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850-487-1824

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

1

R11137		/S58-22 Part I			
Date Submitted	03/15/2024	**Section**	110.3.6	**Proponent**	Mo Madani
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff	Correlates
Commission Action	Pending Review			Classification	Directly

Comments

General Comments No

Related Modifications

FBC - B/Section 1511.4 and Section 110.3.5.

Summary of Modification

Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Rationale

See attached

R11137Text Modification

See attached

Page: 1

Mod11137_TextOfModification.pdf

R11137Text Modification

S58-22 Part I

Original Proposal

IBC: [A] 110.3.6, 1512.3; IEBC: [A] 109.3.5, [BS] 705.3

Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

[A] 110.3.6 Lath, ~~gypsum board~~ and gypsum panel product inspection. Lath, ~~*gypsum board*~~ and *gypsum panel product* inspections shall be made after lathing, ~~*gypsum board*~~ and *gypsum panel products*, interior and exterior, are in place, but before any plastering is applied or ~~*gypsum board* and~~ *gypsum panel product* joints and fasteners are taped and finished.

Exception: *Gypsum ~~board and gypsum~~ panel products* that are not part of a fire-resistance-rated assembly or a shear assembly.

1512.3 Roof recovering. Where the application of a new *roof covering* over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with *gypsum panel products ~~board~~*, mineral fiber, glass fiber or other*approved* materials securely fastened in place.

Reason: Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup with no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S58-22 Part I AS

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

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R11175		/S116-22			
Date Submitted	03/15/2024	**Section**	108.1	**Proponent**	Mo Madani
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

There is a need for code provisions for minimum structural loads for temporary structures. This proposal was developed to address this concern.

Rationale

See attached

R11175Text Modification

See attached

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

R10703	/F15-21 Part II				3
Date Submitted	03/04/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

2023 FBC - Section 10505.10 is marked reserved.

Summary of Modification

This is an editorial proposal covering both the IFC and the IBC to consistently use the term “vegetative roof”.

Rationale

See attached

R10703Text Modification

See attached

Mod10703_TextOfModification.pdf

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R10703Text Modification

F15-21 Part II

Original Proposal

IBC: SECTION 202 (New), SECTION 202, [BF] 1505.10, [BF] 1507.15.1

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

LANDSCAPED ROOF

.

An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

Revise as follows:

[BS] VEGETATIVE ROOF.

A roof ~~An~~ assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

[BF] 1505.10 Vegetative ~~Landscaped~~ roofs. Vegetative ~~Landscaped~~ roofs shall comply with Sections 1505.1 and 1507.15 and shall be installed in accordance with ANSI/SPRI VF-1.

[BF] 1507.15.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed on the roof by the *vegetative roof* or landscaped roofs shall comply with the fire resistance rating requirements of Table 601.

Reason: This is an editorial proposal covering both the IFC and the IBC to consistently use the term "vegetative roof".
The term "landscaped roofs" has been used by the public interchangeably with "vegetative roofs". This has created confusion in the building code and conflicts with industry standards that have coalesced around the term "vegetative roof". . Moreover, some of the sections presently identified as "landscaped roofs" should refer to "vegetative roofs" as they really addresses roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". In these locations, the code is revised to properly use "vegetative roof". In other places, both terms are retained as the language could apply either to a vegetative roof where the membrane, growth medium and vegetation are incorporated as part of the roof assembly, or a landscaped roof where planters, hardscapes, or other features are provided above the roof assembly and not integrated into it. A definition for "landscaped roof" is proposed to capture such features and better distinguish between a true "vegetative roof" as defined in the IBC and industry standards.

Neither the IFC nor the IBC define the term "landscaped roof", but the IBC does contain a definition for the term "vegetative roofs" that reads as follows.

[BS] VEGETATIVE ROOF. *An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.*

This proposal also copies the existing definition from the IBC to the IFC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as

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R10703Text Modification

interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and will not impact how vegetative and landscaped roofs are designed and constructed.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded the proposal coordinates the proper terminology. The proposal covers both the IFC and the IBC to use the term “vegetative roof" consistently”. (Vote: 13-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Protected Membrane Roofing Institute (ccollins@kellencompany.com); John Woestman, Kellen Co., Extruded Polystyrene Foam Association (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

LANDSCAPED ROOF

.
An area ~~on~~ over a roof assembly incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of ~~a~~ the roof assembly.

[BS] VEGETATIVE ROOF .
A roof assembly of interacting components designed to waterproof a building’s top surface that includes, by design,~~vegetation and related landscape elements.~~a vegetative surface.

Commenter's Reason: This public comment adds clarity to the definitions in the original proposal. The original definitions contradicted themselves by saying that a Landscape Roof was not part of a roof assembly only to have the Vegetative Roof definition included it as part of its assembly. This clarifies the intent of the proposal and will prevent interpretation issues in the field.
This proposal coordinates with F15 part 1.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The changes made in the original proposal and public comment do not affect the cost of construction. The modifications only clarify the intent of the language.

Public Comment 2

Proponents: Marcelo Hirschler, GBH International, self (mmh@gbhint.com); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org); Mike Nugent, Chair, ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

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R10703Text Modification

Modify as follows:

2021 International Building Code

[BF] 1505.10 ~~Vegetative~~ Landscaped and vegetative roofs . ~~Vegetative~~ Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15. Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Commenter's Reason: Proposal F16 Part II was approved as submitted and contains the language proposed in this public comment for section 1505.10. The language in F16 part II is the correct one because the fire test needs to apply to all types of roofs (and that is covered by 1505.1 and 1507.16) while the SPRI standard covers installation but only for vegetative roofs.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This is still editorial and corrects an error in the original proposal.

Final Hearing Results	
F15-21 Part II	AMPC1,2

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

R11139	/S62-22				4
Date Submitted	03/15/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition.

Rationale

See attached

R11139Text Modification

See attached

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Mod11139_TextOfModification.pdf

R11139Text Modification

S62-22

Original Proposal

IBC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 15, SECTION 1504, TABLE 1504.2, 1504.6, CHAPTER 16, SECTION 1602, 1602.1, SECTION 1609, 1609.1.1, 1609.3, FIGURE 1609.3(1), FIGURE 1609.3(2), FIGURE 1609.3(3), FIGURE 1609.3(4), FIGURE 1609.3(5), FIGURE 1609.3(6), FIGURE 1609.3(7), FIGURE 1609.3(8), FIGURE 1609.3(9), FIGURE 1609.3(10), FIGURE 1609.3(11), FIGURE 1609.3(12), 1609.3.1, TABLE 1609.3.1, ASCE/SEI Chapter 35 (New)

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

2021 International Building Code

CHAPTER 2 DEFINITIONS

SECTION 202 DEFINITIONS

Revise as follows:

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or

2. In areas where the basic ~~design~~ wind speed, *V*, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure ~~1609.3.(1)~~ 1609.3.(2). For *Risk Category* III health care facilities, and *Risk Category* IV buildings and structures ~~and *Risk Category* III health care facilities~~, the windborne debris region shall be based on Figure~~1609.3(2)~~ 1609.3(3) and Figure 1609.3 (4), respectively .

Add new definition as follows:

[BS] WIND DESIGN GEODATABASE

. The ASCE database (version 2022-1.0) of geocoded wind speed design data.
The ASCE Wind Design Geodatabase of geocoded wind speed design data is available at https://asce7hazardtool.online/.

CHAPTER 15 ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1504 PERFORMANCE REQUIREMENTS

Revise as follows:

TABLE 1504.2 CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM FIGURES 1609.3(1)–(8) (4) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, *Vasd*, 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

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MAXIMUM BASIC WIND SPEED, V, FROM FIGURES 1609.3(1)–~~(8)~~ (4) OR ASCE 7(mph)	MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V , FROM Table 1609.3.1 (mph)	ASTM D7158 CLASSIFICATION	ASTM D3161 or UL 7103 CLASSIFICATION
168	130	H	F
181	140	H	F
194	150	H	F

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

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

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through~~1609.3(12)~~ 1609.3(4) as applicable.

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1602
NOTATIONS

Revise as follows:

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph) (~~km/hr~~ m/s) where applicable.
V	=	Basic ~~design~~ wind speeds, miles per hour (mph) (~~km/hr~~ m/s) determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4) or ASCE 7.
W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

SECTION 1609
WIND LOADS

Revise as follows:

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind

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pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4) are basic ~~design~~ wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1609.3 Basic design wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through ~~1609.3(12)~~ 1609.3(4). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* I ~~II~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(1)~~, 1609.3(5) and 1609.3(6)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* II ~~III~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(2)~~, 1609.3(7) and 1609.3(8)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III ~~IV~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(3)~~, 1609.3(9) and 1609.3(10)~~. The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* IV ~~I~~ buildings and structures shall be obtained from Figure~~s~~ 1609.3(4)~~, 1609.3(11) and 1609.3(12)~~. Basic *wind speeds* for Hawaii, US Virgin Islands, and Puerto Rico shall be determined by using the ASCE *Wind Design Geodatabase*. The ASCE *Wind Design Geodatabase* is available at https://asce7hazardtool.online, or an approved equivalent.

The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.In nonhurricane-prone regions, when the basic ~~design~~ *wind speed*, *V*, is estimated from regional climatic data, the basic design *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.

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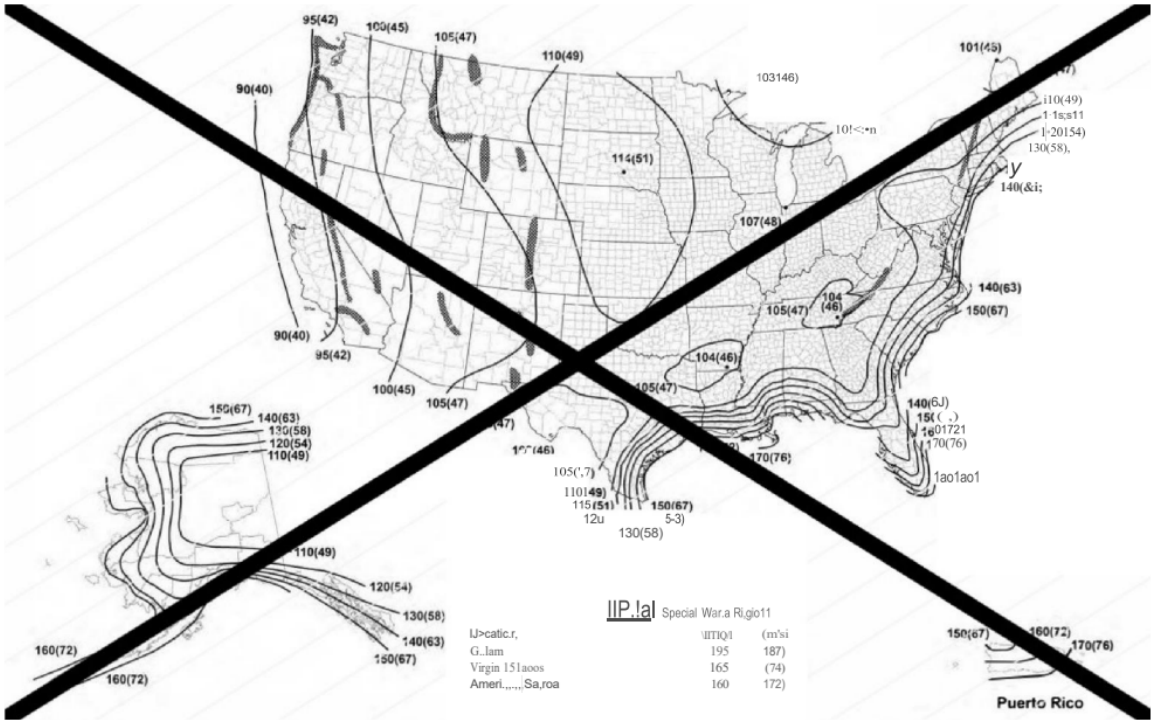

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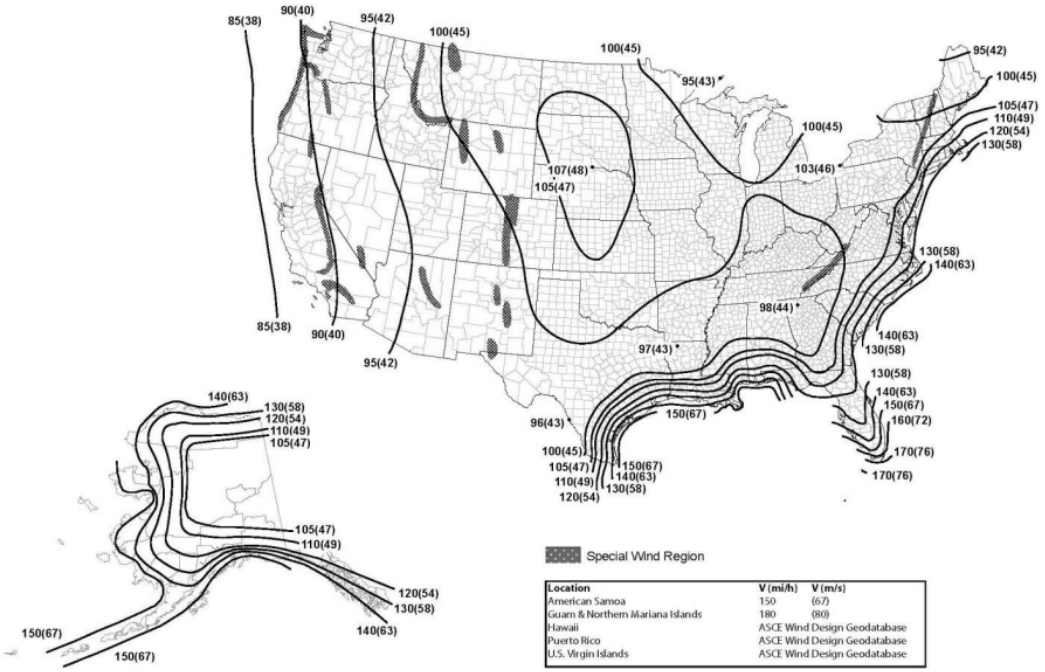

Location	V (mi/h)	V (m/s)
American Samoa	150	(67)
Guam & Northern Mariana Islands	180	(80)
Hawaii	ASCE Wind Design Geodatabase	
Puerto Rico	ASCE Wind Design Geodatabase	
U.S. Virgin Islands	ASCE Wind Design Geodatabase	

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

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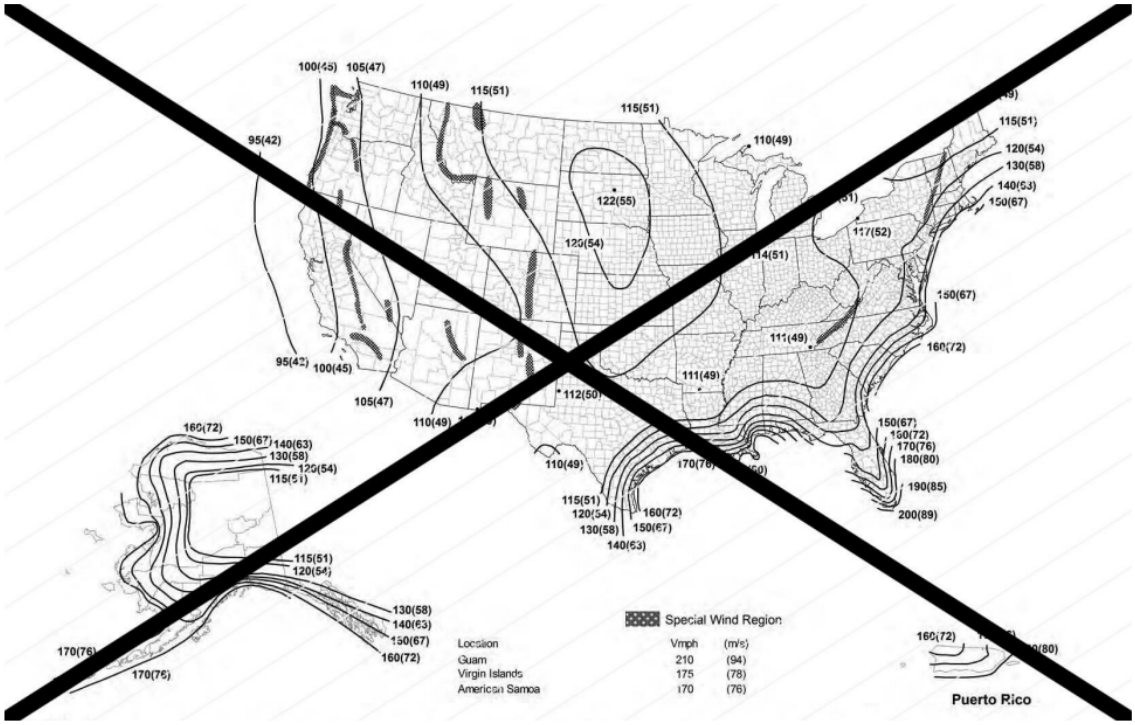
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(1) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY I II BUILDINGS AND OTHER STRUCTURES



