comments **Yes**

Related Modifications

IEBC: [BS] 1501.2.1;
IBC: 3301.2.1

FBC-EB/Section 706.2

Summary of Modification

The proposal moves a provision about construction loads from IEBC Chapter 7 (Alterations – Level 1) to Chapter 15 (Construction Safeguards). Per ICC staff, IEBC Section 705 is linked to IBC Section 1511, so at ICC request, the proposal makes a matching move within the IBC.

Rationale

The proposal moves a provision about construction loads from IEBC Chapter 7 (Alterations – Level 1) to Chapter 15 (Construction Safeguards). Per ICC staff, IEBC Section 705 is linked to IBC Section 1511, so at ICC request, the proposal makes a matching move within the IBC.

The motivation for this proposal is simply to make the structural provisions of the IEBC Work Area and Prescriptive methods match as closely as possible – a motivation that received broad support in the last cycle, resulting in greatly improved consistency in the 2018 code.

This provision for reroofing, however, remains out of sync. Currently, the Work Area method has this provision in Section 705.2, but the Prescriptive method has no matching provision.

In the last cycle, proposal EB19-16 would have added a matching provision to the Prescriptive method. The ICC Committee supported the concept but suggested that instead of adding a duplicate provision, Section 705.2 should be moved to Chapter 15 where it made more sense and could serve both methods. Therefore, following the committee's suggestion, a public comment was submitted. At the PCH, the comment was easily approved by a nearly unanimous show of hands, but it received only 65% approval by OGV voters, so EB19-16 As Modified could not be approved despite broad consensus.

(Note: While both parts of this proposal should be approved, it is perhaps worth noting that the IEBC Prescriptive method still lacks reroofing provisions to match those of the Work Area method in Sec 705. To resolve this, one might propose creating a new section in IEBC Chapter 5 to match the remaining provisions in Sec 705. That could be done as a floor modification or as a public comment, but it is outside the initial narrow scope of this proposal. Going even further, one might propose deleting the rest of IBC Sec 1511 because it is entirely about reroofing, which is an Existing Buildings issue, but that, too, is outside the scope of this proposal.)

Comment Period History

R9677-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Approved as Submitted

2018 International Existing Building Code

Revise as follows:

[BS] ~~705.2~~ 1501.2.1 Structural and construction loads.Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

~~1511.2~~ 3301.2.1. Structural and construction loads.Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

Code Change No: EB75-19

Original Proposal

Section(s): IEBC: [BS] 1501.2.1;
IBC: 3301.2.1

Proponents: David Bonowitz, representing Self (dbonowitz@att.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2018 International Existing Building Code

Revise as follows:

[BS] ~~705.2~~ 1501.2.1 Structural and construction loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

~~1511.2~~ 3301.2.1. Structural and construction loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

Reason: The proposal moves a provision about construction loads from IEBC Chapter 7 (Alterations – Level 1) to Chapter 15 (Construction Safeguards). Per ICC staff, IEBC Section 705 is linked to IBC Section 1511, so at ICC request, the proposal makes a matching move within the IBC.

The motivation for this proposal is simply to make the structural provisions of the IEBC Work Area and Prescriptive methods match as closely as possible – a motivation that received broad support in the last cycle, resulting in greatly improved consistency in the 2018 code.

This provision for reroofing, however, remains out of sync. Currently, the Work Area method has this provision in Section 705.2, but the Prescriptive method has no matching provision.

In the last cycle, proposal EB19-16 would have added a matching provision to the Prescriptive method. The ICC Committee supported the concept but suggested that instead of adding a duplicate provision, Section 705.2 should be moved to Chapter 15 where it made more sense and could serve both methods. Therefore, following the committee's suggestion, a public comment was submitted. At the PCH, the comment was easily approved by a nearly unanimous show of hands, but it received only 65% approval by OGV voters, so EB19-16 As Modified could not be approved despite broad consensus.

(Note: While both parts of this proposal should be approved, it is perhaps worth noting that the IEBC Prescriptive method still lacks reroofing provisions to match those of the Work Area method in Sec 705. To resolve this, one might propose creating a new section in IEBC Chapter 5 to match the remaining provisions in Sec 705. That could be done as a floor modification or as a public comment, but it is outside the initial narrow scope of this proposal. Going even further, one might propose deleting the rest of IBC Sec 1511 because it is entirely about reroofing, which is an Existing Buildings issue, but that, too, is outside the scope of this proposal.)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely relocates existing provisions to more logical places.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal has no technical changes, it just relocates the provision to a more appropriate location. (Vote 12-2)

Assembly Action: **None**

R9677 Rationale

Final Action

EB75-19 AS

Sub Code: Residential

R8488/RB21-19

42

Date Submitted	2/4/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

Summary of Modification

This proposal simply revises the definition of roof assembly.

Rationale

This proposal simply revises the definition of roof assembly. The recent action on WUI proposal WUIC 1 added into the IWUIC a definition based on the IBC definition of roof assembly and it is being proposed here as a revision, for consistency among ICC definitions. Furthermore this definition is more accurate since not all roof assemblies will include an underlayment and the sentence already states that it does include a roof deck and, therefore, stating that it "can include a roof deck" is not correct. The proposed definition reads as follows:

[RB] ROOF ASSEMBLY. 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 includes the roof deck, underlayment and roof covering, and can also include a can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Comment Period History

R8488-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Deny: FRSA urges the TAC to reject the provision of this Mod in the TAC's recommendations to the Commission and that it should not be incorporated into the FBC.

Comment Period History

R8488-G2

Proponent Joseph Belcher **Submitted** 6/28/2021 **Attachments** No

Comment:

The Florida Home Builders Association (FHBA) requests denial of this code change due to the inclusion of the reference to Chapter 11 Section N1101.6.

AS - APPROVED AS SUBMITTED

Revise as follows:

[RB] ROOF ASSEMBLY. 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 ~~includes the roof deck, underlayment and *roof covering*, and can also include a~~ can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Code Change No: RB21-19

Original Proposal

Section(s): [RB] 202

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2018 International Residential Code

Revise as follows:

[RB] ROOF ASSEMBLY. 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 ~~includes the roof deck, underlayment and *roof covering*, and can also include a~~ can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Reason: This proposal simply revises the definition of roof assembly. The recent action on WUI proposal WUIC 1 added into the IWUIC a definition based on the IBC definition of roof assembly and it is being proposed here as a revision, for consistency among ICC definitions. Furthermore this definition is more accurate since not all roof assemblies will include an underlayment and the sentence already states that it does include a roof deck and, therefore, stating that it "can include a roof deck" is not correct.