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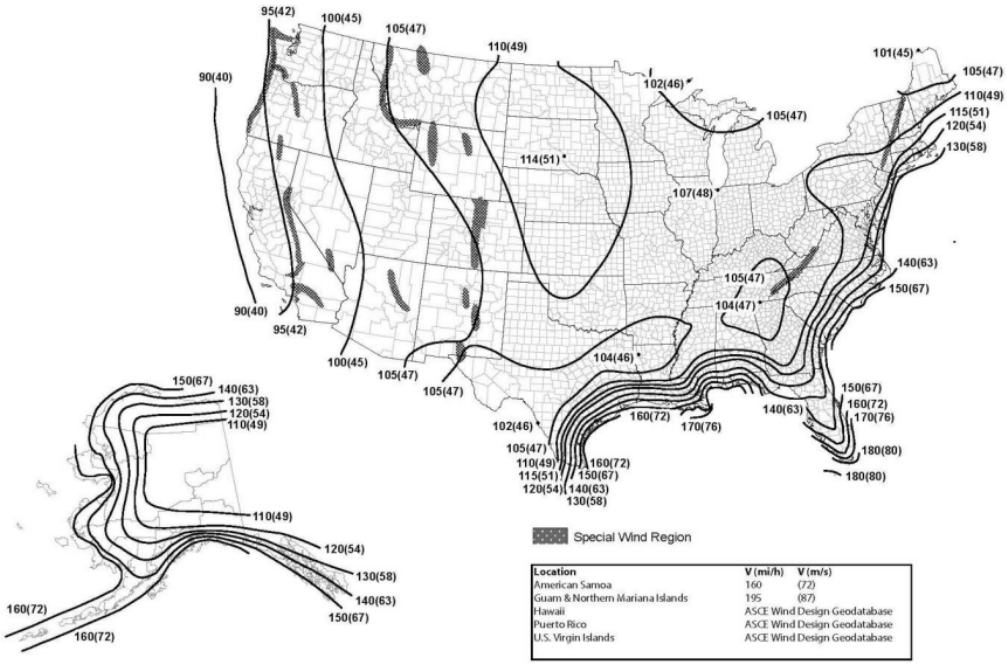

Notes:

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

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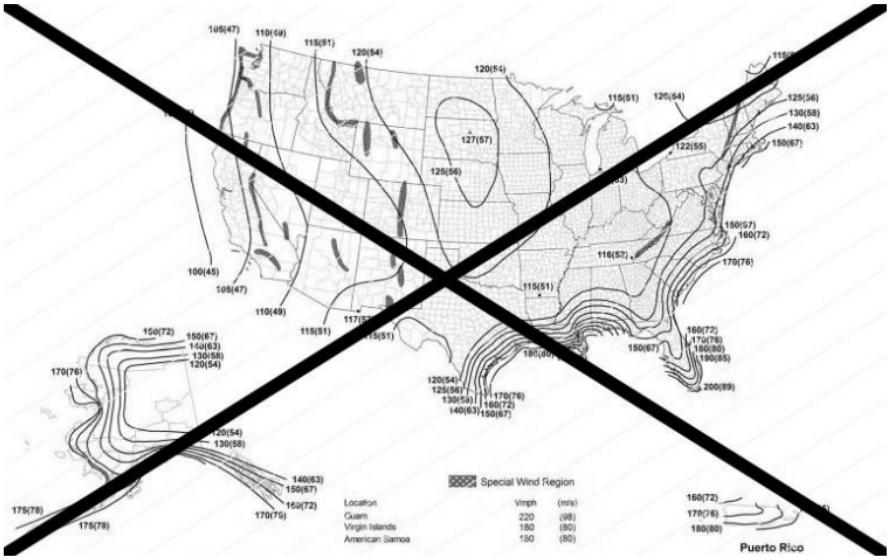
5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(2) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY II ~~III~~ BUILDINGS AND OTHER STRUCTURES



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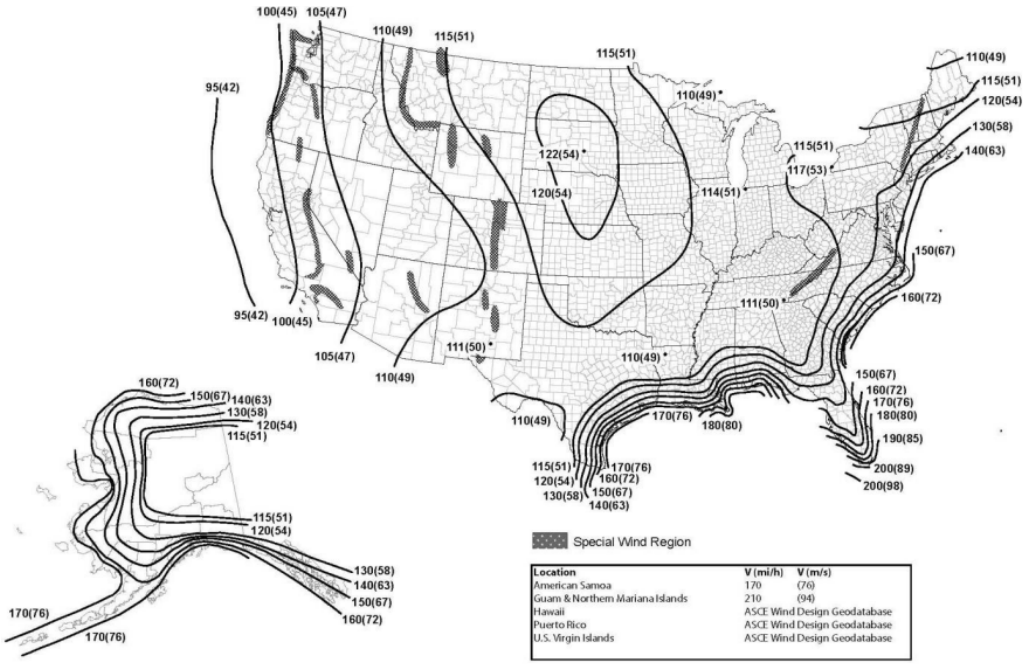

Location	V (mi/h)	V (m/s)
American Samoa	170	(76)
Guam & Northern Mariana Islands	210	(94)
Hawaii	ASCE Wind Design Geodatabase	
Puerto Rico	ASCE Wind Design Geodatabase	
U.S. Virgin Islands	ASCE Wind Design Geodatabase	

Notes:

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3000 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic windspeeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

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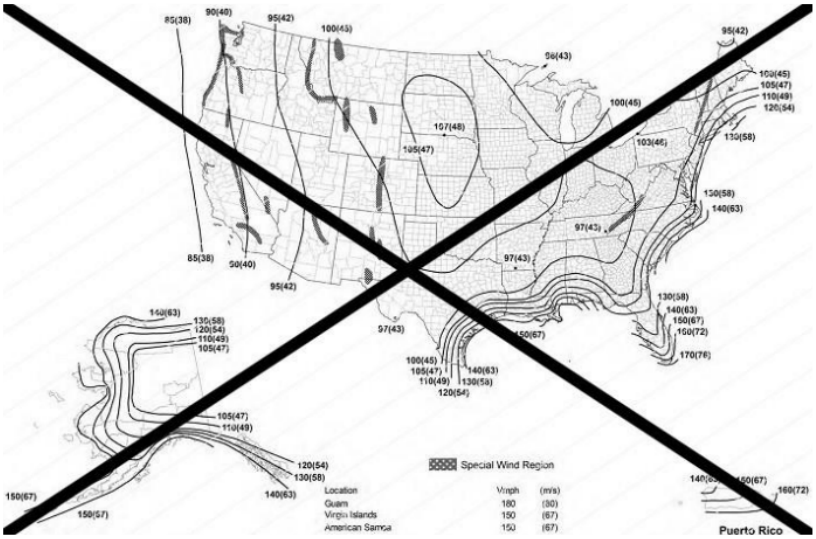
R11139Text Modification

5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1,700 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(3) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY III ~~IV~~ BUILDINGS AND OTHER STRUCTURES



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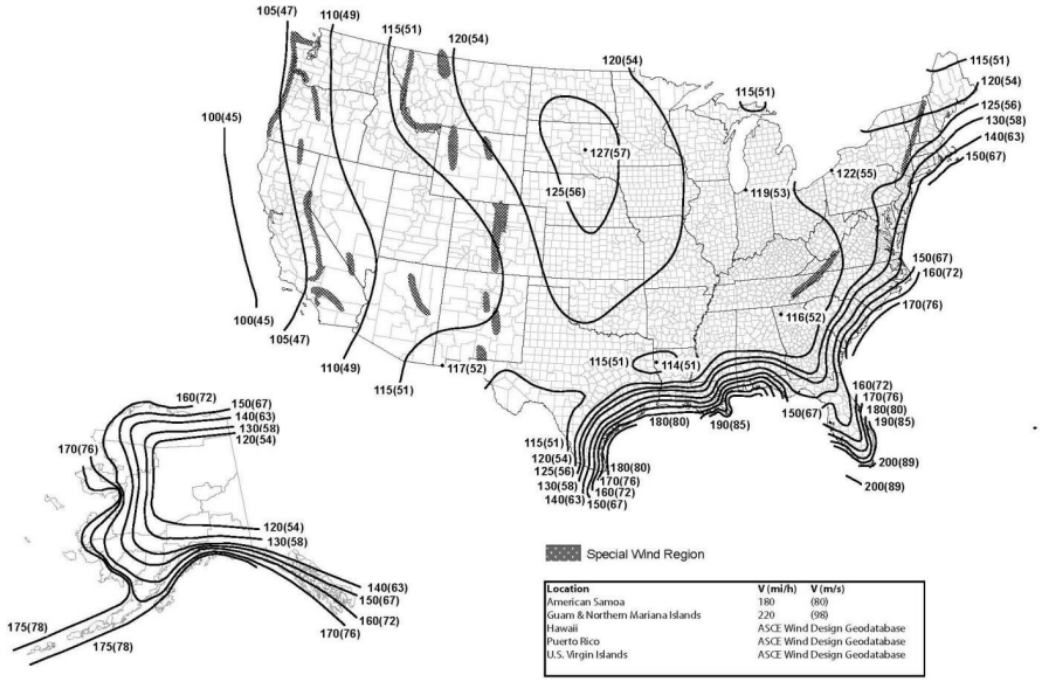
R11139Text Modification



~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours. Point values are provided to aid with interpolation.~~
3. ~~Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.~~
4. ~~Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00333, MRI = 300 Years).~~
6. ~~Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.~~

Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

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R11139Text Modification

5. Wind speeds for Hawaii, US Virgin Islands, and Puerto Rico shall be determined from the ASCE Wind Design Geodatabase.
6. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions. Site specific values for selected special wind regions shall be permitted to be determined using the ASCE Wind Design Geodatabase.
7. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3,000 years).
8. The ASCE Wind Design Geodatabase can be accessed at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

FIGURE 1609.3(4) BASIC ~~DESIGN~~ WIND SPEEDS, V, FOR RISK CATEGORY IV ~~I~~ BUILDINGS AND OTHER STRUCTURES

Delete without substitution:

Page: 12

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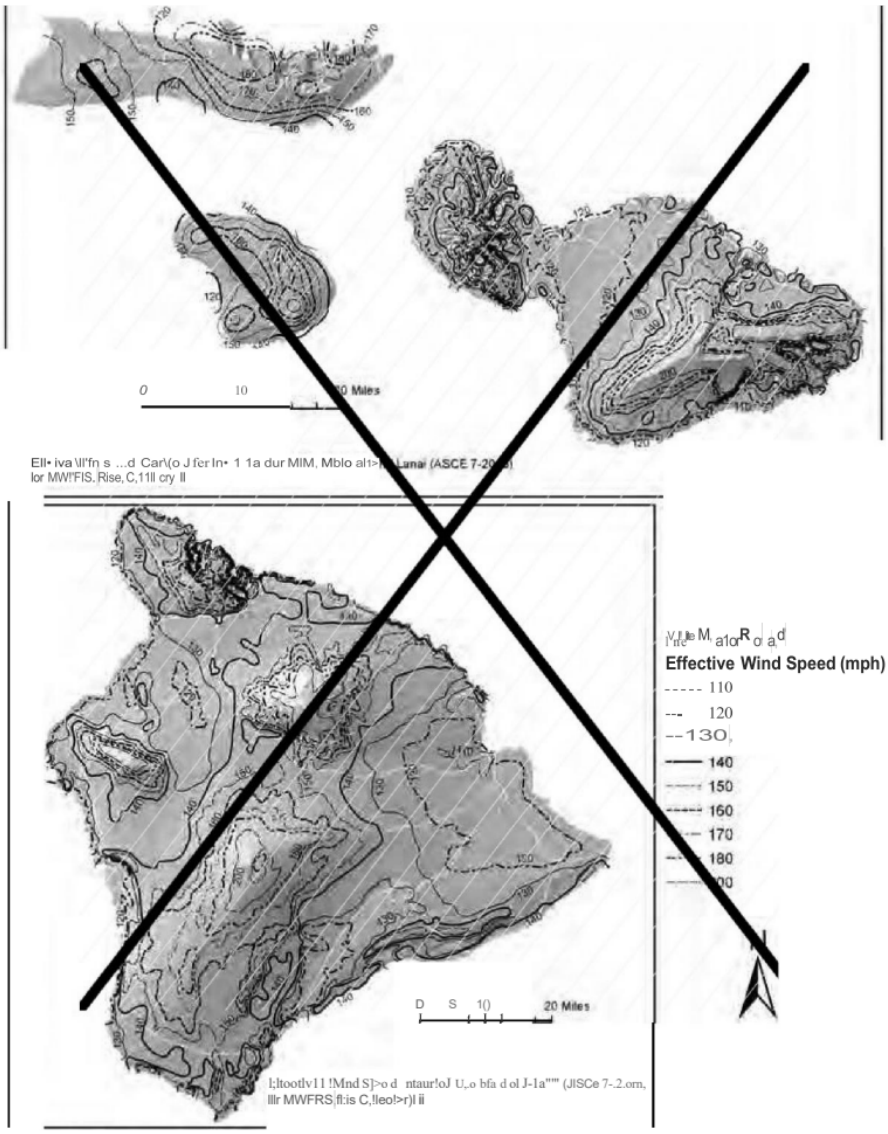
R11139Text Modification



Page: 13

Mod_11139_Text_S62-22.pdf

R11139Text Modification

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_{zt} as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~**FIGURE 1609.3(5) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAI**~~

Page: 14

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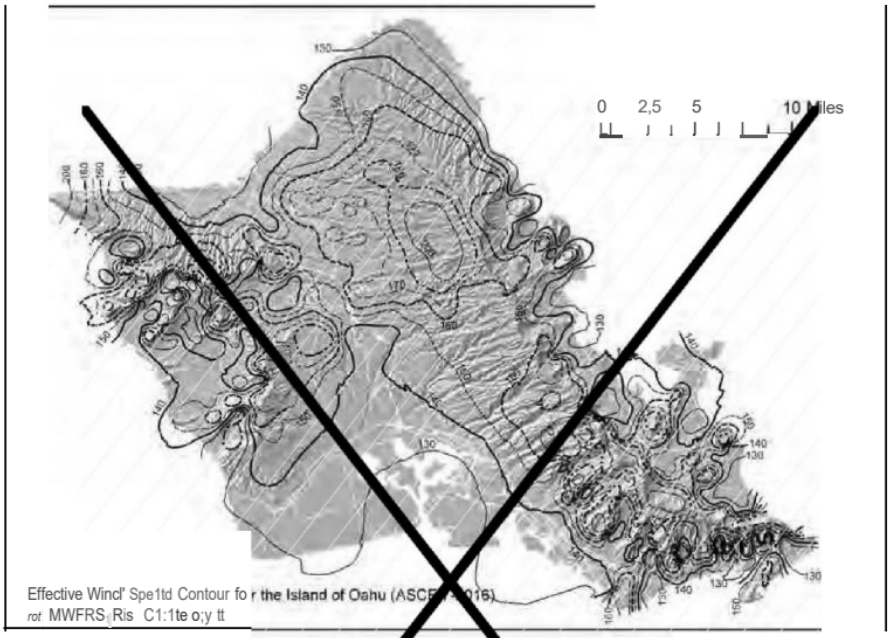

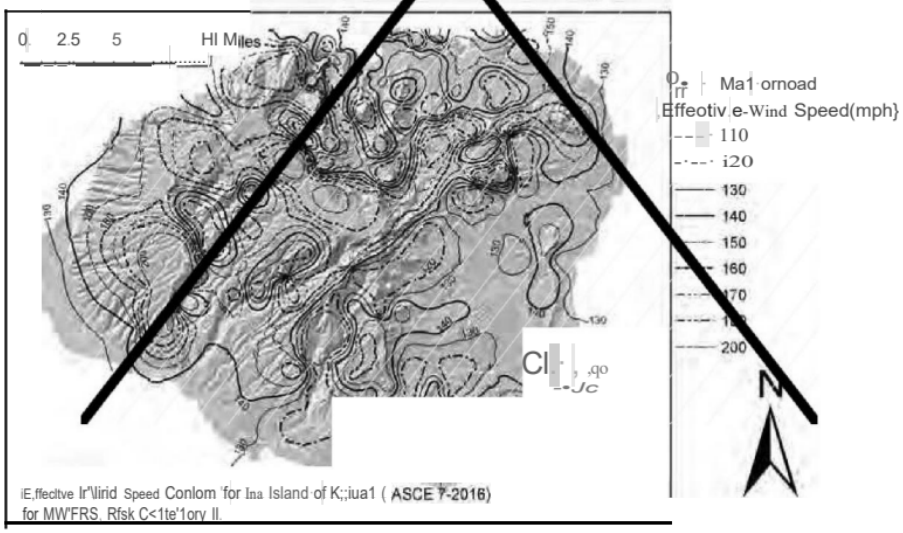

Mod_11139_Text_S62-22.pdf Page: 15

R11139Text Modification

Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.
4. It is permitted to use the standard values of K_{zt} of 1.0 and K_{1} as given in Table 26.6-1 of ASCE 7.
5. Ocean promontories and local escarpments shall be examined for unusual wind conditions.
6. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).

FIGURE 1609.3(6) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)

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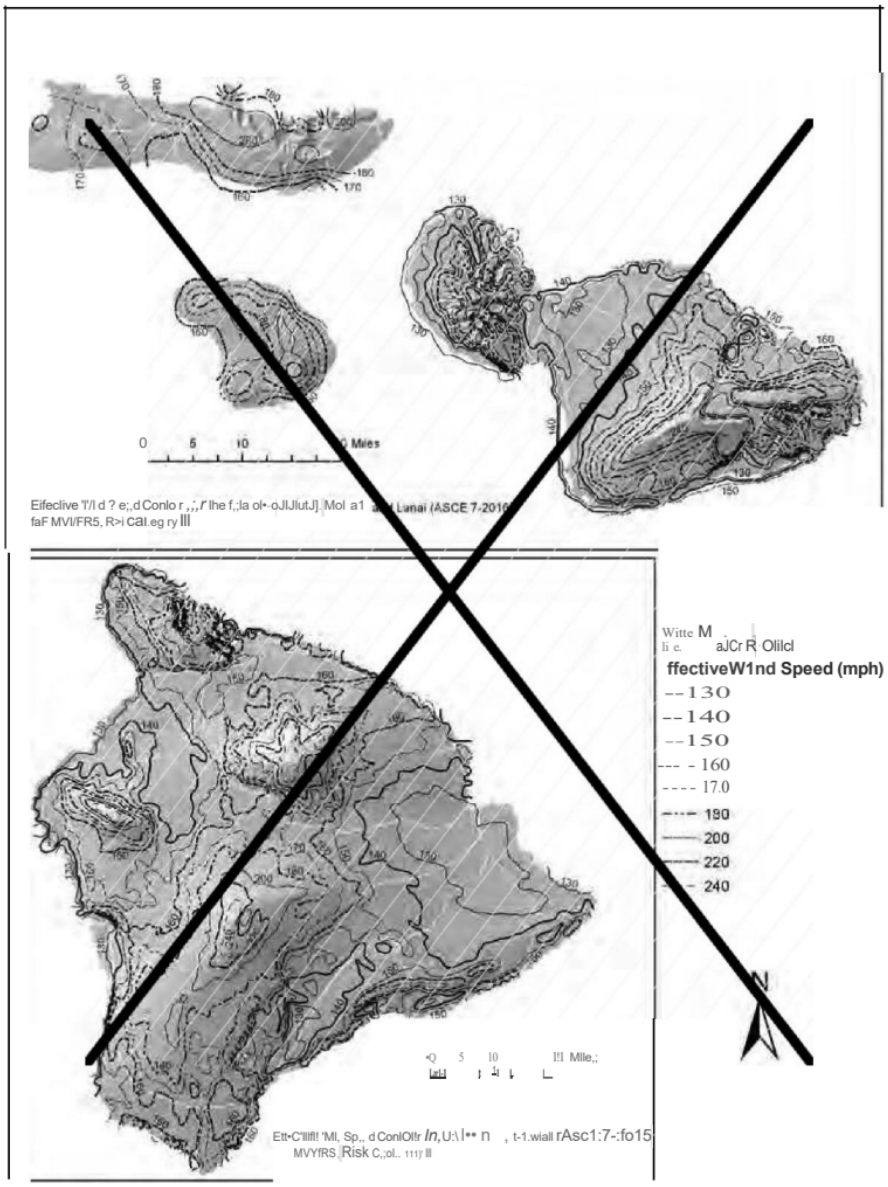
R11139Text Modification



Mod_11139_Text_S62-22.pdf Page: 17

R11139Text Modification

~~**Notes:**~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_{1} as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

-

~~FIGURE 1609.3(7) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

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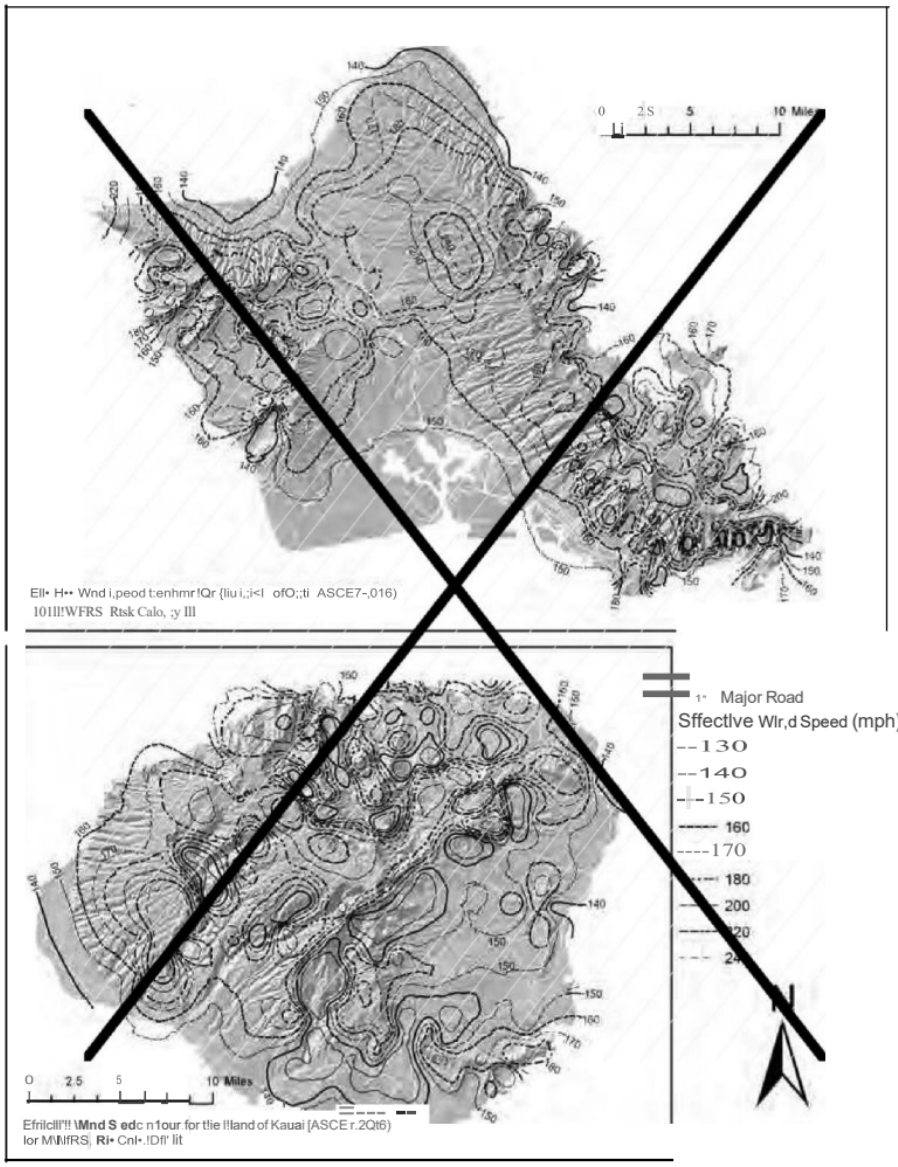

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lor M\NfRS, Ri• Cnl•.!Dfi' lit

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R11139Text Modification

Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C Category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the las wind speed contour of the coastal area.
4. It is permitted to use the standard values of K_{zt} of 1.0 and K_{zt} as given in Table 26.6-1 of ASCE 7.
5. Ocean promontories and local escarpments shall be examined for unusual wind conditions.
6. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).

FIGURE 1609.3(8) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)

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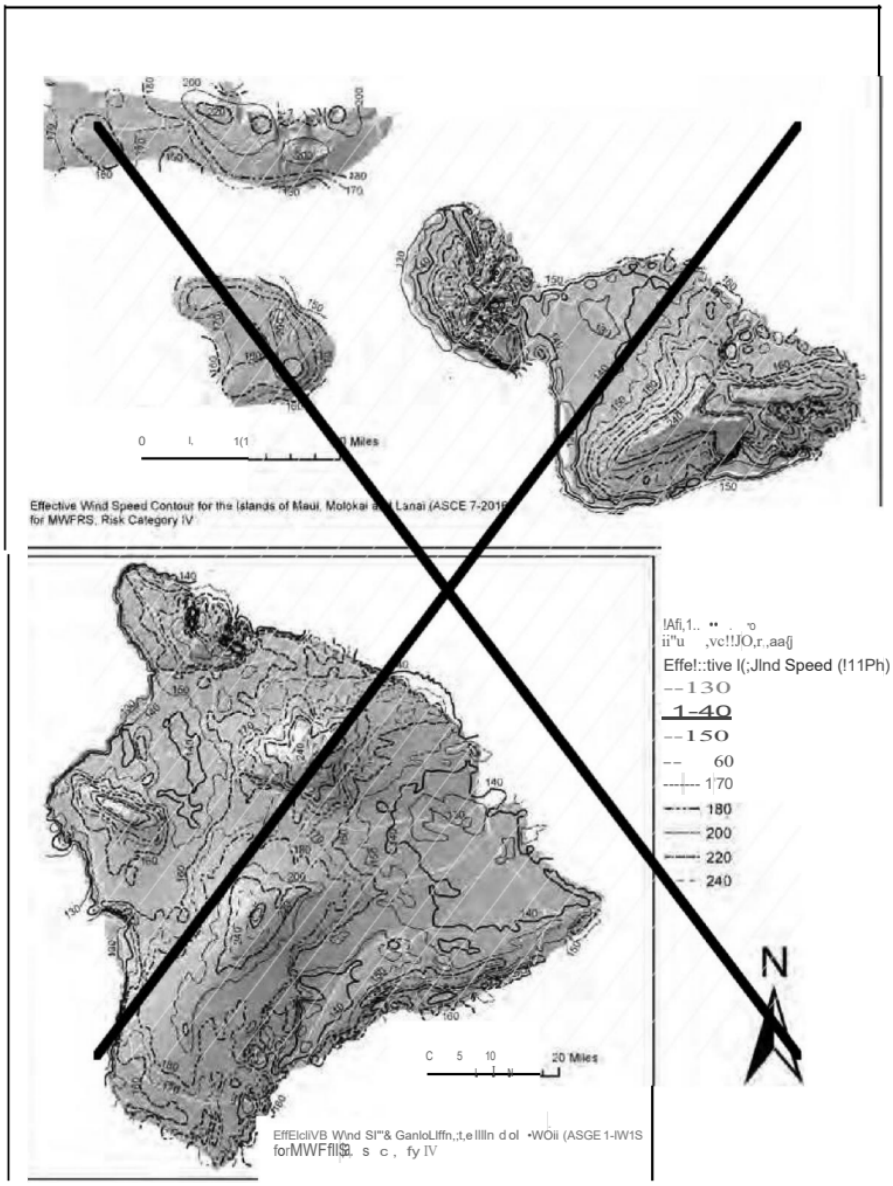
R11139Text Modification



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R11139Text Modification

Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.
2. Linear interpolation between contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. It is permitted to use the standard values of K_{zt} of 1.0 and K_{1} as given in Table 26.6-1 of ASCE 7.
5. Ocean promontories and local escarpments shall be examined for unusual wind conditions.
6. Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).

FIGURE 1609.3(9) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII

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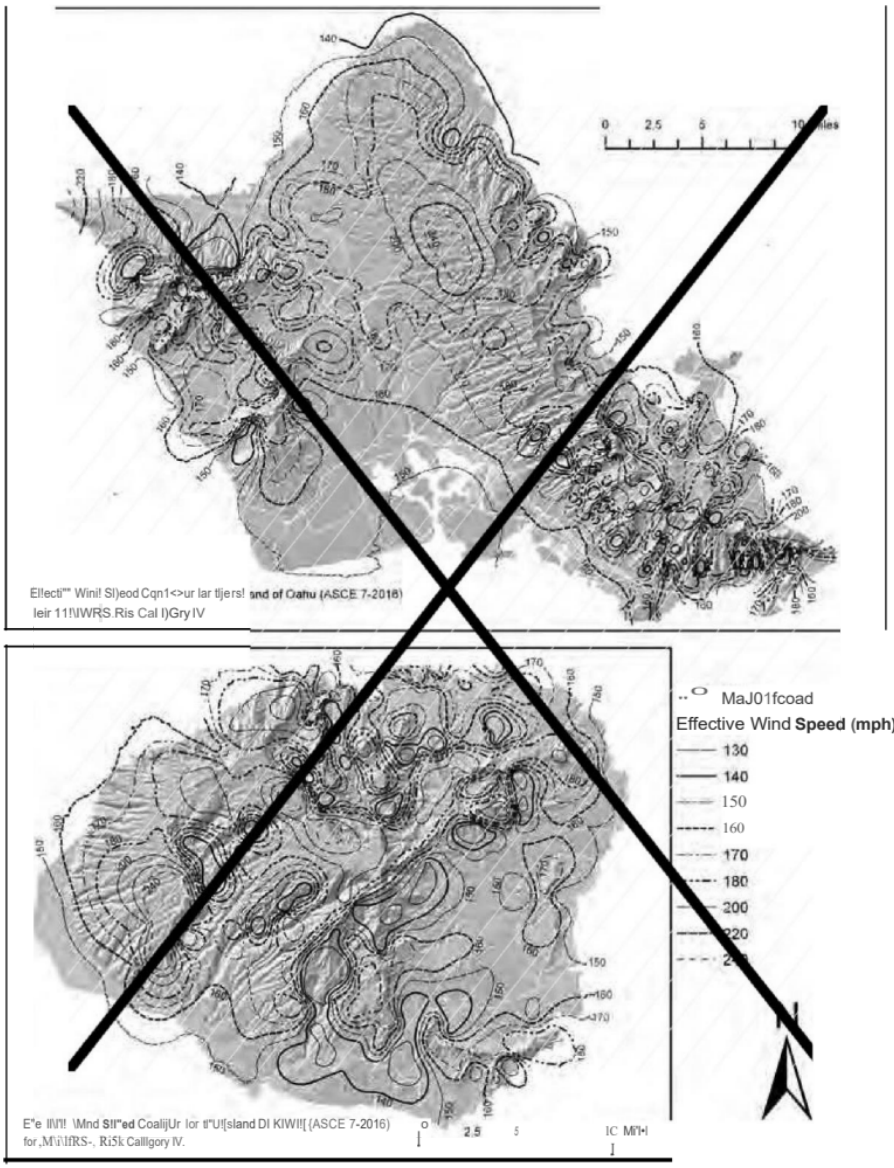
R11139Text Modification



Mod_11139_Text_S62-22.pdf Page: 23

R11139Text Modification

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_{zt} as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 1.7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(10) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