The proposed definition reads as follows:

> **[RB] ROOF ASSEMBLY.** 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 includes the roof deck, underlayment and roof covering, and can also include a can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal based on the proponents published reason statement. These changes are consistent with other codes. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB21-19 **AS**

R9523/S34-19 Part II

43

Date Submitted	3/3/2021	**Section**	324.3.1	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

IRC: R324.3.1, R905.16.4, R905.17.5, Reference Standards UL

Sections R05.16.4 and R905.17.5 do not exist in the 2020 FBC-R.

Summary of Modification

UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Rationale

UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Approved as Submitted

2018 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.

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL 1703 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 1703 or with both UL 61730-1 and UL 61730-2.

Add new standard(s) as follows:

UL

61730-1-2017: Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction
61730-2-2017: Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing

Code Change No: S34-19 Part II

Original Proposal

Section(s): IRC®: R324.3.1, R905.16.4, R905.17.5, UL Chapter 44

Proponent: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2018 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.

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL 1703 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 1703 or with both UL 61730-1 and UL 61730-2.

Add new standard(s) as follows:

UL
61730-1-2017: Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction
61730-2-2017: Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing

Reason: UL 61730-1 and UL 61730-2 are new standards that will eventually replace UL 1703.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact because this simply provides alternative standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 61730-1-2017 and 61730-2-2017, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This harmonizes the referenced standards and provides options. (Vote: 10-0)

Assembly Action: **None**

Final Action

S34-19 Part II **AS**

R9761/RB30-19

44

Date Submitted	3/16/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R202, R301.1.4

Summary of Modification

This code change purpose is to introduce intermodal shipping containers into the International Residential Code based on requests by code officials in the U.S. Prior to this proposal.

Rationale

This code change purpose is to introduce intermodal shipping containers into the International Residential Code based on requests by code officials in the U.S. Prior to this proposal, several jurisdictions had created their own individual regulations or ordinances, or had administered additional requirements beyond the code (e.g. Section R104.11 “Alternative Materials, design and methods of construction and equipment”) so at to be comfortable to ensure a safe structure. This code change proposal is in response to those requests to develop a provision in order to establish a consistent set of provisions which cover the minimum safety requirements, but which do not duplicate existing code provisions.

The proposed definition is consistent with the successful code change proposal to the International Building Code, new Section 3114. For consistency, we are introducing that same definition here.

The reference to the International Building Code has been modeled after Sections R301.1.1 through R301.1.3. The BCAC Shipping Container Working Group chose not to duplicate the newly accepted shipping container structural design language in the International Building Code. This proposal is making a simple reference the new section in the IBC where the provisions for shipping container structural safety are contained. As Section R301.1 applies to structural design only, the other non-structural provisions of the International Residential Code would apply as required (e.g. energy, plumbing, mechanical, electrical, etc.). Also, because Section R301.1.1 deals with primarily alternative sources of structural design (e.g. independent reference standard structural design resources outside the codes), the BCAC shipping container Working Group determined it to be more appropriate to separate this reference to the IBC for clarity.

(Please see the uploaded mod RB30-19 for the complete text)

Comment Period History

R9761-G2

Proponent Joseph Belcher **Submitted** 6/28/2021 **Attachments** No

Comment:

The Florida Home Builders Association (FHBA) requests denial of this code change.

Comment Period History

R9761-G3

Proponent Joseph Belcher **Submitted** 6/28/2021 **Attachments** No

Comment:

The Florida Home Builders Association (FHBA) requests denial of this code change.

Approved as Modified by Public Comment 1

Original Proposal:

2018 International Residential Code

Revise as follows:

SECTION R202
DEFINITIONS

Add new text as follows:

INTERMODAL SHIPPING CONTAINER. A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

R301.1.4 Intermodal shipping containers.Intermodal shipping containers shall be designed in accordance with the structural provisions in Section 3114 of the International Building Code.

Modified Proposal:

2018 International Residential Code

R301.1.4 Intermodal shipping containers.Intermodal shipping containers that are repurposed for use as buildings or structures, or as part of buildings or structures, shall be designed in accordance with the structural provisions in Section 3114 of the International Building Code.

Code Change No: RB30-19

Original Proposal

Section(s): SECTION R202, 202, R301.1.4 (New)

Proponents: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2018 International Residential Code

Revise as follows:

SECTION R202
DEFINITIONS

Add new text as follows:

INTERMODAL SHIPPING CONTAINER. A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

R301.1.4 Intermodal shipping containers. Intermodal shipping containers shall be designed in accordance with the structural provisions in Section 3114 of the International Building Code.

Reason: This code change purpose is to introduce intermodal shipping containers into the International Residential Code based on requests by code officials in the U.S. Prior to this proposal, several jurisdictions had created their own individual regulations or ordinances, or had administered additional requirements beyond the code (e.g. Section R104.11 "Alternative Materials, design and methods of construction and equipment") so at to be comfortable to ensure a safe structure. This code change proposal is in response to those requests to develop a provision in order to establish a consistent set of provisions which cover the minimum safety requirements, but which do not duplicate existing code provisions.

The proposed definition is consistent with the successful code change proposal to the International Building Code, new Section 3114. For consistency, we are introducing that same definition here.

The reference to the International Building Code has been modeled after Sections R301.1.1 through R301.1.3. The BCAC Shipping Container Working Group chose not to duplicate the newly accepted shipping container structural design language in the International Building Code. This proposal is making a simple reference the new section in the IBC where the provisions for shipping container structural safety are contained. As Section R301.1 applies to structural design only, the other non-structural provisions of the International Residential Code would apply as required (e.g. energy, plumbing, mechanical, electrical, etc.). Also, because Section R301.1.1 deals with primarily alternative sources of structural design (e.g. independent reference standard structural design resources outside the codes), the BCAC shipping container Working Group determined it to be more appropriate to separate this reference to the IBC for clarity.

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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on theBCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will decrease the cost of construction. This new code section will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for residential building construction. Current use of repurposed intermodal shipping containers requires the owner or builder to submit through the alternative means and methods administrative provisions.

Report of Committee Action Hearings

Committee Action: **Disapproved**

Committee Reason: This should simply reference the IBC for intermodal shipping containers. These structures need to be engineered and don't belong in the IRC. (Vote: 8-3)

Assembly Action: **None**

Public Comments

Public Comment 1:

Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2018 International Residential Code

R301.1.4 Intermodal shipping containers. Intermodal shipping containers that are repurposed for use as buildings or structures, or as part of buildings or structures, shall be designed in accordance with the structural provisions in Section 3114 of the International Building Code.

Commenter's Reason: The IRC-B code development committee noted that the original proposal as written should be disapproved because:

- Shipping containers belong in the International Building Code.
- Performance based design required therefore does not belong in IRC.
- User can apply through the alternate means and methods provisions.
- The proposed language literally says nothing about utilizing shipping containers for structures and buildings.

We believe the arguments for an only IBC provision fall short as a result of comments brought to the shipping container task group's attention. One most notable finding was that there is still the belief that since the IRC does not address intermodal shipping containers that they are exempt from the IRC. Other comments received by the task group were views that since the containers are already designed and constructed to ISO specifications that there is no further need to design for use as dwellings. Both types of assumptions are not accurate. Therefore, it suggests a need for a direct reference.

Further, the shipping container task group has received compliments for proposing this language as it makes clear that said repurposed containers are in fact subject to the IBC structurally and the IRC for the remainder of the required code required attributes.

In regard to the perception that the proposed language falls short of identifying the utilization of shipping containers, we agree. In response we have modified the provision to address this short fall.

In view of the above, we recommend that this proposal be given consideration "as modified" at the fall ICC code hearings.

This public comment 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. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as w ell as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/codedevelopment-process/building-code-actioncommittee-bcac.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction The code change proposal and pubic comment will decrease the cost of construction. This new section will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for residential building construction. Current use of repurposed intermodal shipping containers requires the owner or builder to submit through the alternative means and methods administrative process.

Final Action

RB30-19	**AMPC1**

R8877/RB240-19

45

Date Submitted	2/11/2021	**Section**	703	**Proponent**	Mo Madani
Chapter	7	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

TABLE R703.6.3(1), TABLE R703.6.3(2), TABLE R905.7.5(2)

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

The box nail dimensions listed in Tables do not match those listed in ASTM F1667.

Rationale

The box nail dimensions listed in Tables do not match those listed in ASTM F1667.
The nominal head diameter of a 3d box, 4d box and 5d box nail is 0.219 inches with a minimum head diameter of 0.197 inches
The nominal head diameter of a 6d and 7d box nail is 0.266 inches. with a minimum head diameter of 0.239 inches
The nominal head diameter of an 8d box nail is 0.297 inches with a minimum head diameter of 0.267 inches
The nominal shank diameter (not shank thickness) of a 3d box nail is 0.076 inches with a minimum of 0.072 inches
The nominal shank diameter (not shank thickness) of a 4d and 5d box nail is 0.080 inches with a minimum of 0.076 inches
The nominal shank diameter (not shank thickness) of a 6d and 7d box nail is 0.099 inches with a minimum of 0.095 inches
The nominal shank diameter (not shank thickness) of an 8d box nail is 0.113 inches with a minimum of 0.109 inches
Listing the nail type (3d box, 4d box, etc.) and then the nominal length and nominal shank diameter provides a correct description of the fastener
The Cedar Shake & Shingle Bureau has listed in their installation manuals the use of box nails for installation these products.
In Table R703.6.3(2) the size of the R&R and sanded shingles should read 16", 18" and 24" not 16", 8" and 24"

Revise as follows:

TABLE R703.6.3(1)
SINGLE-COURSE SIDEWALL FASTENERS

SINGLE-COURSE SIDEWALL FASTENERS			
Product type	~~**Nail type , and minimum**~~ **shank diameter and length (inches)**	~~**Minimum head diameter (inches)**~~	~~**Minimum shank thickness (inches)**~~
R & R and sanded shingles			
16? and 18? shingles	3d box $1^1/_4$ x 0.076	~~0.19~~	~~0.08~~
24? shingles	4d box $1^1/_2$ x 0.076	~~0.19~~	~~0.08~~
Grooved shingles			
16? and 18? shingles	3d box $1^1/_4$ x 0.076	~~0.19~~	~~0.08~~
24? shingles	4d box $1^1/_2$ x 0.076	~~0.19~~	~~0.08~~
Split and sawn shakes			
18? straight-split shakes	5d box $1^3/_4$ x 0.080	~~0.19~~	~~0.08~~
18? and 24? handsplit shakes	6d box 2 x 0.099	~~0.19~~	~~0.0915~~
24? tapersplit shakes	5d box $1^3/_4$ x 0.080	~~0.19~~	~~0.08~~
18? and 24? tapersawn shakes	6d box 2 x 0.099	~~0.19~~	~~0.0915~~

For SI: 1 inch = 25.4 mm.

TABLE R905.7.5(2)
NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

SHAKES	NAIL TYPE, AND MINIMUMSHANK DIAMETER ANDLENGTH(inches)		
18? straight-split	5d box $1^3/_4$? x 0.080	~~0.19?~~	~~.080?~~
18? and 24? handsplit and resawn	6d box 2? x 0.099	~~0.19?~~	~~.0915?~~
24? taper-split	5d box $1^3/_4$? x 0.080	~~0.19?~~	~~.080?~~
18? and 24? tapersawn	6d box 2? x 0.099	~~0.19?~~	~~.0915?~~
Shingles	**Nail Type, and Minimum Shank Diamater and Length ~~(inches)~~**	~~**Minimum Head Size**~~	~~**Minimum Shank Diameter**~~
16? and 18?	3d box $1^1/_4$? x 0.076	~~0.19?~~	~~.080?~~
24?	4d box $1^1/_2$? x 0.080	~~0.19?~~	~~.080?~~

For SI: 1 inch = 25.4 mm.