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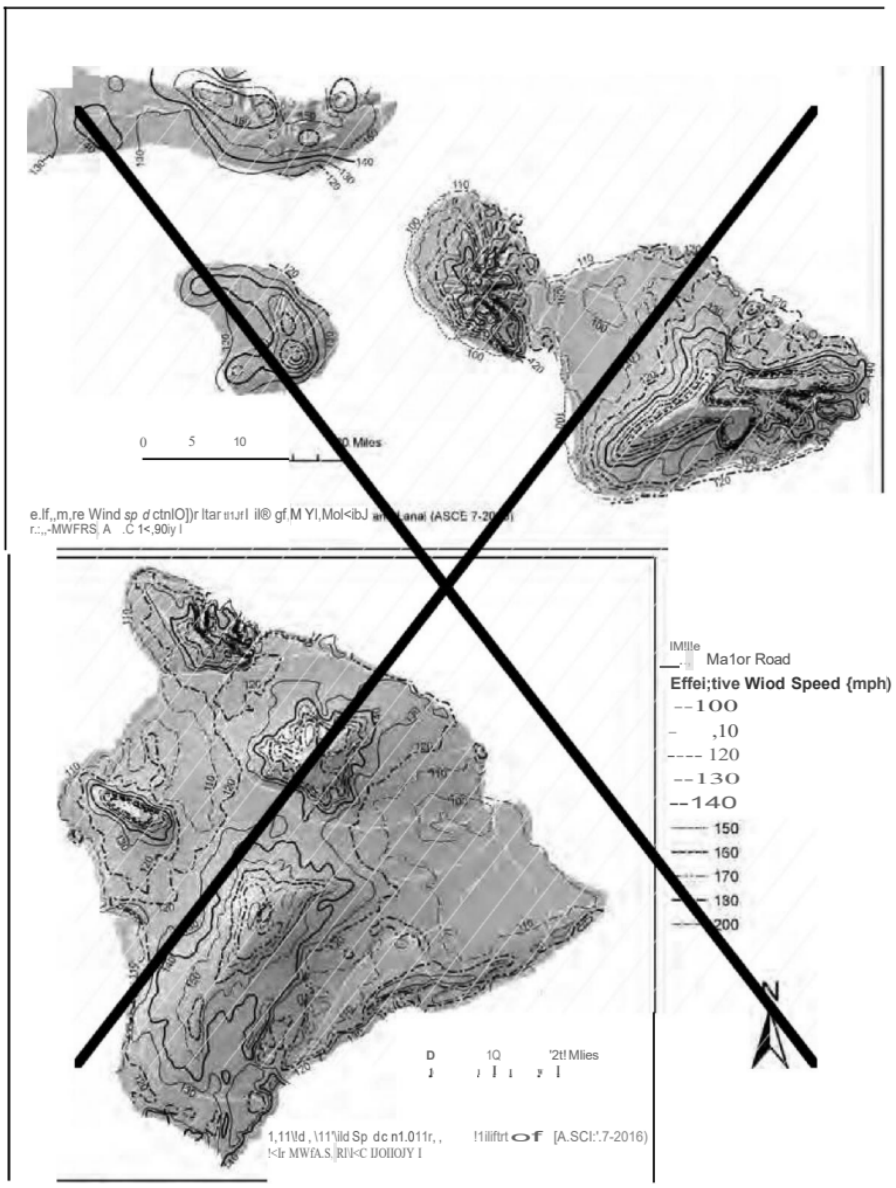
R11139Text Modification



Mod_11139_Text_S62-22.pdf Page: 25

R11139Text Modification

~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour at 33 feet (10 m) above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~It is permitted to use the standard values of K_{zt} of 1.0 and K_{zt} as given in Table 26.6-1 of ASCE 7.~~
5. ~~Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~
6. ~~Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(11) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

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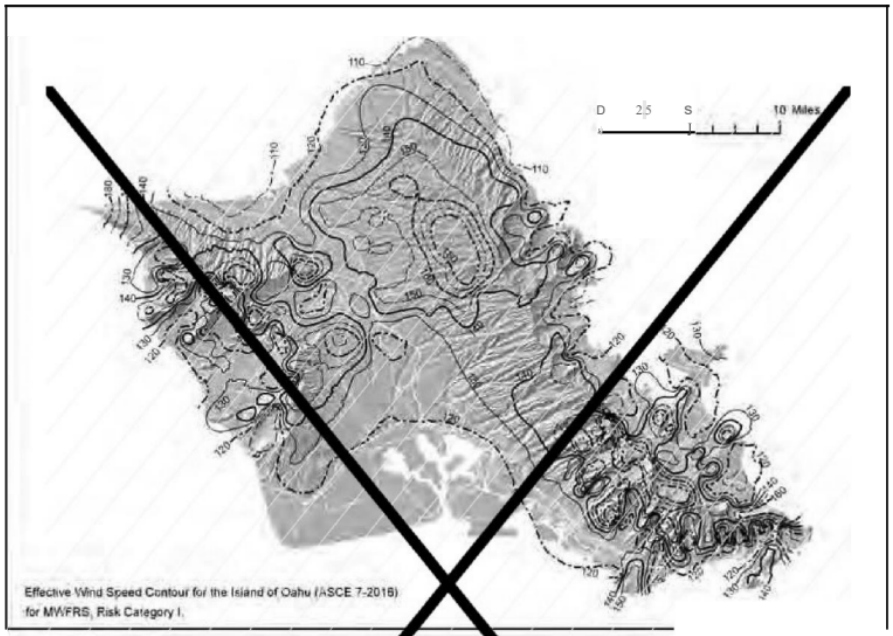

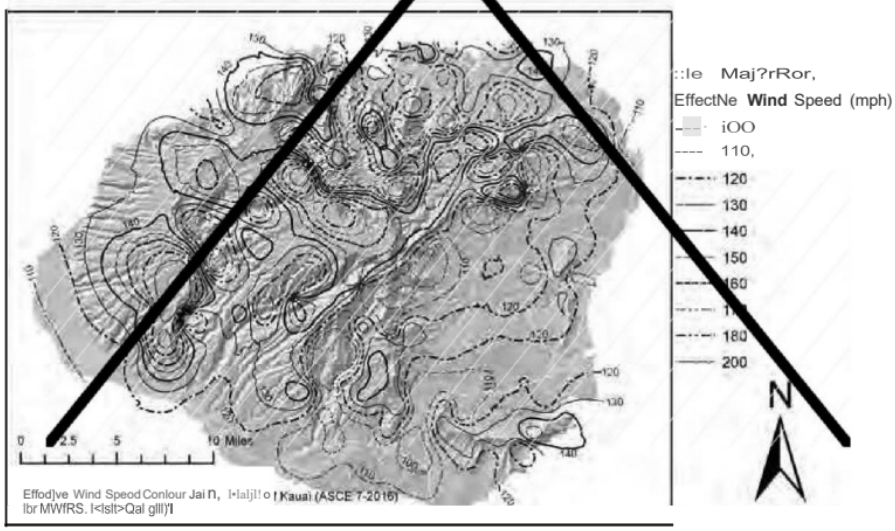

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R11139Text Modification

~~Notes:~~

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

~~2. Linear interpolation between contours is permitted.~~

~~3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~

~~4. It is permitted to use the standard values of K_{zt} of 1.0 and K_{zt} as given in Table 26.6-1 of ASCE 7.~~

~~5. Ocean promontories and local escarpments shall be examined for unusual wind conditions.~~

~~6. Wind speeds correspond to approximately a 15% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).~~

~~FIGURE 1609.3(12) BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

Revise as follows:

1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speeds of Figures 1609.3(1) through 1609.3~~(12)~~ (4) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6} \quad \textbf{(Equation 16-17)}$$

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3~~(12)~~ (4).

Add new standard(s) as follows:

ASCE/SEI

American Society of Civil Engineers Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191

7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Reason: This proposal is a coordination proposal to bring the 2024 IBC up to date with the provisions of the 2022 edition of *ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE/SEI 7-22). ASCE 7 will be updated to the 2022 edition from the 2016 edition as an Administrative update in the 2024 I-Codes.

This proposal includes technical updates as well as editorial corrections or re-organizations. Technical updates to the wind speed maps within ASCE/SEI 7-22 include new hurricane coastline wind speed contours from the Carolina's through Texas, as well as, new Special Wind Region definitions in Southern California and Northern Colorado. All of these updates are based upon recent wind studies conducted in these areas. These wind speeds for the contiguous United States and Alaska are available from the maps in ASCE 7-22, which are updated in Section 1609 of this proposal.

R11139Text Modification

Along with the continental United States, the wind speeds for US Virgin Island and Puerto Rico were also updated based upon recent wind studies of these islands. The resulting wind speeds accounting for the steep terrain of these island created a very dense contour map that is not easily read by a map that is sized practically for inclusion into a printed standard. Therefore the the wind speeds for US Virgin Islands and Puerto Rico - along with wind speeds for Hawaii - are only included in the ASCE Wind Design Geodatabase and therefore are no longer represented with maps in ASCE/SEI 7-22. Consequently, Hawaii and Puerto Rico maps - as well as values for US Virgin Islands - are being removed from the IBC and replaced with a pointer to the ASCE Wind Design Geodatabase. The wind speeds within the updated Special Wind Regions also are available for the designer ASCE Wind Design Geodatabase. This database of geocoded wind speed design data is freely available and accessed at the ASCE 7 Hazard Tool at https://asce7hazardtool.online/, or from an approved equivalent.

A summary of the coordination changes is provided below.

Section 202 DEFINITIONS:

Windborne Debris Region: Corrections to this definition for correct term of "basic*wind speed*" deleting the outdated inclusion of "design" in the term. Also reorganized Risk Category order and correct pointers to the updated maps. No technical changes.

Wind Design Geodatabase: Adding a new definition for the database that contains the windspeeds from ASCE 7-22. The database is the 2022-1.0 version and is freely available at https://asce7hazardtool.online/.

Table 1504.2: Updates the pointer to the maps in 1609.3(1)-(4).

1504.6 Edge systems for low-slope roofs. Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1602.1 Notations: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.1.1Determination of wind loads: Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

1609.3 Basic design wind speed: This section updates all of the basic wind speed maps for the contiguous United States and Alaska, as well as the Notes, to match what is in ASCE/SEI 7-22. It also includes the updates to the pointers for the maps. Additionally, the order of the maps has been revised. The maps now begin with Risk Category I and progress to Risk Category IV. The pointer to the ASCE Wind Design Geodatabase is added for Hawaii, US Virgin Islands, and Puerto Rico, and because maps for these three areas are no longer produced in ASCE/SEI 7-22, the maps have been removed from the IBC and are not replaced.

1609.3.1 Wind speed conversion and **Table 1609.3.1:** Updates the pointer to the maps in 1609.3(1)-(4). Removes "design" from basic wind speed.

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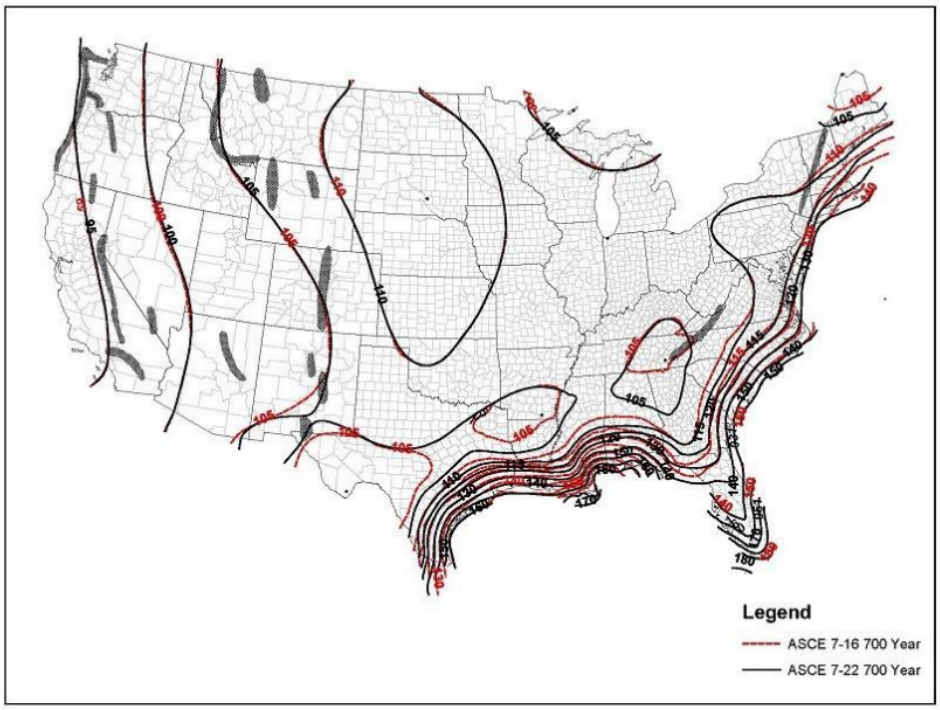

Cost Impact: The code change proposal will increase the cost of construction
ASCE 7 is a national minimum design load standard. Therefore as the study of each hazard advances from one edition to the next, updates to the national maps will impact the nation differently. In this case, the wind speeds for ASCE 7-22 largely remain unchanged, therefore the is no impact to the cost of construction from the updated maps. However, in some areas the wind speeds decrease and in other areas the wind speeds increase. The proposed code change will modestly increase the cost of construction along in some areas along the hurricane coastline between the Carolinas and Texas where the windspeeds have increased.

Although the wind speeds do increase in some locations along the hurricane coastline, the higher wind speeds influence less than 3% of the United States. The wind speeds decrease in most areas along the hurricane coastline (as shown by the wind speed contours moving closer to the coastline), while in the Gulf Coast area of the Florida Panhandle the contours extend further inland, which indicates higher wind speeds for this area. And most of the rest of the continental United States the speeds do not change and therefore the cost of construction will be unchanged; see the Risk Category II map below that compared ASCE 7-22 to ASCE 7-16. ASCE 7 Wind speeds are available at the ASCE 7 Hazard Tool (https://asce7hazardtool.online/), which is free to all users, to view and compare various locations.

R11139Text Modification

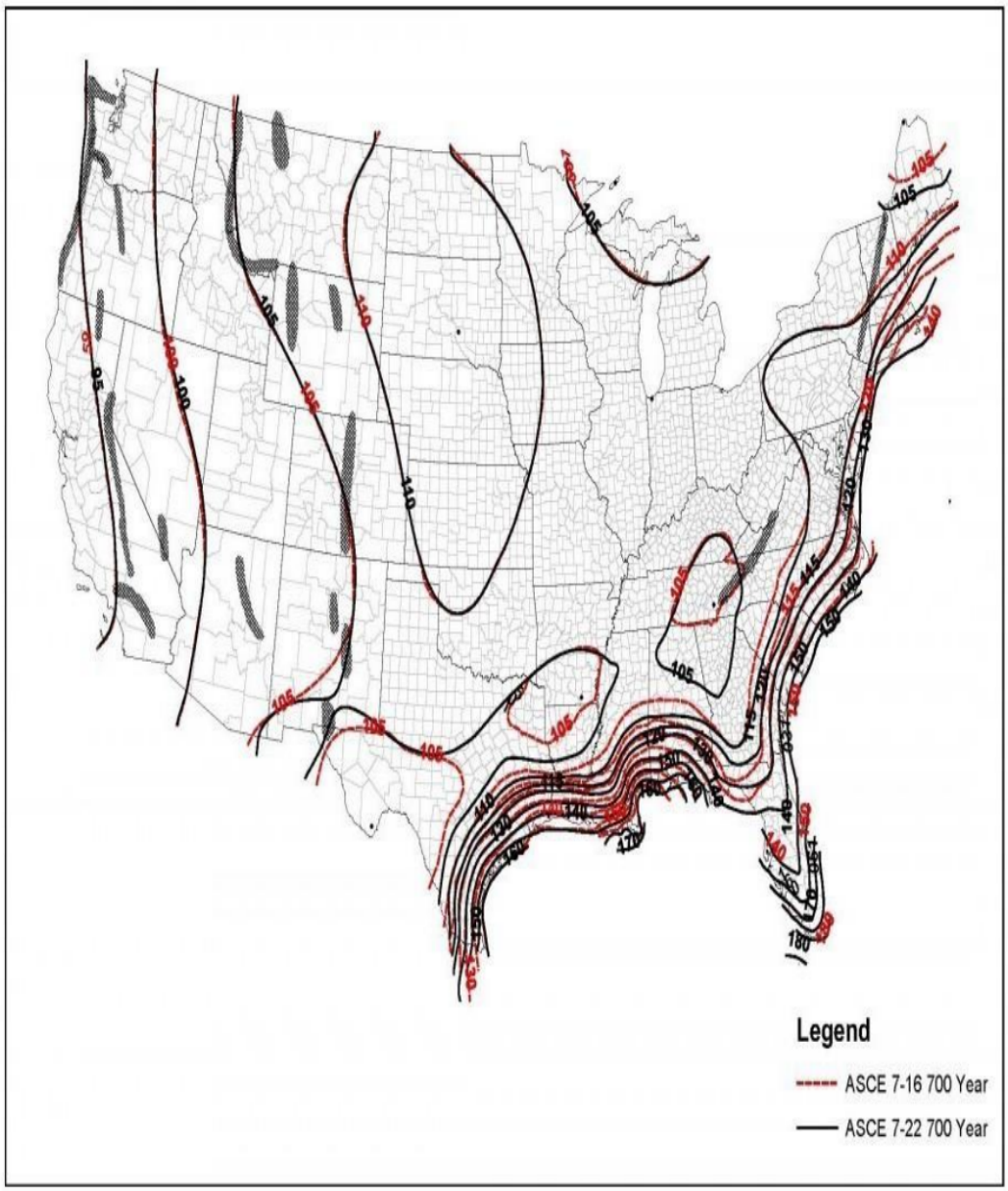

FIGURE: Comparison of ASCE/SEI 7-22 basic wind speeds for Risk Category II (700 Year MRI) to ASCE/SEI 7-16. (Courtesy ARA)

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R11139Text Modification

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

Public Hearing Results

Committee Action **As Modified**

Committee Modification: Figure 1609.3(2): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).
Figure 1609.3(3): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 3% probability of exceedance in 50 years (Annual Exceedance Probability = 0.000588, MRI = 1,700 years).