MODIFICATION

Committee Modification:

The modification was to change the title of the 2nd column in Tables R703.6.3(1), R703.6.3(2) and R905.7.5(2) as follows:

R8877 Text Modification

Nail type, and minimum ~~shank diameter and~~ length and shank diameter (inches)

Code Change No: RB240-19

Original Proposal

Section(s): TABLE R703.6.3(1), TABLE R703.6.3(2), TABLE R905.7.5(2)

Proponents: Rick Allen, International Staple, Nail and Tool Association, representing International Staple, Nail and Tool Association (rallen@isanta.org)

2018 International Residential Code

Revise as follows:

TABLE R703.6.3(1)
SINGLE-COURSE SIDEWALL FASTENERS

SINGLE-COURSE SIDEWALL FASTENERS			
Product type	**~~Nail type , and minimum~~ shank diameter and length (inches)**	**~~Minimum head diameter (inches)~~**	**~~Minimum shank thickness (inches)~~**
R & R and sanded shingles			
16" and 18" shingles	3d box 1¼ x 0.076	~~0.19~~	~~0.08~~
24" shingles	4d box 1½ x 0.076	~~0.19~~	~~0.08~~
Grooved shingles			
16" and 18" shingles	3d box 1¼ x 0.076	~~0.19~~	~~0.08~~
24" shingles	4d box 1½ x 0.076	~~0.19~~	~~0.08~~
Split and sawn shakes			
18" straight-split shakes	5d box 1¾ x 0.080	~~0.19~~	~~0.08~~
18" and 24" handsplit shakes	6d box 2 x 0.099	~~0.19~~	~~0.0915~~
24" tapersplit shakes	5d box 1¾ x 0.080	~~0.19~~	~~0.08~~
18" and 24" tapersawn shakes	6d box 2 x 0.099	~~0.19~~	~~0.0915~~

For SI: 1 inch = 25.4 mm.

TABLE R905.7.5(2)
NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

SHAKES	NAIL TYPE, AND MINIMUMSHANK DIAMETER ANDLENGTH(inches)		
18" straight-split	5d box $1^{3}/_{4}$" x 0.080	~~0.19"~~	~~.080"~~
18" and 24" handsplit and resawn	6d box 2" x 0.099	~~0.19"~~	~~.0915"~~
24" taper-split	5d box $1^{3}/_{4}$" x 0.080	~~0.19"~~	~~.080"~~
18" and 24" tapersawn	6d box 2" x 0.099	~~0.19"~~	~~.0915"~~
Shingles	**Nail Type, and Minimum Shank Diamater and Length ~~(inches)~~**	**~~Minimum Head Size~~**	**~~Minimum Shank Diameter~~**
16" and 18"	3d box $1^{1}/_{4}$" x 0.076	~~0.19"~~	~~.080"~~
24"	4d box $1^{1}/_{2}$" x 0.080	~~0.19"~~	~~.080"~~

For SI: 1 inch = 25.4 mm.

Reason:
The box nail dimensions listed in Tables do not match those listed in ASTM F1667.
The nominal head diameter of a 3d box, 4d box and 5d box nail is 0.219 inches with a minimum head diameter of 0.197 inches
The nominal head diameter of a 6d and 7d box nail is 0.266 inches. with a minimum head diameter of 0.239 inches
The nominal head diameter of an 8d box nail is 0.297 inches with a minimum head diameter of 0.267 inches
The nominal shank diameter (not shank thickness) of a 3d box nail is 0.076 inches with a minimum of 0.072 inches
The nominal shank diameter (not shank thickness) of a 4d and 5d box nail is 0.080 inches with a minimum of 0.076 inches
The nominal shank diameter (not shank thickness) of a 6d and 7d box nail is 0.099 inches with a minimum of 0.095 inches
The nominal shank diameter (not shank thickness) of an 8d box nail is 0.113 inches with a minimum of 0.109 inches
Listing the nail type (3d box, 4d box, etc.) and then the nominal length and nominal shank diameter provides a correct description of the fastener
The Cedar Shake & Shingle Bureau has listed in their installation manuals the use of box nails for installation these products.
In Table R703.6.3(2) the size of the R&R and sanded shingles should read 16", 18" and 24" not 16", 8" and 24"

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These proposed changes do not change the existing requirements but instead clarify the description of the fasteners

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Committee Modification:

The modification was to change the title of the 2nd column in Tables R703.6.3(1), R703.6.3(2) and R905.7.5(2) as follows:

Nail type, and minimum ~~shank diameter and~~ length <u>and shank diameter</u> (inches)

Committee Reason: The modification changed the order of the column heading to match the information provided in the column below. The proposal is consistent with the industry standard, ASTM 1667 and clarifies requirements. (Vote: 10-0)

Assembly Action: **None**

Final Action

RB240-19	**AM**

R8945/RB274-19

46

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

The proposal makes two editorial changes.

Rationale

The proposal makes two editorial changes. The alternate for ASTM D 1970 is redundant as that standard is listed in Section R905.1.1. Table R905.1.1 (1) includes ASTM D226 Type II for high wind areas; that material is also appropriate for lower wind zone areas.

ORIGINAL

AS - APPROVED AS SUBMITTED

AM - APPROVED AS MODIFIED USING PUBLIC COMMENT 1

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* complying with ASTM D1970 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 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* for the applicable roof covering for maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:

   3.1. Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).

   3.2. The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.

   3.3. *Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).

   3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19 mm) into the roof sheathing.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 140 MPH	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult = 140 MPH
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D6757
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 ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing
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 D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ASTM D6757

For SI: 1 mile per hour = 0.447 m/s.

MODIFICATION
PUBLIC COMMENT 1

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 to ASTM D1970, and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.

2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a label indicating compliance to 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 for maximum ultimate design wind speeds, Vult, less than 140 miles per hour 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(4)B. Underlayment shall be attached in accordance with Table R905.1.1(3).

3. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:

   3.1. Apply a 19-inch-wide (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).

   3.2. The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.

3.3. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).

3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19 mm) into the roof sheathing.

Code Change No: RB274-19

Original Proposal

Section(s): R905.1.1, TABLE R905.1.1(1)

Proponents: Mike Fischer, Kellen Company, representing The Asphalt Roofing Manufacturers Association (mfischer@kellencompany.com)

2018 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* complying with ASTM D1970 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 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* for the applicable roof covering for maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:
   3.1. Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).
   3.2. The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.
   3.3. *Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).
   3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19 mm) into the roof sheathing.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 140 MPH	MAXIMUM ULTIMATE DESIGN WND SPEED, Vult ≥ 140 MPH
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D6757
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 ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing
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 D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ASTM D6757

For SI: 1 mile per hour = 0.447 m/s.

Reason: The proposal makes two editorial changes. The alternate for ASTM D 1970 is redundant as that standard is listed in Section R905.1.1. Table R905.1.1 (1) includes ASTM D226 Type II for high wind areas; that material is also appropriate for lower wind zone areas.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal based on the proponent's reason. The alternate for ASTM D1970 is redundant since it is listed in Section R905.1.1. Table R905.1.1(1) includes ASTM D226 Type II for high wind areas and is also appropriate for low wind zones. (Vote: 11-0)

Assembly Action: **None**

Public Comments

Public Comment 1:

T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Public Comment

Further modify as follows:

2018 International Residential Code

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 to ASTM D1970, and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a label indicating compliance to 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 for maximum ultimate design wind speeds, Vult, less than 140 miles per hour 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(4)B. Underlayment shall be attached in accordance with Table R905.1.1(3).
3. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:
   - 3.1. Apply a 19-inch-wide (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).
   - 3.2. The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.
   - 3.3. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).
   - 3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19 mm) into the roof sheathing.

Commenter's Reason: This public comment corrects 2 errors. While underlayment complying with ASTM D1970 is mentioned in Section R905.1.1, it is not specifically mentioned in Tables R905.1.1(1), R905.1.1(2), or R905.1.1(3). The exception is needed to maintain some of the specific criteria for the use of this underlayment such as roof ventilation and climate exposure.

The second part corrects an error related to the use 4 inch wind strips complying with ASTM D1970 over the joints in the roof deck. In areas where wind design is required in accordance with Figure R301.2(5)B, the intent was for the underlayment to be ASTM D226 Type II or ASTM D4868 Types III or IV with the enhanced fastening. This public comment makes that correction and also adds an additional modification to correlate with RB275 which was Approved as Submitted by the IRC B Committee.

This public comment also clarifies labeling language for ASTM D1970 underlayment products that is consistent with other underlayment products referenced in this section.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment will slightly increase the cost of construction. In areas where wind design is required, a heavier felt underlayment (30#) and enhanced fastening is required over the taped joints in the roof deck.

Final Action

RB274-19 **AMPC1**

R8946/RB275-19

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Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

This code change simply requires an extra layer of 30# roofing felt

Rationale

This code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2018 IRC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where wind design is required in accordance with Figure R301.2(4)B. The wind design required trigger is consistent with other limitations in the IRC and would also capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for the northeastern U.S. and Alaska, where the wind design required region is based on the 140 mph wind speed contour, the trigger remains the same. This proposal would also remove the enhanced underlayment requirements from the Special Wind Regions.

ORIGINAL

AS - APPROVED AS SUBMITTED

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* complying with ASTM D1970 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 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* for the applicable roof covering for ~~maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour~~ areas where wind design is not required in accordance with Figure R301.2(4)B shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.

3. ~~As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:~~

   3.1. ~~Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).~~

   3.2. ~~The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.~~

   3.3. ~~*Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32 gage sheet metal. Power driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).~~

   3.4. ~~The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than ¾ inch (19 mm) into the roof sheathing.~~

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140~~
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IVASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D6757~~
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing~~
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 D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ~~ASTM D6757~~

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(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four 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	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
		eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets19 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 four 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.	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 two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four 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 four 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.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: 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.	~~For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 unitshorizontal (4:12), u~~Underlayment shall be twolayers applied in the following
Mineral-surfaced roll roofing	R905.5		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Slate and slate-type shingles	R905.6		manner: apply a19-inch strip of underlayment felt parallel to andstarting at the eaves. Starting at the eave, apply36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4inches and shall be offset by 6 feet.~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall beone layer applied in the following manner: underlaymentshall be applied shingle fashion, parallelto and starting from the eave and lapped 4 inches.End laps shall be 4 inches and shall be offset by 6 feet.~~
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		
Photovoltaic shingles	R905.16	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four 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 four 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.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: 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.

TABLE R905.1.1(3)

UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 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 ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	R905.3		
Photovoltaic	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 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 ~~nails or cap staples with a nominal cap diameter of not lessthan 1 inch~~. Metal caps shall have a thickness of not less than32-gage sheet metal. Power-driven metal caps shall have aminimum thickness of 0.010 inch. Minimum thickness of theoutside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to
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(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
			penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Code Change No: RB275-19

Original Proposal

Section(s): R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3)

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

2018 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* complying with ASTM D1970 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 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* for the applicable roof covering for ~~maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour~~ areas where wind design is not required in accordance with Figure R301.2(4)B shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. ~~As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:~~
   - 3.1. ~~Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).~~
   - 3.2. ~~The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.~~
   - 3.3. ~~*Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32 gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).~~
   - 3.4. ~~The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140~~
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IVASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D6757~~
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing~~
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 D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ~~ASTM D6757~~

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(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four 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 sheets19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph except all laps shall be not less than 4 inches.~~ 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

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
		inches and shall be offset by 6 feet. For roof slopes of four 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.	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 two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four 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 four 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.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: 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.	~~For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 unitshorizontal (4:12), u~~Underlayment shall be twolayers applied in the following manner: apply a19-inch strip of underlayment felt parallel to andstarting at the eaves. Starting at the eave, apply36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4inches and shall be offset by 6 feet.~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall beone layer applied in the following manner: underlaymentshall be applied shingle~~
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(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
			~~fashion, parallelto and starting from the eave and lapped 4 inches.End laps shall be 4 inches and shall be offset by 6 feet.~~
Photovoltaic shingles	R905.16	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four 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 four 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.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: 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.