Figure 1609.3(4): Notes: 7. Wind speeds correspond to approximately a ~~15%~~ 1.6% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00033, MRI = 3,000 years).

Committee Reason: Approved as modified as per the provided reason statement. The modification corrects the probability of exceedance percentages in the Figures notes. (Vote: 14-0)

Final Hearing Results

S62-22 AM

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

5

R11055		/G159-21			
Date Submitted	03/13/2024	**Section**	1202.3	**Proponent**	Mo Madani
Chapter	12	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Proponents believe the current requirements for minimum R-value of air-impermeable insulation laid out in Table 1202.3 should be expressed as a percentage of the total R-value for each assembly.

Rationale

See attached

R11055Text Modification

See attached

Page: 1

Mod11055_TextOfModification.pdf

R11055Text Modification

G159-21

Original Proposal

IBC: 1202.3, TABLE 1202.3

Proponents: Paul Duffy, Paul Duffy and Associates, American Chemistry Council - Spray Foam Coalition

2021 International Building Code

Revise as follows:

1202.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side *a*(*ttic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with either Item 5.1 or 5.2, and additionally Item 5.3.
   5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
      5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
      5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the ~~R-values~~ R-value percentages in Table 1202.3 for condensation control.
      5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the ~~R-values~~ R-value percentages in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
      5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

Page: 1

Mod_11055_Text_G159-21.pdf

R11055Text Modification

5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented attics shall meet the following requirements:

5.2.1. A vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to $1/600$ of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.

5.2.5. The vapor diffusion port shall protect the attic against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (50 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3 units vertical in 12 units horizontal (3:12).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top the attic floor, or on top of the ceiling.

5.2.9. Where only air-permeable insulation is used and is installed directly below the structural roof sheathing, air shall be supplied at a flow rate greater than or equal to 50 cubic feet per minute (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling.

5.3. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.
2. Section 1202.3 does not apply to enclosures in Climate Zones 5 through 8 that are humidified beyond 35 percent during the three coldest months.

TABLE 1202.3 INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM *R*-VALUE OF AIR-IMPERMEABLE INSULATION EXPRESSED AS A PERCENTAGE OF TOTAL R-VALUE[a]
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5 10%
4C	R-10 20%
4A, 4B	R-15 30%
5	R-20 40%
6	R-25 50%
7	R-30 60%
8	R-35 70%

a. Contributes to, but does not supersede, thermal resistance requirements for attic and roof assemblies in Section C402.2.1 of the International Energy Conservation Code.

Reason: Reason:

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The existing table in Section 1202.3 was created at a time when the maximum insulation levels contemplated in the most extreme locations covered by the IECC was R-49. In more recent code cycles, insulation requirements have increased and many builders or designers are attempting to go "beyond code" minimums to achieve near zero, net-zero, or even zero energy consumption. The proponents believe the current requirements for minimum R-value of air-impermeable insulation laid out in Table 1202.3 should be expressed as a percentage of the total R-value for each assembly. This approach is intended to maintain a minimum surface temperature at the interface between impermeable and permeable insulation to avoid condensation that may occur in high R-value assemblies if the R-value of air-impermeable insulation is not proportionally increased.

The proposed version of Table 1202.3 was created using the total R-value required in each climate zone in Table 1202.3. The proposed version of Table 1202.3 expresses the required R-value of air-impermeable insulation as a percentage of the original R-value rather than absolute values. See calculations in the attached table.

Insulation for Condensation Control

Climate Zone	Air Impermeable Insulation Req'd	IECC Required Total R-Value	Percentage of Air Impermeable R-Value to Total Insulation R-Value
2B, 3B Tile Roof	0	38	0%
1, 2A, 2B, 3A, 3B, 3C	R-5	R-38	10%
4C	R-10	R-49	20%
4A, 4B	R-15	R-49	30%
5	R-20	R-49	40%
6	R-25	R-49	50%
7	R-30	R-49	60%
8	R-35	R-49	70%

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the table in the section so it can be more broadly applied using sound building science principles.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: This proposal was approved as it coordinates with the International Energy Code. (Vote: 11-2)

Final Hearing Results

G159-21 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

R11056	/G160-21				6
Date Submitted	03/13/2024	**Section**	1202.3	**Proponent**	Mo Madani
Chapter	12	**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

There was an error in converting the measurements in the original proposal.

Rationale

See attached

1st Comment Period History

R11056-G1

Proponent Aaron Phillips Submitted 6/21/2024 11:17:15 AM Attachments No

Comment:

ARMA encourages support of this Mod to correct an error in the code.

R11056Text Modification

See attached

Page: 1

Mod11056_TextOfModification.pdf

R11056Text Modification

G160-21

Original Proposal

IBC: 1202.3

Proponents: Craig Conner, self, self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, Myself (joe@buildingscience.com)

2021 International Building Code

Revise as follows:

1202.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side *a*(*ttic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with either Item 5.1 or 5.2, and additionally Item 5.3.
   - 5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
     - 5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
     - 5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table 1202.3 for condensation control.
     - 5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the R-values in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
     - 5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

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R11056Text Modification

5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented attics shall meet the following requirements:

5.2.1. A vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to 1/600 1/150 of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.

5.2.5. The vapor diffusion port shall protect the attic against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (50 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3 units vertical in 12 units horizontal (3:12).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top the attic floor, or on top of the ceiling.

5.2.9. Where only air-permeable insulation is used and is installed directly below the structural roof sheathing, air shall be supplied at a flow rate greater than or equal to 50 cubic feet per minute (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling.

5.3. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.
2. Section 1202.3 does not apply to enclosures in Climate Zones 5 through 8 that are humidified beyond 35 percent during the three coldest months.

Reason: I got it wrong in my original proposal. There was an error in converting the measurements. The original work was based on 1:300 and the intention was to double the vent area… Doubling the vent area is really 1:150 not 1:600.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost increase is due to the increase in vent area. The cost increase is small as it increases the size of the vent area - it does not require the addition of vents, only an increase in the size of the vents. Note that having too little vent area can lead to problems that will have associated costs.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it addresses an error that occurred in G119-18. The 1/150 ratio is for vapor diffuser ports and follows recommended industry practices. (Vote: 14-0)

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R11056Text Modification

Final Hearing Results

G160-21 AS

Mod_11056_Text_G160-21.pdf Page: 3

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

R10892	/FS141-21				7
Date Submitted	03/08/2024	**Section**	1404.3	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

2023 FBC - B - Section 1405.

Summary of Modification

This proposal is needed to coordinate with the IECC R-value options for wood-frame and cold-formed steel-frame walls to achieve compliance using exterior continuous insulation only without cavity insulation.

Rationale

See attached

R10892Text Modification

See attached

Mod10892_TextOfModification.pdf

Page: 1

R10892Text Modification

FS141-21

Original Proposal

IBC: 1404.3, TABLE 1404.3(5) (New)

Proponents: Jay Crandell (modify to non-exclusive license to use "comments"), P.E., ABTG/ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3) , or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table 1404.3(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B). Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.
5. In Climate Zones 4 through 8, a vapor retarder on the interior side of frame walls shall not be required where the assembly complies with Table 1404.3(5).

Add new text as follows:

TABLE 1404.3(5) CONTINUOUS INSULATION ON WALLS WITHOUT A CLASS I, II, or III INTERIOR VAPOR RETARDER[a] –

CLIMATE ZONE	PERMITTED CONDITIONS[b,c]
4	Continuous insulation with R-value >= 4.5
5	Continuous insulation with R-value >= 6.5
6	Continuous insulation with R-value >= 8.5
7	Continuous insulation with R-value >= 11.5
8	Continuous insulation with R-value >= 14

Page: 1

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R10892Text Modification

a. The total insulating value of materials to the interior side of the exterior continuous insulation, including any cavity insulation, shall not exceed R-5. Where the R-value of materials to the interior side of the exterior continuous insulation exceeds R-5, an *approved* design shall be required.

b. A water vapor control material layer having a permeance of not greater than 1 perm in accordance with ASTM E96, Procedure A (dry cup) shall be placed on the exterior side of the wall and to the interior side of the exterior continuous insulation. The exterior continuous insulation shall be permitted to serve as the vapor control layer where, at its installed thickness or with a facer on its interior face, the exterior continuous insulation is a Class I or II vapor retarder.

c. The requirements of this table apply only to continuous insulation used to control moisture in order to allow walls without a Class I, II or III interior vapor retarder. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*.

Reason: This proposal is needed to coordinate with the IECC R-value options for wood-frame and cold-formed steel-frame walls to achieve compliance using exterior continuous insulation only without cavity insulation. This approach is consistent with the long-standing successful use of "insulation entirely above the roof deck" for low-slope roof systems (the same principle applies to walls). Consequently, this wall insulation option needs to be supported with a coordinated approach in the building code's water vapor control provisions to ensure performance at least equivalent to other wall assembly conditions addressed in Section 1404.3 (e.g., Tables 1404.3(3) and 1404.3(4)).
It is well known that placing the majority of insulation continuously on the exterior side of an assembly can provide a high degree of thermal and moisture control and protection of the structure. It also does not require an interior vapor retarder and, therefore, maximizes inward drying potential. For these reasons and others, it is commonly known as the "perfect wall". It is a practice currently and successfully used, yet it needs building code requirements to ensure appropriate use, compliance and enforcement.

As with any practice, there are limitations and requirements to prevent unintended misapplication. These are addressed in footnotes to the table in a manner consistent with other tables in Section 1404.3. The overall requirements of this proposal are based on an extensive review of water vapor control codes, standards, research data, field data, and practices (refer to ABTG, 2015 and ASTM, 2017 in the bibliography). This same research was used to justify major improvements to the vapor retarder provisions for the 2021 editions of the IBC and IRC during the 2018 and 2019 code development cycles. However, this "perfect wall" option was not addressed at that time.

Bibliography: ABTG (2015). Assessment of Water Vapor Control Methods for Modern Insulated Light-Frame Wall Assemblies, ABTG Research Report No. 1410-03, http://www.appliedbuildingtech.com/rr/1410-03
Crandell, J.H., "Assessment of Hygrothermal Performance and Design Guidance for Modern Light-Frame Wall Assemblies," Advances in Hygrothermal Performance of Building Envelopes: Materials, Systems and Simulations, ASTM STP1599, P. Mukhopadhyaya and D. Fisler, Eds., ASTM International, West Conshohocken, PA, 2017, pp. 362-394, http://dx.doi.org/10.1520/STP159920160097

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an option for vapor control, not a requirement. Thus, it does not impact cost of construction and, in some cases, may provide a solution that is more cost-effective for a particular building wall application.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal provides another wall insulation option for the code users. (Vote: 13-0)

Final Hearing Results

FS141-21 AS

Page: 2

Mod_10892_Text_FS141-21.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

8

R10895	/FS144-21				
Date Submitted	03/08/2024	**Section**	1404.3	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

2023 FBC - B - Table 1405.3(3).

Summary of Modification

Table 1404.3(3). This proposal seeks to define the term rainscreen and to add to include rainscreens to the list of vented claddings that work in a system with Class III Vapor Retarder assemblies.

Rationale

See attached

R10895Text Modification

See attached

Page: 1

Mod10895_TextOfModification.pdf

R10895Text Modification

FS144-21

Original Proposal

IBC: SECTION 202 (New), TABLE 1404.3(3)

Proponents: Theresa Weston, The Holt Weston Consultancy, LLC, The Holt Weston Consultancy, LLC (holtweston88@gmail.com)

2021 International Building Code

Add new definition as follows:

RAINSCREEN

.

An assembly applied to an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

Revise as follows:

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R2.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R7.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R11.25 over 2 × 6 wall
7	Continuous insulation with *R*-value ≥ R10 over 2 × 4 wall Continuous insulation with*R*-value ≥ R15 over 2 × 6 wall
8	Continuous insulation with *R*-value ≥ R12.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, *rainscreens*, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Reason: Rainscreens are aa common and growing construction technique that is not material specific. The concept of cladding and substrates layers separated by a cavity that allows water to drain and air flow to accelerate drying is the most basic understanding of how a rainscreen system works. This proposal seeks to define the term *rainscreen* and to add to include *rainscreens* to the list of vented claddings that work in a system with Class III Vapor Retarder assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not add a new requirement but clarifies existing requirements and already existing option and so will not either increase or decrease the cost of construction.

Page: 1

Mod_10895_Text_FS144-21.pdf

R10895Text Modification

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

RAINSCREEN SYSTEM. An assembly applied to the exterior side of an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

Portions of table not shown remain unchanged.

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code,*rainscreensrainscreen systems,* and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Committee Reason: The committee concluded that the modification is an essential addition to clarify the exterior side of the exterior wall. Adding the word "system" is critical to guide to the appropriate system. The proposal defines an already used concept. (Vote: 13-0)

Final Hearing Results

FS144-21 AM

Page: 2

Mod_10895_Text_FS144-21.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

9

R11104 | **/S9-22**

Date Submitted	03/14/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	14	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC-B.

Summary of Modification

This is a clarifying proposal to clean up the wording in regard to the basic wind speed referenced in the many sections of the code. This proposal makes the wording consistent with ASCE 7 and other loading standards.

Rationale

See attached

R11104Text Modification

See attached

Page: 1

Mod11104_TextOfModification.pdf

R11104Text Modification

S9-22

Original Proposal

IBC: SECTION 202, [BS] 1404.16, [BS] 1404.18, 1504.6, 1504.9; IBC: TABLE 1504.9; IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16.8, 1602.1, 1603.1, 1603.1.4, TABLE 1604.3, 1609.1.1, TABLE 1609.2, 1609.2.2, 1609.3, 1609.3.1, TABLE 1609.3.1, 1705.12, 2304.6.1, TABLE 2304.10.2, TABLE 2308.7.5, 2404.1, 2404.2, 2404.3.1, 2404.3.3, 2404.3.5, 2405.5.2

Proponents: Emily Guglielmo, NCSEA Wind Committee (eguglielmo@martinmartin.com); Don Scott, ASCE 7 Wind Load Subcommittee (dscott@pcs-structural.com); Jennifer Goupil, Structural Engineering Institute of ASCE, Structural Engineering Institute of ASCE (jgoupil@asce.org)

2021 International Building Code

Revise as follows:

[BS] BASIC WIND SPEED, *V*.

~~Basic design wind speeds.~~ The wind speed used for design, as determined in Chapter 16.

[BS] HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The US Atlantic Ocean and Gulf of Mexico coasts where the basic~~design~~ wind speed, *V*, for Risk Category II buildings is greater than 115 mph (51.4 m/s);
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

[BS] WINDBORNE DEBRIS REGION. Areas within *hurricane-prone regions* located:

1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic ~~design~~ wind speed, *V*, is 130 mph (58 m/s) or greater; or
2. In areas where the basic ~~design~~ wind speed, V, is 140 mph (63 m/s) or greater.

For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).

[BS] 1404.16 Fiber-cement siding. *Fiber-cement siding* complying with Section 1403.10 shall be permitted on *exterior walls* of Type I, II, III, IV and V construction for wind pressure resistance or basic wind speed exposures as indicated by the manufacturer's listing and *label* and *approved* installation instructions. Where specified, the siding shall be installed over sheathing or materials listed in Section 2304.6 and shall be installed to conform to the *water-resistive barrier* requirements in Section 1402. Siding and accessories shall be installed in accordance with *approved* manufacturer's instructions. Unless otherwise specified in the *approved* manufacturer's instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth shank and shall be long enough to penetrate the studs not less than 1 inch (25 mm). For cold-formed steel *light-frame construction*, corrosion-resistant fasteners shall be used. Screw fasteners shall penetrate the cold-formed steel framing not fewer than three exposed full threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer's instructions.

[BS] 1404.18 Polypropylene siding. *Polypropylene siding* conforming to the requirements of this section and complying with Section 1403.12 shall be limited to *exterior walls* located in areas where the basic wind speed, V, specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed, V, exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. *Polypropylene siding* shall be installed in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the building so as to provide weather protection for the *exterior walls*

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of the building.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic ~~design~~ *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

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Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

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

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

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

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

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

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

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Revise as follows:

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

Exceptions:

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

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2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2^{1}/2$ units vertical in 12 units horizontal ($2^{1}/2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		

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ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, $V \geq 140$ MPH
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic ~~Design~~ Wind Speed, V < 140 mph except all laps shall be not less than 4 inches

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

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, V < 140 MPH	MAXIMUM BASIC ~~DESIGN~~ WIND SPEED, $V \geq 140$ MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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

1507.16.8 Wind resistance. *Photovoltaic shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum ~~nominal design~~ basic wind speed, V.

1602.1 Notations. The following notations are used in this chapter:

D	=	Dead load.
D_i	=	Weight of ice in accordance with Chapter 10 of ASCE 7.
E	=	Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.
F	=	Load due to fluids with well-defined pressures and maximum heights.
F_a	=	Flood load in accordance with Chapter 5 of ASCE 7.
H	=	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.
L	=	Live load.
L_r	=	Roof live load.
R	=	Rain load.
S	=	Snow load.
T	=	Cumulative effects of self-straining load forces and effects.
V_{asd}	=	Allowable stress design wind speed, miles per hour (mph)~~(km/hr)~~ (m/s) where applicable.
V	=	Basic ~~design~~ wind speed, V, miles per hour (mph)~~(km/hr)~~ (m/s) determined from Figures 1609.3(1) through 1609.3(12) or ASCE 7.