TABLE R905.1.1(3)
UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 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 ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage sheet
Clay and concrete tile	R905.3		
Photovoltaic	R905.16		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
			metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
Metal roof shingles	R905.4	Manufacturer's installation instructions.	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 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 ~~nails or cap staples with a nominal cap diameter of not lessthan 1 inch~~. Metal caps shall have a thickness of not less than32-gage sheet metal. Power-driven metal caps shall have aminimum thickness of 0.010 inch. Minimum thickness of theoutside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
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.

Reason: This code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2018 IRC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where wind design is required in accordance with Figure R301.2(4)B. The wind design required trigger is consistent with other limitations in the IRC and would also capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for the northeastern U.S. and Alaska, where the wind design required region is based on the 140 mph wind speed contour, the trigger remains the same. This proposal would also remove the enhanced underlayment requirements from the Special Wind Regions.

Water infiltration due to wind driven rain has been well documented from post-hurricane damage assessments where hurricane winds were strong enough to blow off the primary roof covering, but not strong enough to blow off roof sheathing. In such instances, significant property damage and extended occupant displacement routinely occur due to water intrusion. In many cases, the building will appear relatively undamaged from the exterior except for roof covering loss. However, a closer inspection would reveal significant interior and contents damage.

Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24–48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be

available for use. An insurance closed claims study for residential properties conducted following Hurricane Charley in 2004 indicated interior losses and additional living expenses were 27% of the total loss costs.

Recent hurricanes have not been an exception. The following photographs show buildings damaged due to Hurricane Michael which impacted Mexico Beach and the Panama City area of Florida (other areas as well). While structurally, the buildings performed well, each had extensive interior damage likely due to wind driven rain and roof covering loss. Also, parts of North Carolina that were hit by Hurricane Florence in 2018 are in areas where the design wind speed is around 145 mph. However, these areas suffered substantial residential roof damage at winds which measured only at around 100 mph.

Tests performed by IBHS at the Research Center have consistently shown that the secondary roof underlayment strategies recommended by the IBHS Fortified Home™ - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. Two of these strategies are already recognized by the code in Exceptions 1 and 2 to Section R905.1.1. A 2011 hurricane demonstration clearly showed the benefit of sealing the seams of the roof deck sheathing which is one of the strategies recognized in Exception 2 to Section R905.1.1.

A summary of the results of the demonstration can be viewed at the following link: http://ibhstest.wpengine.com/ibhs-news-releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following link: https://disastersafety.org/thunderstorms/wind-driven-rain-demo/.

A more recent study included an assessment of a new approach where the roof is covered with two layers of high-quality underlayment attached with cap nails. Based on the performance achieved with this system, it has now been added to the FORTIFIED Home–Hurricane program as a fifth option for achieving a sealed roof deck. This report is identified in the bibliography and has been included as an attachment to this code change. All of the mitigation strategies, including the two layers of felt underlayment reduced water entry into the attic space by 70% or more.

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

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

If one of the methods in Exceptions 1 or 2 of Section R905.1.1 are used, this proposal will not increase the cost of construction.

If the double layer of underlayment option is used, for areas where wind design is required, the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between $100 to $200. For areas where the design wind speed is less than 140 mph but equal to or greater than 130 mph in the wind design required region, additional fasteners will be required in addition to the additionally layer of underlayment.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved for several reasons. This proposal will reduce water infiltration. The double under layment is moving towards a sealed roof deck. The provisions are only applicable in greater than 130 mph zones, so this will benefit high wind regions and reduce storm damage. (Vote: 10-1)

Assembly Action: **None**

Final Action

RB275-19 **AS**

R8947/RB277-19

48

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **Yes**

Related Modifications

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

This section is amended to require concrete and clay tiles to be installed only over solid structural sheathing boards.

Rationale

This section is amended to require concrete and clay tiles to be installed only over solid structural sheathing boards. The change is necessary because there were numerous observations of tile roofs pulling away from wood framed buildings following the 1994 Northridge Earthquake. The SEAOSC/LA City Post Northridge Earthquake committee findings indicated significant problems with tile roofs was due to inadequate design and/or construction. Therefore, the amendment is needed to minimize such occurrences in the event of future significant earthquakes. This amendment will reduce the failure of concrete and clay tile roofs during a significant earthquake and is in accordance with the scope and objectives of the International Building Code.

Comment Period History

R8947-G1

Proponent Alan Gremillion **Submitted** 7/1/2021 **Attachments** No

Comment:

If an additional layer of 30# felt is installed, then this would increase construction costs = $300 for a 2,000 home.

ORIGINAL

AM - APPROVED AS MODIFIED

Revise as follows:

R905.3.1 Deck requirements.Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

MODIFICATION

PUBLIC COMMENT 1

R905.3.1 Deck requirements.Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in Seismic Design Categories A, B and C.

Code Change No: RB277-19

Original Proposal

Section(s): R905.3.1

Proponents: Shahen Akelyan, representing LAOBS and ICC IA Basin Chapter (shahen.akelyan@lacity.org)

2018 International Residential Code

Revise as follows:

R905.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

Reason: This section is amended to require concrete and clay tiles to be installed **only** over solid structural sheathing boards. The change is necessary because there were numerous observations of tile roofs pulling away from wood framed buildings following the 1994 Northridge Earthquake. The SEAOSC/LA City Post Northridge Earthquake committee findings indicated significant problems with tile roofs was due to inadequate design and/or construction. Therefore, the amendment is needed to minimize such occurrences in the event of future significant earthquakes. This amendment will reduce the failure of concrete and clay tile roofs during a significant earthquake and is in accordance with the scope and objectives of the International Building Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal limits the "spaces sheathing", therefore it does not increase any cost.

Report of Committee Action Hearings

Committee Action: **Disapproved**

Committee Reason: It is not appropriate that these sheathing types should not be allowed anywhere but in high seismic zones. (Vote: 6-5)

Assembly Action: **None**

Public Comments

Public Comment 1:

Shahen Akelyan, representing ICC LA Basin Chapter (shahen.akelyan@lacity.org) requests As Modified by Public Comment

Modify as follows:

2018 International Residential Code

R905.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

> **Exception:** Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in Seismic Design Categories A, B and C.

Commenter's Reason: The proposed modification to the original proposal clarifies the structural board/sheathing and adds an exception to the projects in Seismic Design Categories A, B, and C. The intent of the proposal was to have a limitation in High Seismic Area.

During the Committee Action Hearings in Albuquerque, New Mexico, we attempted to propose a floor modification that would have proposed the subject change and exception. Unfortunately, it was ruled out of order. However, with the original language, the proposal was disapproved with only 6-5 vote. The committee commented positively about the proposal and suggested to submit a public comment to bring in the floor modification.

The similar proposal and floor modification was submitted to the IBC under S25-19, and it was approved, as modified, by the committee. This proposal will be constant with the approved proposal in IBC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction The proposal limits the "spaced sheathing", therefore it does not increase any cost.

Final Action

RB277-19 **AMPC1**

R8948/RB278-19

49

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

ASTM F1667-18 requires that when gage is used as a diameter for nails, a decimal equivalent must also be shown.

Rationale

ASTM F1667-18 requires that when gage is used as a diameter for nails, a decimal equivalent must also be shown. This requirement was put in place because of the multiple and conflicting wire gage tables that are used in the manufacturing of nails.

ORIGINAL

AS - APPROVED AS SUBMITTED

Revise as follows:

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 deck not less than $^{3}/_{4}$ inch (19 mm) or through the thickness of the 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

R8949/RB279-19

50

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **No**

Related Modifications

R301.2.1, R905.4.4.1(New), TABLE R905.4.4.1 (New), FM Chapter 44 (New), UL Chapter 44 (New)

This code change is already part of the 2020 FBC-R.

Summary of Modification

This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

Rationale

This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

ORIGINAL

AM - APPROVED AS MODIFIED

Add new text as follows:

R905.4.4.1 Wind Resistance of metal roof shingles.Metal roof shingles applied to 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

TABLE R905.4.4.1
CLASSIFICATION OF ASPHALT STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,VASDFROM TABLE R301.2.1.3 (mph)	ASTM D7158[a] SHINGLE CLASSIFICATION	ASTM D3161 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

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

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R301.2.1 Wind design criteria.Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design wind speed in Table R301.2(1) as determined from Figure R301.2(5)A. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. Metal roof shingles shall be designed for wind speeds in accordance with Section R905.4.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

Add new text as follows:

FM
4474—2011: American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

UL
580—2006: Test for Uplift Resistance of Roof Assemblies—with Revisions through October 2013

MODIFICATION
COMMITTEE MODIFICATION

Committee Modification:

TABLE R905.4.4.1

CLASSIFICATION OF STEEP SLOPE METAL ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 ~~OR D7158~~

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	~~ASTM D7158[a] SHINGLE CLASSIFICATION~~	ASTM D3161 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

~~a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Code Change No: RB279-19

Original Proposal

Section(s): R301.2.1, R905.4.4.1(New), TABLE R905.4.4.1 (New), FM Chapter 44 (New), UL Chapter 44 (New)

Proponents: Andy Williams, Metal Construction Association, representing Metal Construction Association (afwilliams@Connect2amc.com)

2018 International Residential Code

Add new text as follows:

R905.4.4.1 Wind Resistance of metal roof shingles. Metal roof shingles applied to 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

TABLE R905.4.4.1
CLASSIFICATION OF ASPHALT STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,VASDFROM TABLE R301.2.1.3 (mph)	ASTM D7158[a] SHINGLE CLASSIFICATION	ASTM D3161 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

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

a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R301.2.1 Wind design criteria. Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design wind speed in Table R301.2(1) as determined from Figure R301.2(5)A. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. Metal roof shingles shall be designed for wind speeds in accordance with Section

R905.4.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

Add new text as follows:

FM

4474—2011: American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

UL

580—2006: Test for Uplift Resistance of Roof Assemblies—with Revisions through October 2013

Reason: This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

Table R905.2.4.1 is appropriate to metal roof shingles. The title is changed to reflect modifications that were made to ASTM D3161 dating back to 2013.

The major issue is that the wind uplift testing is currently addressed by multiple standards that determine compliance through uplift ratings. Metal shingle performance is not correctly represented by these current tests due to the air permeability inherent in the design of the shingle units, so a fan-induced method was developed through ASTM, with UL as a major proponent, as an alternative to the required uplift resistance testing. Manufacturers use one or more of the standards listed to determine this performance and feel they should choose the correct and most representative method to show compliance.

ASTM D3161 (Fan Induced) was originally created for asphalt shingles however the standard was expanded in 2013 to evaluate wind resistance of discontinuous, air permeable, steep slope roofing products with or without contribution from adhesives or mechanical interlocking to hold down the leading tab edge and is not limited to asphalt shingles. This clearly includes metal shingles (specifically identified in Scope Section 1.3).

ASTM D3161 removes difficulties for metal shingle manufacturers currently required to run UL 1897 or UL 580 in a non-air-permeable manner that does not fairly represent the product. UL has provided metal shingle wind classifications for many years and currently has D3161-related listings in the Online Classification Directory. UL was also a proponent of the D3161 scope change showing acceptance of D3161 as a means to demonstrate metal shingle wind resistance. The scope is clear. "This test method was formerly titled "Wind Resistance of Asphalt Shingles (Fan-Induced Method)" but was revised to acknowledge that the method is applicable to many other steep slope roofing products and has been used to evaluate the wind resistance of those products for many years by several testing and certification laboratories."

The modification to Section R301.2.1 is placed to point the reader to Section R905.4.4.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal introduces alternate wind resistance testing that is more appropriate to metal shingles.

Staff Analysis: The referenced standard, FM 4474-2011 and UL 580-2006/13, is currently referenced in other 2018 I-codes.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Committee Modification:

TABLE R905.4.4.1
CLASSIFICATION OF STEEP SLOPE METAL ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 ~~OR D7158~~

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	~~ASTM D7158[a] SHINGLE CLASSIFICATION~~	ASTM D3161 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

For SI: 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.
~~a. The standard calculations contained in ASTM D7158 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Committee Reason: The modification removed the third column in the table to make the proposal specific to metal roofs. The committee removed the footnote for coordination with the approval of the modification. The modified proposal was approved because it provides criteria for metal roofs. This will be consistent with the proposal for asphalt shingles. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB279-19 **AM**

R8950/RB283-19

51

Date Submitted	2/12/2021	**Section**	906	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R906.1, NFPA Chapter 44 (New)

Summary of Modification

During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276.