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W	=	Load due to wind pressure.
W_i	=	Wind-on-ice in accordance with Chapter 10 of ASCE 7.

1603.1 General. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for buildings constructed in accordance with the*conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and live loads.
2. Ground snow load, p_g.
3. Basic ~~design~~ wind speed, V, miles per hour (mph)~~(km/hr)~~ (m/s) and allowable stress design wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.
6. Design load-bearing values of soils.
7. Rain load data.

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

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

TABLE 1604.3 DEFLECTION LIMITS[a, b, c, h, i]

CONSTRUCTION	L or L_r	S or W[f]	$D + L$[d, g]
Roof members:[e]			
Supporting plaster or stucco ceiling	l/360	l/360	l/240
Supporting nonplaster ceiling	l/240	l/240	l/180
Not supporting ceiling	l/180	l/180	l/120
Floor members	l/360	—	l/240
Exterior walls:			
With plaster or stucco finishes	—	l/360	—
With other brittle finishes	—	l/240	—
With flexible finishes	—	l/120	—
Interior partitions:[b]			
With plaster or stucco finishes	l/360	—	—

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CONSTRUCTION	*L* or *L*	*S* or *W*	*D* + *L*
With other brittle finishes	*l*/240	—	—
With flexible finishes	*l*/120	—	—
Farm buildings	—	—	*l*/180
Greenhouses	—	—	*l*/120

For SI: 1 foot = 304.8 mm.

a. For structural roofing and siding made of formed metal sheets, the total load deflection shall not exceed*l*/60. For secondary roof structural members supporting formed metal roofing, the live load deflection shall not exceed *l*/150. For secondary wall members supporting formed metal siding, the design wind load deflection shall not exceed *l*/90. For roofs, this exception only applies when the metal sheets have no roof covering.

b. Flexible, folding and portable partitions are not governed by the provisions of this section. The deflection criterion for interior partitions is based on the horizontal load defined in Section 1607.16 .

c. See Section 2403 for glass supports.

d. The deflection limit for the $D+(L+L_r)$ load combination only applies to the deflection due to the creep component of long-term dead load deflection plus the short-term live load deflection. For lumber, structural glued laminated timber, prefabricated wood I-joists and structural composite lumber members that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection shall be permitted to be estimated as the immediate dead load deflection resulting from 0.5*D*. For lumber and glued laminated timber members installed or used at all other moisture conditions or cross laminated timber and wood structural panels that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection is permitted to be estimated as the immediate dead load deflection resulting from *D*. The value of 0.5*D* shall not be used in combination with ANSI/AWC NDS provisions for long-term loading.

e. The preceding deflections do not ensure against ponding. Roofs that do not have sufficient slope or camber to ensure adequate drainage shall be investigated for ponding. See Chapter 8 of ASCE 7.

f. The wind load shall be permitted to be taken as 0.42 times the “component and cladding” loads or directly calculated using the 10-year mean return interval basic wind speed, V, for the purpose of determining deflection limits in Table 1604.3. Where framing members support glass, the deflection limit therein shall not exceed that specified in Section 1604.3.7

g. For steel structural members, the deflection due to creep component of long-term dead load shall be permitted to be taken as zero.

h. For aluminum structural members or aluminum panels used in skylights and sloped glazing framing, roofs or walls of sunroom additions or patio covers not supporting edge of glass or aluminum sandwich panels, the total load deflection shall not exceed *l*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *l*/175 for each glass lite or *l*/60 for the entire length of the member, whichever is more stringent. For aluminum sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed *l*/120.

i. *l* = Length of the member between supports. For cantilever members, l shall be taken as twice the length of the cantilever.

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic ~~design~~ *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.

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2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through 1609.3(12) are basic~~design~~ wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

TABLE 1609.2 WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE FOR WOOD STRUCTURAL PANELS[a, b, c, d]

FASTENER TYPE	FASTENER SPACING (inches)		
	Panel Span ≤ 4 feet	4 feet < Panel Span ≤ 6 feet	6 feet < Panel ≤ Span 8 feet
No. 8 wood-screw-based anchor with 2-inch embedment length	16	10	8
No. 10 wood-screw-based anchor with 2-inch embedment length	16	12	9
1/4-inch diameter lag-screw-based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N, 1 mile per hour = 0.447 m/s.

a. This table is based on a 140 mph basic wind speed~~s~~, V, and a 45-foot mean roof height.

b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located not less than 1 inch from the edge of the panel.

c. Anchors shall penetrate through the exterior wall covering with an embedment length of 2 inches minimum into the building frame. Fasteners shall be located not less than $2^1/_2$ inches from the edge of concrete block or concrete.

d. Where panels are attached to masonry or masonry/stucco, they shall be attached using vibration-resistant anchors having a minimum ultimate withdrawal capacity of 1,500 pounds.

1609.2.2 Application of ASTM E1996. The text of Section 6.2.2 of ASTM E1996 shall be substituted as follows:
6.2.2 Unless otherwise specified, select the wind zone based on the basic~~design~~ *wind speed*, *V*, as follows:

6.2.2.1 *Wind Zone 1*–130 mph ≤ basic ~~design~~ *wind speed*, *V* < 140 mph.

6.2.2.2 *Wind Zone 2*–140 mph ≤ basic ~~design~~ *wind speed*, *V* < 150 mph at greater than one mile (1.6 km) from the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.3 *Wind Zone 3*–150 mph (67 m/s) ≤ basic ~~*design*~~ *wind speed*, *V* ≤ 160 mph (72 m/s), or 140 mph (63 m/s) ≤ basic~~design~~ *wind speed*, *V* ≤ 160 mph (72 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark.

6.2.2.4 *Wind Zone 4*– basic ~~design~~ *wind speed*, *V* > 160 mph (72 m/s).

1609.3 Basic ~~design~~ wind speed. The basic ~~design~~ *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* II buildings and structures shall be obtained from Figures 1609.3(1), 1609.3(5) and 1609.3(6). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* III buildings and structures shall be obtained from Figures 1609.3(2), 1609.3(7) and 1609.3(8). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* IV buildings and structures shall be obtained from Figures 1609.3(3), 1609.3(9) and 1609.3(10). The basic ~~design~~ *wind speed*, *V*, for use in the design of *Risk Category* I buildings and structures shall be obtained from Figures 1609.3(4), 1609.3(11) and 1609.3(12). The basic ~~design~~ *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic ~~design~~ wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.
In nonhurricane-prone regions, when the basic ~~*design*~~ *wind speed*, *V*, is estimated from regional climatic data, the basic ~~design~~ *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.

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1609.3.1 Wind speed conversion. Where required, the basic ~~design~~ wind speed, V, of Figures 1609.3(1) through 1609.3(12) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6} \quad \textbf{(Equation 16-17)}$$

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

TABLE 1609.3.1 WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.

c. V = basic ~~design~~ wind speeds determined from Figures 1609.3(1) through 1609.3(12).

1705.12 Special inspections for wind resistance. *Special inspections* for wind resistance specified in Sections 1705.12.1 through 1705.12.3, unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where *basic wind speed*, V is 150 miles per hour (67 m/sec) or greater.
2. In wind Exposure Category C or D, where *basic wind speed*, V is 140 mph (62.6 m/sec) or greater.

2304.6.1 Wood structural panel sheathing. Where *wood structural panel* sheathing is used as the exposed finish on the outside of *exterior walls*, it shall have an exterior exposure durability classification. Where *wood structural panel* sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). *Wood structural panel* sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable allowable stress design wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

TABLE 2304.10.2 FASTENING SCHEDULE

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[g]	SPACING AND LOCATION
Roof		
1. Blocking between ceiling joists, rafters or trusses to top plate or other framing below	4-8d box ($2^1/2$" x 0.113"); or 3-8d common ($2^1/2$" × 0.131"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3"14 gage staples, $^7/_{16}$" crown	Each end, toenail
Blocking between rafters or truss not at the wall top plate, to rafter or truss	2-8d common ($2^1/2$" × 0.131") 2-3" × 0.131" nails 2-3" 14 gage staples	Each end, toenail
	2-16 d common ($3^1/2$" × 0.162") 3-3" × 0.131" nails 3-3" 14 gage staples	End nail
Flat blocking to truss and web filler	16d common ($3^1/2$" × 0.162") @ 6" o.c. 3" × 0.131" nails @ 6" o.c. 3" × 14 gage staples @ 6" o.c	Face nail
2. Ceiling joists to top plate	4-8d box ($2^1/2$" x 0.113"); or 3-8d common ($2^1/2$" × 0.131"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, $^7/_{16}$" crown	Each joist, toenail
3. Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (see Section 2308.7.3.1, Table 2308.7.3.1)	3-16d common ($3^1/2$" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, $^7/_{16}$" crown	Face nail

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DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
4. Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.7.3.1, Table 2308.7.3.1)	Per Table 2308.7.3.1	Face nail
5. Collar tie to rafter	3-10d common (3" × 0.148"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Face nail
6. Rafter or roof truss to top plate (See Section 2308.7.5, Table 2308.7.5)	3-10 common (3" × 0.148"); or 3-16d box (3 1/2" × 0.135"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131 nails; or 4-3" 14 gage staples, 7/16" crown	2 toenails on one side and 1 toenail on opposite side of rafter or truss[c]
7. Roof rafters to ridge valley or hip rafters; or roof rafter to 2-inch ridge beam	2-16d common (3 1/2" × 0.162"); or 3-16d box (3 1/2" × 0.135"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
	3-10d common (3 1/2" × 0.148"); or 4-16d box (3 1/2" × 0.135"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Toenail
Wall		
8. Stud to stud (not at braced wall panels)	16d common (3 1/2" × 0.162");	24" o.c. face nail
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	16" o.c. face nail
9. Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d common (3 1/2" × 0.162")	16" o.c. face nail
	16d box (3 1/2" × 0.135"); or 3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	12" o.c. face nail
10. Built-up header (2" to 2" header)	16d common (3 1/2" × 0.162")	16" o.c. each edge, face nail
	16d box (3 1/2" × 0.135")	12" o.c. each edge, face nail
11. Continuous header to stud	4-8d common (2 1/2" × 0.131"); or 4-10d box (3" × 0.128"); or 5-8d box (2 1/2" x 0.113")	Toenail
12. Top plate to top plate	16d common (3 1/2" × 0.162")	16" o.c. face nail
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
13. Top plate to top plate, at end joints	8-16d common (3 1/2" × 0.162"); or 12-16d box (3 1/2" x 0.135"); or 12-10d box (3" × 0.128"); or 12-3" × 0.131" nails; or 12-3" 14 gage staples, 7/16" crown	Each side of end joint, face nail (minimum 24" lap splice length each side of end joint)
14. Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common (3 1/2" × 0.162")	16" o.c. face nail
	16d box (3 1/2" × 0.135"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
15. Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common (3 1/2" × 0.162"); or 3-16d box (3 1/2" × 0.135"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	16" o.c. face nail
16. Stud to top or bottom plate	3-16d box (3 1/2" x 0.135"); or 4-8d common (2 1/2" × 0.131"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-8d box (2 1/2" x 0.113"); or 4-3" 14 gage staples, 7/16" crown	Toenail
	2-16d common (3 1/2" × 0.162"); or 3-16d box (3 1/2" x 0.135"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
17. Top plates, laps at corners and intersections	2-16d common (3 1/2" × 0.162"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Face nail
18. 1" brace to each stud and plate	3-8d box (2 1/2" x 0.113"); or 2-8d common (2 1/2" × 0.131"); or 2-10d box (3" × 0.128"); or 2-3" × 0.131" nails; or 2-3" 14 gage staples, 7/16" crown	Face nail
DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION

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19. 1" × 6" sheathing to each bearing	3-8d box ($2^1/_2$" x 0.113"); or 2-8d common ($2^1/_2$" × 0.131"); or 2-10d box (3" × 0.128"); or 2-$1^3/_4$" 16 gage staples, 1" crown	Face nail
20. 1" × 8" and wider sheathing to each bearing	3-8d common ($2^1/_2$" × 0.131"); or 3-8d box ($2^1/_2$" x 0.113"); or 3-10d box (3" × 0.128"); or 3-$1^3/_4$" 16 gage staples, 1" crown	Face nail
	Wider than 1" × 8" 3-8d common ($2^1/_2$" x 0.131"); or 4-8d box ($2^1/_2$" × 0.113"); or 3-10d box (3" × 0.128"); or 4-$1^3/_4$" 16 gage staples, 1" crown	
Floor		
21. Joist to sill, top plate, or girder	4-8d box ($2^1/_2$" × 0.113"); or 3-8d common ($2^1/_2$" × 0.131"); or floor 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, $^7/_{16}$" crown	Toenail
22. Rim joist, band joist, or blocking to top plate, sill or other framing below	8d box ($2^1/_2$" × 0.113")	4" o.c., toenail
	8d common ($2^1/_2$" × 0.131"); or 10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, $^7/_{16}$" crown	6" o.c., toenail
23. 1" × 6" subfloor or less to each joist	3-8d box ($2^1/_2$" × 0.113"); or 2-8d common ($2^1/_2$" × 0.131"); or 3-10d box (3" × 0.128"); or 2-$1^3/_4$" 16 gage staples, 1" crown	Face nail
24. 2" subfloor to joist or girder	3-16d box ($3^1/_2$" × 0.135"); or 2-16d common ($3^1/_2$" × 0.162")	Blind and face nail
25. 2" planks (plank & beam - floor & roof)	3-16d box ($3^1/_2$" × 0.135"); or 2-16d common ($3^1/_2$" × 0.162")	Each bearing, face nail
26. Built-up girders and beams, 2" lumber layers	20d common (4" × 0.192")	32" o.c., face nail at top and bottom staggered on opposite sides
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, $^7/_{16}$" crown	24" o.c. face nail at top and bottom staggered on opposite sides
	And: 2-20d common (4" × 0.192"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, $^7/_{16}$" crown	Ends and at each splice, face nail
27. Ledger strip supporting joists or rafters	3-16d common ($3^1/_2$" × 0.162"); or 4-16d box ($3^1/_2$" × 0.135"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, $^7/_{16}$" crown	Each joist or rafter, face nail
28. Joist to band joist or rim joist	3-16d common ($3^1/_2$" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, $^7/_{16}$" crown	End nail
29. Bridging or blocking to joist, rafter or truss	2-8d common ($2^1/_2$" × 0.131"); or 2-10d box (3" × 0.128"); or 2-3" × 0.131" nails; or 2-3" 14 gage staples, $^7/_{16}$" crown	Each end, toenail
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]		**Edges (inches)** / **Intermediate supports (inches)**
30. $^3/_8$" - $^1/_2$"	6d common or deformed (2" × 0.113"); or $2^3/_8$" × 0.113" nail (subfloor and wall)	6 / 12
	8d common or deformed ($2^1/_2$" × 0.131"× 0.281" head) (roof) or RSRS-01 ($2^3/_8$" × 0.113") nail (roof)[d]	6[e] / 6[e]
	$1^3/_4$" 16 gage staple, $^7/_{16}$" crown (subfloor and wall)	4 / 8
	$2^3/_8$" × 0.113"× 0.266" head nail (roof)	3[f] / 3[f]
$1^3/_4$" 16 gage staple, $^7/_{16}$" crown (roof)	3[f]	3[f]
31. $^{19}/_{32}$" - $^3/_4$"	8d common ($2^1/_2$" × 0.131"); or deformed (2" × 0.113") (subfloor and wall)	6 / 12
	8d common or deformed ($2^1/_2$" × 0.131" × 0.281" head) (roof) or RSRS-01 ($2^3/_8$" × 0.113") nail (roof)[d]	6[e] / 6[e]
	$2^3/_8$" × 0.113"× 0.266" head nail; or 2" 16 gage staple, $^7/_{16}$" crown	4 / 8
32. $^7/_8$" - $1^1/_4$"	10d common (3" × 0.148"); or deformed ($2^1/_2$" × 0.131" × 0.281" head)	6 / 12
Other exterior wall sheathing		
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33. 1/2" fiberboard sheathing[b]	1 1/2" × 0.120", galvanized roofing nail (7/16" head diameter); or 1 1/4" 16 gage staple with 7/16" or 1" crown	3	6
34. 25/32" fiberboard sheathing[b]	1 3/4" × 0.120" galvanized roofing nail (7/16" diameter head); or 1 1/2" 16 gage staple with 7/16" or 1" crown	3	6
Wood structural panels, combination subfloor underlayment to framing			
35. 3/4" and less	8d common (2 1/2" × 0.131"); or deformed (2" × 0.113"); or deformed (2" × 0.120")	6	12
36. 7/8" - 1"	8d common (2 1/2" × 0.131"); or deformed (2 1/2" × 0.131"); or deformed (2 1/2" × 0.120")	6	12
37. 1 1/8" - 1 1/4"	10d common (3" × 0.148"); or deformed (2 1/2" × 0.131"); or deformed (2 1/2" × 0.120")	6	12
Panel siding to framing			
38. 1/2" or less	6d corrosion-resistant siding (1 7/8" × 0.106"); or 6d corrosion-resistant casing (2" × 0.099")	6	12
39. 5/8"	8d corrosion-resistant siding (2 3/8" × 0.128"); or 8d corrosion-resistant casing (2 1/2" × 0.113")	6	12
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing[a]			
		Edges (inches)	**Intermediate supports (inches)**
Interior paneling			
40. 1/4"	4d casing (1 1/2" × 0.080"); or 4d finish (1 1/2" × 0.072")	6	12
41. 3/8"	6d casing (2" × 0.099"); or 6d finish (2" × 0.092") (Panel supports at 24 inches)	6	12

For SI: 1 inch = 25.4 mm.

a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.

b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).

c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

d. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

e. Tabulated fastener requirements apply where the ~~ultimate design~~ basic wind speed, V, is less than 140 mph. For wood structural panel roof sheathing attached to gable-end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ~~ultimate design~~ basic wind speed, V, is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed per the AWC NDS.

f. Fastening is only permitted where the ~~ultimate design~~ basic wind speed, V, is less than or equal to 110 mph.

g. Nails and staples are carbon steel meeting the specifications of ASTM F1667. Connections using nails and staples of other materials, such as stainless steel, shall be designed by acceptable engineering practice or approved under Section 104.11.