Rationale

During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276. This proposal will make the code consistent with IBC Section 1508.1. FM 4450 is no longer applicable for this use. NFPA 276 is referenced in the IBC.

Comment Period History

R8950-G1

Proponent Michael Silvers (FRSA **Submitted** 6/16/2021 **Attachments** No

Comment:

FRSA request a Motion to Approve: FRSA urges the TAC to approve the provision of this Mod in the TAC's recommendations to the Commission and that it should be incorporated into the FBC.

ORIGINAL

AS - APPROVED AS SUBMITTED

Revise as follows:

R906.1 General.~~The use of~~ Where above-deck thermal insulation is installed, such insulation shall be ~~permitted provided that such insulation is~~ covered with an *approved* roof covering and ~~complies with FM 4450~~ shall comply with NFPA 276 or UL 1256.

Add new standard(s) as follows:

NFPA

276-15: Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components

Code Change No: RB283-19

Original Proposal

Section(s): R906.1, NFPA Chapter 44 (New)

Proponent: Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council (mfischer@kellencompany.com)

2018 International Residential Code

Revise as follows:

R906.1 General. ~~The use of~~ Where above-deck thermal insulation is installed, such insulation shall be ~~permitted provided that such insulation is~~ covered with an *approved* roof covering and ~~complies with FM 4450~~ shall comply with NFPA 276 or UL 1256.

Add new standard(s) as follows:

NFPA

276-15: Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components

Reason: During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276. This proposal will make the code consistent with IBC Section 1508.1. FM 4450 is no longer applicable for this use. NFPA 276 is referenced in the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial in nature to align with IBC requirements.

Staff Analysis: The referenced standard, NFPA 276-15, is currently referenced in other 2018 I-codes.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The replacement of FM4450 with NFPA 276 for roof insulation is appropriate and will be consistent with the IBC. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB283-19 **AS**

R9521/S33-19 Part II

52

Date Submitted	3/3/2021	**Section**	902.3	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

R902.3, R905.16.6, R905.16.4, TABLE R905.16.6 (New), R905.17.5, R905.17.7, UL Chapter 44 (New)

Original text of this code change is not consistent with that of the 2020 FBC-R.

Summary of Modification

BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance.

Rationale

BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance in the following areas: testing such as:

1. Fire testing (UL 790 or ASTM E108)
2. Impact testing
3. Wind resistance (ASTM D3161 or UL 1897)
4. Wind driven rain
5. Environmental conditions
6. Electrical (UL 1703)
7. Materials (UL 1703)

Having one standard, UL 7103, to address electrical, fire, wind resistance, impact resistance and durability of this new type of building material make's it far easier to determine compliance with all the minimum code requirements. The standard includes all the marking requirements for the ratings (fire classification, wind resistance, and electrical) and the minimum content for the installation instructions.

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

R902.3 Building-integrated photovoltaic product. Building-integrated photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with ~~Section R902.1~~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.

R905.16.6 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table ~~R905.2.4.1~~ R905.16.6 for the appropriate maximum basic wind speed. ~~*Photovoltaic shingle* packaging shall bear a label to indicate compliance with the procedures in ASTM D3161 and the required classification from Table R905.2.4.1.~~

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL ~~1703~~7103.

Add new text as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	UL 7103[a] SHINGLE CLASSIFICATION	UL 7103 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL ~~1703~~7103.

Delete without substitution:

~~**R905.17.7 Wind resistance. BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.**~~

Add new standard(s) as follows:

UL
7103-19: Outline of Investigation for Building-Integrated Photovoltaic Roof Coverings

Modified Proposal:

Modify proposal as follows:

TABLE R905.16.6

Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3(mph)	~~UL 7103[a] SHINGLE CLASSIFICATION~~	UL 7103 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

~~a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Code Change No: S33-19 Part II

Original Proposal

Section(s): R902.3, R905.16.6, R905.16.4, TABLE R905.16.6 (New), R905.17.5, R905.17.7, UL Chapter 44 (New)

Proponents: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2018 International Building Code

Revise as follows:

R902.3 Building-integrated photovoltaic product. Building-integrated photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with ~~Section R902.1~~ 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.

R905.16.6 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table ~~R905.2.4.1~~ R905.16.6 for the appropriate maximum basic wind speed. ~~*Photovoltaic shingle* packaging shall bear a label to indicate compliance with the procedures in ASTM D3161 and the required classification from Table R905.2.4.1.~~

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL ~~1703~~ 7103.

Add new text as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	UL 7103[a] SHINGLE CLASSIFICATION	UL 7103 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R9521 Rationale

Page: 2

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL ~~1703~~ 7103.

Delete without substitution:

~~**R905.17.7 Wind resistance.** BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.~~

Add new standard(s) as follows:

UL
7103-19: Outline of Investigation for Building-Integrated Photovoltaic Roof Coverings

Reason: BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance in the following areas: testing such as:

1. Fire testing (UL 790 or ASTM E108)
2. Impact testing
3. Wind resistance (ASTM D3161 or UL 1897)
4. Wind driven rain
5. Environmental conditions
6. Electrical (UL 1703)
7. Materials (UL 1703)

Having one standard, UL 7103, to address electrical, fire, wind resistance, impact resistance and durability of this new type of building material make's it far easier to determine compliance with all the minimum code requirements. The standard includes all the marking requirements for the ratings (fire classification, wind resistance, and electrical) and the minimum content for the installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements remain the same. This proposal is simply editorial by providing a different format in order to assist in determining code compliance.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL7103-19, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,V_{ASD} FROM TABLE R301.2.1.3(mph)	~~UL 7103[a] SHINGLE CLASSIFICATION~~	UL 7103 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

~~a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Committee Reason: The modification removes the third column of Table R905.16.6 since UL7103 is not applicable to photovoltaic shingles. The proposal references UL7103 which covers photovoltaic roof coverings. The reference is necessary in the codes to provide requirements for this industry. (Vote: 9-0)

Assembly Action: **None**

Final Action

S33-19 Part II **AM**