TABLE 2308.7.5 REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a, b, c, e, f, g, h]

NOMINAL ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} [i]	ROOF SPAN (feet)							OVERHANGS (pounds/feet)[d]
	12	20	24	28	32	36	40	
85	-72	-120	-145	-169	-193	-217	-241	-38.55
90	-91	-151	-181	-212	-242	-272	-302	-43.22
100	-131	-281	-262	-305	-349	-393	-436	-53.36
110	-175	-292	-351	-409	-467	-526	-584	-64.56

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour =~~1.61 km/hr~~

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0.447 meters per second , 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the loads by the following adjustment coefficients:

	Mean Roof Height (feet)									
EXPOSURE	15	20	25	30	35	40	45	50	55	60
B	1.00	1.00	1.00	1.00	1.05	1.09	1.12	1.16	1.19	1.22
C	1.21	1.29	1.35	1.40	1.45	1.49	1.53	1.56	1.59	1.62
D	1.47	1.55	1.61	1.66	1.70	1.74	1.78	1.81	1.84	1.87

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the loads shall be increased by adding the overhang loads found in the table. The overhang loads are based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

e. The uplift connection requirements are based on wind loading on end zones as defined in Figure 28.5-1 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimension of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down).

g. Interpolation is permitted for intermediate values of V_{asd} and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.

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

2404.1 Vertical glass. Glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* due to basic ~~design~~ *wind speed*, *V*, in Section 1609 for components and cladding. Glass in glazed curtain walls, glazed storefronts and glazed partitions shall meet the seismic requirements of ASCE 7, Section 13.5.9. The load resistance of glass under uniform *load* shall be determined in accordance with ASTM E1300.
The design of vertical glazing shall be based on Equation 24-1.

$$0.6F_{gw} \le F_{ga} \quad \textbf{(Equation 24-1)}$$

where:
F_{gw} = Wind *load* on the glass due to basic ~~*design wind speed*~~, *V*, computed in accordance with Section 1609.
F_{ga} = Short duration *load* on the glass as determined in accordance with ASTM E1300.

2404.2 Sloped glass. Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, *sunrooms*, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by Equations 24-2, 24-3 and 24-4.

$$F_g = 0.6W_s - D \quad \textbf{(Equation 24-2)}$$

$$F_g = 0.6W_s + D + 0.5\,S \quad \textbf{(Equation 24-3)}$$

$$F_g = 0.3\,W_s + D + S \quad \textbf{(Equation 24-4)}$$

where:
D = Glass *dead load* psf (kN/m^2).
For glass sloped 30 degrees (0.52 rad) or less from horizontal,

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= 13 t_g (For SI: 0.0245 t_g).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= 13 t_g cos θ (For SI: 0.0245 t_g cos θ).

F_g = Total *load*, psf (kN/m^2) on glass.

S = Snow *load*, psf (kN/m^2) as determined in Section 1608.

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m^2) due to basic ~~design~~ *wind speed*, V, as calculated in Section 1609.

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, V, as calculated in Section 1609.

θ = Angle of slope from horizontal.

Exception: The performance grade rating of *unit skylights* and *tubular daylighting devices* shall be determined in accordance with Section 2405.5.

The design of sloped glazing shall be based on Equation 24-5.

$$F_g \le F_{ga} \quad \textbf{(Equation 24-5)}$$

where:

F_g = Total *load* on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ga} = Short duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equations 24-2 and 24-3; or the long duration *load* resistance of the glass as determined in accordance with ASTM E1300 for Equation 24-4.

2404.3.1 Vertical wired glass. Wired glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to the following equation:

$$0.6F_{gw} < 0.5\,F_{ge} \quad \textbf{(Equation 24-6)}$$

where:

F_{gw} = Wind *load* on the glass due to basic ~~*design*~~ *wind speed*, V, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* from ASTM E1300 using a thickness designation for monolithic glass that is not greater than the thickness of wired glass.

2404.3.3 Vertical patterned glass. Patterned glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-9.

$$F_{gw} < 1.0\,F_{ge} \quad \textbf{(Equation 24-9)}$$

where:

F_{gw} = Wind *load* on the glass due to basic ~~*design*~~ *wind speed*, V, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for patterned glass shall be based on the thinnest part of the glass. Interpolation between nonfactored *load* charts in ASTM E1300 shall be permitted.

2404.3.5 Vertical sandblasted glass. Sandblasted glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors, and other exterior applications shall be designed to resist the wind *loads* in Section 1609 for components and cladding according to Equation 24-12.

$$0.6F_{gw} < 0.5\,F_{ge} \quad \textbf{(Equation 24-12)}$$

where:

F_g = Wind *load* on the glass due to basic ~~*design*~~ *wind speed*, V, computed in accordance with Section 1609.

F_{ge} = Nonfactored *load* in accordance with ASTM E1300. The value for sandblasted glass is for moderate levels of sandblasting.

2405.5.2 Skylights rated for separate performance grades for positive and negative design pressure. The design of skylights rated for performance grade for both positive and negative design pressures shall be based on Equations 24-14 and 24-15.

$$F_{gi} \le PG_{Pos} \quad \textbf{(Equation 24-}$$

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$F_{go} \leq PG_{Neg}$ **(Equation 24-14)**

15)

where:

PG_{Pos} = Performance grade rating of the skylight under positive design pressure;

PG_{Neg} = Performance grade rating of the skylight under negative design pressure; and

F_{gi} and F_{go} are determined in accordance with the following:

For

where:

W_o = Outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, V, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic, psf (kN/m^2) for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-3 and 24-4 in Section 2404.2.

F_{go}= Maximum load on the skylight determined from Equation 24-2.

For 0.6 W_o < D,

where:

W_o = The outward wind force, psf (kN/m^2) due to basic ~~design~~ wind speed, V, as calculated in Section 1609.

D = The dead weight of the glazing, psf (kN/m^2) as determined in Section 2404.2 for glass, or by the weight of the plastic for plastic glazing.

F_{gi} = Maximum load on the skylight determined from Equations 24-2 through 24-4 in Section 2404.2.

F_{go} = 0.

Reason: This is a clarifying proposal to clean up the wording in regard to the basic wind speed referenced in the many sections of the code. This proposal makes the wording consistent with ASCE 7 and other loading standards.
Also, modified the metric conversions used for wind speeds in that the maps are based on miles per hour and the conversion is to meters per second not kilometers per hour.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed code change will not affect the cost of construction. It's just a cleanup with the language to make consistent with other documents.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
2304.6.1 Wood structural panel sheathing. Where *wood structural panel* sheathing is used as the exposed finish on the outside of *exterior walls*, it shall have an exterior exposure durability classification. Where *wood structural panel* sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). *Wood structural panel* sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable ~~allowable stress design~~ basic wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.

Committee Reason: Approved as modified as the proposal updates the terms consistent with ASCE 7. Specifically updating to the term 'basic wind speed'. The modification fixes the terminology consistent with ASCE 7. (Vote: 14-0)

Final Hearing Results

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

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R10721		/F16-21 Part II			
Date Submitted	03/04/2024	**Section**	1505.10	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Section marked reserved in the 2023 FBC - B.

Summary of Modification

The term “landscaped roofs” has been used by the public to mean the same as “vegetative roofs” but it is used with a different meaning in ICC codes. Proposal to clarify

Rationale

See attached

R10721Text Modification

See attached

Mod10721_TextOfModification.pdf

Page: 1

R10721Text Modification

F16-21 Part II

Original Proposal

IBC: [BF] 1505.10

Proponents: Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[BF] 1505.10 Landscaped and Vegetative roofs. Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15. Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Reason: The term “landscaped roofs” has been used by the public to mean the same as “vegetative roofs” but it is used with a different meaning in ICC codes.The IBC defines vegetative roofs as follows:
VEGETATIVE ROOF. An assembly of interacting components designed to waterproof a building’s top surface that includes, by design, vegetation and related landscape elements.

This means that vegetative roof is a term that refers specifically to roof systems that are part of the building envelope. Moreover, it is clear Section 317 really should refer to “vegetative roofs” because they really address roofs that are part of the building envelope and, thus, are associated with the existing definition of “vegetative roofs”. Therefore, the term “landscaped roofs” is unnecessary and should be replaced by the defined term “vegetative roofs” in this section.
Moreover, the language in the IFC in the set of sections 317, which applies to “vegetative roofs”, needs to contain requirements that are consistent with those in the present edition of the SPRI VF-1 standard. However, in actual fact, the language in the IFC is that Sections 317.2, 317.3 and 317.4 are based on an old edition of the SPRI VF-1 standard and, thus, most of the requirements are unnecessary.

Note that Section 1505.10 of the IBC requires that vegetative roofs be installed per the SPRI VF-1 standard. Thus, this proposal simply cleans up section 317 of the IFC and replaces the term "landscaped roofs" with "vegetative roofs". It also clarifies that section 1505.10 of the IBC (controlled by the IFC) applies to both vegetative roofs and landscaped roofs and that the SPRI standard contains the requirements for vegetative roofs. The fire classification for all types of such roofs is contained in section 1505.1 of the IBC and is not delegated to the SPRI industry standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will not impact how vegetative roofs are designed and constructed as both the IBC and IFC will refer to the same edition of the SPRI standard.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined the proposal properly correlated terminology. The term "landscaped roofs" has been used by the public to mean the same as "vegetative roofs". Also, based on the committee's action on F15-21 Part II. (Vote: 12-1)

Final Hearing Results

F16-21 Part II AS

Page: 1

Mod_10721_Text_F16-21 Part II.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

11

R11094 | **/S1-21**

Date Submitted	03/14/2024	**Section**	1505.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

The initial sentence of Section 1505.1 is modified to clarify that Section 1505 establishes fire classification requirements of roof assemblies instead of a requirement to divide roof assemblies into classes. A new sentence is introduced as a replacement for the final sentence.

Rationale

See attached

R11094Text Modification

See attached

Page: 1

Mod11094_TextOfModification.pdf

R11094Text Modification

S1-21

Original Proposal

IBC: [BF] 1505.1

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

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

2021 International Building Code

Revise as follows:

[BF] 1505.1 General. Fire classification of *roof assemblies* shall be in accordance with Section 1505.~~*Roof assemblies* shall be divided into the classes defined in this section.~~ The minimum fire classification of *roof assemblies* installed on buildings shall comply with Table 1505.1 based on type of construction of the building. Class A, B and C *roof assemblies* and *roof coverings* required to be listed by this section shall be tested in accordance with ASTM E108 or UL 790. In addition, *fire-retardant-treated wood roof coverings* shall be tested in accordance with ASTM D2898. ~~The minimum *roof coverings* installed on buildings shall comply with Table 1505.1 based on the type of construction of the building.~~

Exception: *Skylights and sloped glazing* that comply with Chapter 24 or Section 2610.

Reason: The initial sentence of Section 1505.1 is modified to clarify that Section 1505 establishes fire classification requirements of roof assemblies instead of a requirement to divide roof assemblies into classes. A new sentence is introduced as a replacement for the final sentence. It clarifies that Table 1505.1 provides the minimum fire classification for roof assemblies based on type of construction, rather than the "minimum roof covering," which is a vague and potentially confusing phrase. Rearrangement of the section makes it read more logically and improves clarity.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies code language and rearranges existing provisions. These changes are not expected to affect cost of construction.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1505.1 MINIMUM ROOF ASSEMBLY~~COVERING~~ CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the *International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of Group R-3 and Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

R11094Text Modification

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

Committee Reason: The committee determined the modification makes TABLE 1505.1 consistent with the proposal. The committee based their approval on the proponent's reason statement and concluded the code change clarifies the existing language. The committee suggested fixing TABLE 1505.1 footnote b, "Nonclassified roof coverings" to "Nonclassified roof assembly" in the public comment phase. (Vote: 12-1)

Final Hearing Results	
S1-21	AM

Mod_11094_Text_S1-21.pdf Page: 2

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

12

R11095		/S1-22			
Date Submitted	03/14/2024	**Section**	1502.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - B.

Summary of Modification

This proposal deletes the redundant requirement in IBC Section 1502.3-Scuppers.

Rationale

See attached

R11095Text Modification

See attached

Mod11095_TextOfModification.pdf

Page: 1

R11095Text Modification

S1-22

Original Proposal

IBC: 1502.3

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1502.3 Scuppers.** Where *scuppers* are used for secondary (emergency overflow) roof drainage, the quantity, size, location and inlet elevation of the *scuppers* shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1611.1. *Scuppers* shall not have an opening dimension of less than 4 inches (102 mm). The flow through the primary system shall not be considered when locating and sizing *scuppers*.~~

Reason: IBC's Section 1502.3-Scuppers provides requirements for scuppers used as secondary (emergency overflow) roof drainage that are identical to those in IPC's Section 1106.5-Parapet Wall Scuppers and Section 1108-Secondary (Emergency) Roof Drains. IBC's Section 1502.1-General and Section 1502.2-Secondary (Emergency Overflow) Drains or Scuppers already provide pointers to the IPC. This proposal deletes the redundant requirement in IBC Section 1502.3-Scuppers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal eliminates redundant language. There is no change in technical requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this proposal removes duplication and ambiguity with the IPC. (Vote: 10-4)

Final Hearing Results

S1-22 AS

Page: 1

Mod_11095_Text_S1-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

13

R11096 | **/S2-21**

Date Submitted	03/14/2024	**Section**	1505.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC-B.

Summary of Modification

Table 1505.1. This proposal removes the existing permission to use nonclassifed roof coverings on buildings of Group R-3 occupancy.

Rationale

See attached

R11096Text Modification

See attached

Page: 1

Mod11096_TextOfModification.pdf

R11096Text Modification

S2-21

Original Proposal

IBC: TABLE 1505.1

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

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

2021 International Building Code

Revise as follows:

TABLE 1505.1 MINIMUM ROOF COVERING CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the*International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of~~Group R-3 and~~ Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

Reason: This proposal removes the existing permission to use nonclassifed roof coverings on buildings of Group R-3 occupancy. The option permitting nonclassified roof coverings on buildings in Group R-3 has been present in all versions of the IBC back to and including the 2000 edition. However, the description of Group R-3 occupancy in the 2000 IBC differs from successive editions; it includes buildings with no more than two dwelling units or adult and child care facilities that accommodate no more than five people for less than 24 hours. IBC editions from 2003 through 2021 include within Group R-3 buildings with up to sixteen occupants.
In the 2021 IBC, Group R-3 occupancies have occupants who are primarily permanent, and this Group encompasses those buildings not within Groups R-1, R-2, R-4 or I. Among the building uses included in Group R-3 are congregate living facilities with up to sixteen nontransient occupants; these buildings are permitted to use nonclassified roof coverings. In comparison, Group R-1 includes congregate living facilities with more than ten transient occupants, yet does not permit nonclassified roof coverings. As an additional example, Group R-4 occupancies are restricted to between six and sixteen occupants, excluding staff. Both Groups R-1 and R-4 include buildings in which the number of occupants may be less than the number permitted in a building that falls within Group R-3, yet both Groups R-1 and R-4 do not permit nonclassified roof coverings.

The acceptance of nonclassified roof coverings on Group R-3 buildings is puzzling since all other residential groups require classified roof coverings, and the number of occupants permitted in some Group R-3 buildings is greater than the number permitted in some Group R-1 and R-4 buildings. The current situation, which permits nonclassified roof coverings on Group R-3 buildings, may increase the life safety hazard to occupants of these buildings and is worthy of reconsideration.

Cost Impact: The code change proposal will increase the cost of construction
The cost of classified roof coverings may be higher than the cost of non-classified roof covers in some situations.

Page: 1

Mod_11096_Text_S2-21.pdf

R11096Text Modification

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal is a good change in the direction of safety. As indicated by manufacturers, there are many designs that people can choose from. This proposal is not a limiting factor. One of the committee members mentioned this proposal contradicts with an exception in the IRC. (Vote: 11-2)

Final Hearing Results

S2-21 AS

Mod_11096_Text_S2-21.pdf Page: 2

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

14

R11097 /S3-21

Date Submitted	03/14/2024	**Section**	1505.2	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC-B.

Summary of Modification

This proposal recommends addition of ASTM D4869 Type IV underlayment as an alternative to D226 Type II in Exception 4 based on equivalent compositional requirements

Rationale

See attached

R11097Text Modification

See attached

Page: 1

Mod11097_TextOfModification.pdf

R11097Text Modification

S3-21

Original Proposal

IBC: [BF] 1505.2

Proponents: Aaron R. Phillips, Asphalt Roofing Manufacturers Association, Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

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

2021 International Building Code

Revise as follows:

[BF] 1505.2 Class A roof assemblies. Class A *roof assemblies* are those that are effective against severe fire test exposure. Class A *roof assemblies* and *roof coverings* shall be *listed* and identified as Class A by an *approved* testing agency. Class A *roof assemblies* shall be permitted for use in buildings or structures of all types of construction.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete roof deck.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 ounce per square foot (0.0416 kg/m^2) copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over ASTM D226, Type II<u>or ASTM D4869, Type IV</u> *underlayment* over combustible decks.

Reason: Exception 4 was added to Section 1505.2 via proposal S20 in the code development cycle that created the 2015 edition. The supporting information for S20 included test data substantiating the Class A classification of a roof assembly that comprises slate shingles and ASTM D226 Type II underlayment installed on a combustible deck. This proposal recommends addition of ASTM D4869 Type IV underlayment as an alternative to D226 Type II in Exception 4 based on equivalent compositional requirements. The minimum masses of saturated felt, saturant, and desaturated felt are equivalent for both ASTM D226 Type II and ASTM D4869 Type IV saturated felts. Because the compositional requirements of ASTM D226 Type II and ASTM D4869 Type IV saturated felts are equivalent, the behavior in a UL 790 or ASTM E108 fire test can be expected to be equivalent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an alternative underlayment option, which can generally be expected to increase competitiveness in the market. No change in cost of construction is anticipated.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded the code change correlates the existing code text. (Vote: 13-0)

Page: 1

Mod_11097_Text_S3-21.pdf

R11097Text Modification

Final Hearing Results

S3-21 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

15

R11098		/S5-22			
Date Submitted	03/14/2024	**Section**	1503.4	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - B.

Summary of Modification

This code change proposal is intended to clarify the code's existing requirements requirements regarding attic and enclosed rafter ventilation. An exception is added to direct users to Section 1202.3 to the code's provisions unvented attics and unvented enclosed rafters.

Rationale

See attached

R11098Text Modification

See attached

Page: 1

Mod11098_TextOfModification.pdf

R11098Text Modification

S5-22

Original Proposal

IBC: 1503.4

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1503.4 Attic and rafter ventilation. Ventilation of *attic* and enclosed rafter assemblies ~~Intake and exhaust vents~~ shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented attic and unvented enclosed rafter assemblies shall be permitted in accordance with Section 1202.3.

Reason: This code change proposal is intended to clarify the code's existing requirements requirements regarding attic and enclosed rafter ventilation. The words "... attic and enclosed rafter assemblies... are added to clarify the scoping of the requirement. An exception is added to direct users to Section 1202.3 to the code's provisions unvented attics and unvented enclosed rafters.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal has no cost impact. It simply clarifies the code's existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1503.4 Attic and rafter ventilation. Intake and exhaust vents for v~~V~~entilation of *attic* and enclosed rafter assemblies shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.
Exception: Unvented attic and unvented enclosed rafter assemblies shall be permitted in accordance with Section 1202.3.

Committee Reason: Approved as modified as the proposal provided clarification and needed direction for unvented attics and unvented enclosed rafter assemblies. The modification clarifies the section by returning the first sentence of 1503.4 to the existing code language. (Vote: 14-0)

Final Hearing Results

S5-22 AM

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

16

R11099 | **/S6-21**

Date Submitted	03/14/2024	**Section**	1511.1.1	**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 No

Related Modifications

Summary of Modification

This proposal clarifies that penthouses and other enclosed rooftop structures are not required to be included in the building height.

Rationale

See attached

R11099Text Modification

See attached

Page: 1

Mod11099_TextOfModification.pdf

R11099Text Modification

S6-21

Original Proposal

IBC: 1511.1.1

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

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

2021 International Building Code

Revise as follows:

[BG] 1511.1.1 Area limitation. The aggregate area of *penthouses* and other enclosed *rooftop structures* shall not exceed one-third the area of the supporting roof deck. Such *penthouses* and other enclosed *rooftop structures* shall not be required to be included in determining the ~~*building area* or number of stories~~*building height*, number of *stories* or *building area* as regulated by Section 503.1. The area of such *penthouses* shall not be included in determining the *fire area* specified in Section 901.7.

Reason: This proposal clarifies that penthouses and other enclosed rooftop structures are not required to be included in the building height. This section already states that these structures are not included in the number of stories and Section 1510.2.1 has penthouse height limits above the roof deck, which are independent of building height limitations in Section 503.1. Based on this, it is believed the intent of the code is that the height of these types of structures is only regulated in terms above height above the roof deck.

The commentary for the definition of "building height" indicates that since a penthouse is defined as a structure that is built above the roof of a building, it is above the point to which building height is measured. Therefore a penthouse would not affect the measurement of the building height and can be located above the maximum allowed roof height. However, per definition in Section 202, "building height" is measured to the average height of the highest roof surface so it must be clarified in the code that the roof surface of penthouses and other enclosed rooftop structures are not considered in the building height.

Also, it should be noted that the wording in this proposal is revised/re-ordered to "*building height*, number of *stories* or *building area*" simply to match the wording in Section 503.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is intended to be a clarification that will not change the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it matches the intent of the code and is a good clarification. (Vote: 14-0).

Final Hearing Results

S6-21 AS

Page: 1

Mod_11099_Text_S6-21.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

17

R11100 **/S6-22**

Date Submitted	03/14/2024	**Section**	1504.1	**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 No

Related Modifications

Summary of Modification

This code change proposal is intended to clarify this section's intent. This code change proposal is not intended to change the code's technical requirements or stringency. Section 1504.1 "Wind resistance of roofs".

Rationale

See attached

R11100Text Modification

See attached

Page: 1

Mod11100_TextOfModification.pdf

R11100Text Modification

S6-22

Original Proposal

IBC: 1504.1

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

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

Reason: This code change proposal is intended to clarify this section's intent. This code change proposal is not intended to change the code's technical requirements or stringency.
Currently, Section 1504.1 indicates roof decks and roof coverings "...shall be designed for *wind loads*..." While this is true for some of the roof covering types in this section, some other roof covering types are designed by classifications based on the maximum basic wind speed maps. For example, asphalt shingle roof coverings are designed for wind resistance based on classifications in Table 1504.2.

Also, the change striking "...Sections 1504.2, 1504.3, 1504. and 1504.5..." and replacing it with "...this Section." is intended to appropriately reference the requirements entire section. Over the years and code development cycles, this section has been added to without updating the subsection pointers in Section 1504.1. Changing this pointer to "...this Section." addresses this and also will address any future additions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is a clarification of the code's existing requirements; it does not change the code's technical requirements or stringency.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1504.1 Wind resistance of roofs. *Roof decks* and *roof coverings* shall be designed in accordance with ~~and this~~ Section 1504.

Committee Reason: Approved as modified as the proposal gives clarity and deletes the unnecessary reference to Chapter 16. The modification fixes a typo and improves the flow. (Vote: 14-0)

Final Hearing Results

S6-22 AM

Page: 1

Mod_11100_Text_S6-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

18

R11101 **/S7-21**

Date Submitted	03/14/2024	**Section**	1511.2.4	**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 No

Related Modifications

Summary of Modification

Modifies Section 1511.2.4 "Type of construction". Concerning penthouse fire resistance rating.

Rationale

See attached

R11101Text Modification

See attached

Page: 1

Mod11101_TextOfModification.pdf

R11101Text Modification

S7-21

Original Proposal

IBC: [BG] 1511.2.4

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

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

2021 International Building Code

Revise as follows:

[BG] 1511.2.4 Type of construction. Penthouses shall be constructed of ~~building elements~~ *building element* materials as required for the type of construction of the building ~~on which such penthouses are built~~. Penthouse *exterior walls* and roof construction shall have a *fire-resistance rating* as required for the type of construction of the building. Supporting construction of such *exterior walls* and roof construction shall have a *fire-resistance rating* not less than required for the *exterior wall* or roof supported.

Exceptions:

1. On buildings of Type I construction, the *exterior walls* and roofs of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating*. The *exterior walls* and roofs of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall not be required to have a *fire-resistance rating*.
2. On buildings of Type I construction two stories or less in height above *grade plane* or of Type II construction, the *exterior walls* and roofs of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating* or a lesser *fire-resistance rating* as required by Table 705.5 and be constructed of *fire-retardant-treated wood*. The *exterior walls* and roofs of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall be permitted to be constructed of *fire-retardant-treated wood* and shall not be required to have a *fire-resistance rating*. Interior framing and walls shall be permitted to be constructed of *fire-retardant-treated wood*.
3. On buildings of Type III, IV or V construction, the *exterior walls* of *penthouses* with a *fire separation distance* greater than 5 feet (1524 mm) and less than 20 feet (6096 mm) shall be permitted to have not less than a 1-hour *fire-resistance rating* or a lesser *fire-resistance rating* as required by Table 705.5. On buildings of Type III, IV or VA construction, the *exterior walls* of *penthouses* with a *fire separation distance* of 20 feet (6096 mm) or greater shall be permitted to be of heavy timber construction complying with Sections 602.4 and 2304.11 or noncombustible construction or *fire-retardant-treated wood* and shall not be required to have a *fire-resistance rating*.

Reason: The 2021 IBC changed penthouse construction requirements to be as required for building elements based on type of construction instead of requiring walls, floors and roofs to be as required for the type of construction. This change results in overly conservative fire-resistance ratings when the exceptions to this section are used since the exceptions only reduce ratings for exterior walls and roofs. For example, Exception 1 could allow exterior walls and roofs to not have a fire-resistance rating; however, the exception doesn't apply to the secondary members supporting the roof, primary structural frame supporting the roof, or interior bearing walls supporting the roof. The resul would be a non-rated roof supported by a primary structural frame with a 1 or 2-hour rating, secondary members with a 1 or 1 1/2-hour framing and interior bearing walls with a 1 or 2-hour rating.

Prior to the 2021 change, IBC Section 704.1 required the fire-resistance rating of supporting construction for penthouse exterior walls and roofs to be not less than the rating of the wall or roof supported. This level of protection is appropriate for a penthouse that is constructed above the roof of the building and is not considered to be part of the primary structural frame of the building. This proposal makes this clear by putting this requirement into the penthouse requirements rather than relying on Section 704.1.

This proposal also removes the requirement that penthouse floors be constructed as required for the type of construction. By definition,

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Mod_11101_Text_S7-21.pdf

rooftop structures (including penthouses) are constructed over the roof deck of the building, so the the fire-resistance rating of the roof of the building should be allowed for the "floor" of the penthouse.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will reduce the required fire-resistance rating requirements for penthouses which will result in a decreased cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The proposal was approved as it revises the language to meet the intent and corrects what could have been misread. (Vote: 13-1)

Final Hearing Results

S7-21 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

19

R11102 **/S7-22**

Date Submitted	03/14/2024	**Section**	1504.4.4	**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 No

Related Modifications

Summary of Modification

This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Adds new Section 1504.4.4 "Slate shingles".

Rationale

See attached

R11102Text Modification

See attached

Page: 1

Mod11102_TextOfModification.pdf

R11102Text Modification

S7-22

Original Proposal

IBC: 1504.4.4 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1504.4.4 Slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table 1504.2.

Reason: This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Wind resistance of slate roof coverings is not currently addressed in the IBC. This code change adds wind resistance testing in accordance with ASTM D3161 and its classification designations similar to what is already provided for in the IBC for asphalt shingles and metal roof shingles. Existing Table 1504.2 is referenced providing the required wind resistance classification based on the maximum basic wind speed, V, or maximum allowable stress design wind speed, Vasd. Slate package labeling is required to facilitate classification identification and enforcement. Such package labeling would be slate supplier specific, but most likely would be in the form of of a pallet tag.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While this code change proposal adds a requirement for wind resistance testing, it will not result in an increase in the cost of construction. Slate suppliers have indicating they already have ASTM D3161 testing in-place and classifications available.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal provides the needed testing requirements for slate shingles. (Vote: 14-0)

Final Hearing Results

S7-22 AS

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Mod_11102_Text_S7-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

20

R11103		/S8-22			
Date Submitted	03/14/2024	**Section**	1504.5	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod "Section 1504.8" is not consistent with that of the 2023 FBC - B.

Summary of Modification

Per referenced standard ANSI/SPRI/FM 4435-ES-1—17 a low slope roof is one with a slope of 2:12 or less (e.g. =2:12), but the references in section 1504 to low-slope are less than 2:12 (e.g. ~ 2:12). This proposal corrects these discrepancies and adds a definition of Low-Slope.

Rationale

See attached

R11103Text Modification

See attached

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Mod11103_TextOfModification.pdf

R11103Text Modification

S8-22

Original Proposal

IBC: SECTION 202 (New), SECTION 202, 1504.5, 1504.6, 1504.6.1, 1504.7, 1504.8, 1507.12.3

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

2021 International Building Code

Add new definition as follows:

LOW-SLOPE. A roof slope two units vertical in 12 units horizontal (17-percent slope) or less.

Revise as follows:

[BF] STEEP-SLOPE. A roof slope greater than 2 units vertical in 12 units horizontal (17-percent slope)~~or greater~~.

1504.5 Ballasted low-slope single-ply roof systems. Ballasted low-slope ~~(roof slope < 2:12)~~ single-ply roof system coverings installed in accordance with Section 1507.12 shall be designed in accordance with ANSI/SPRI RP-4.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roofsystems ~~having a slope less than 2 units vertical in 12 units horizontal (2:12o)~~ n a *low slope* roof shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design *wind speed*, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

1504.6.1 Gutter securement for low-slope roofs. Gutters that are used to secure the perimeter edge of the roof membrane on low-slope ~~(less than 2:12 slope)~~ built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

1504.7 Physical properties. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.

1504.8 Impact resistance. *Roof coverings* installed on low-slope roofs ~~(roof slope < 2:12)~~ in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in FM 4470.

1507.12.3 Ballasted low-slope roofs. Ballasted low-slope roofs ~~(roof slope < 2:12)~~ shall be installed in accordance with this section and Section 1504.5. Stone used as *ballast* shall comply with ASTM D448 or ASTM D7655.

Reason: This proposal addresses an inconsistency in the code. Per referenced standard ANSI/SPRI/FM 4435-ES-1–17 a low slope roof is one with a slope of 2:12 or less (e.g. ≤2:12), but the references in section 1504 to low-slope are less than 2:12 (e.g. < 2:12). This proposal corrects these discrepancies and adds a definition of Low-Slope. The definition of steep slope has subsequently been revised to reference roof slopes greater than 2:12.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is just and editorial correction therefore no cost is associated with it.

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R11103Text Modification

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

LOW-SLOPE. A roof slope less than two units vertical in 12 units horizontal (17-percent slope) ~~less~~ ~~or~~ .
[BF] STEEP-SLOPE. A roof slope ~~greater than~~ 2 units vertical in 12 units horizontal (17-percent slope) or greater.

Committee Reason: Approved as modified as the proposal defines 'low-slope' and 'steep-slope' roofs consistent with the usage in Chapter 15. The modification adds clarity consistent with current code usage. (Vote: 14-0)

Final Hearing Results

S8-22 AM

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

21

R11105 **/S10-21**

Date Submitted	03/14/2024	**Section**	1511.9	**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

Summary of Modification

Currently the IBC does not have any specific provisions for the design and installation of raised-deck systems. These provisions should be a subsection to Section 1511 because these systems are a roof structure over a roof assembly

Rationale

See attached

R11105Text Modification

See attached

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Mod11105_TextOfModification.pdf

R11105Text Modification

S10-21

Original Proposal

IBC: SECTION 202 (New), 1511.9 (New), 1511.9.1 (New), 1511.9.2 (New), 1511.9.3 (New), 1511.9.4 (New), 1511.9.5 (New), 1511.9.6 (New)

Proponents: Mike Nugent, Chair, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org)

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

2021 International Building Code

Add new definition as follows:

RAISED-DECK SYSTEM

.

(For application to Chapter 15 only). A system consisting of decking or pavers supported by pedestals installed over a roof assembly to provide a walking surface.

Add new text as follows:

1511.9 *Raised-deck systems* installed over a *roof assembly*. *Raised-deck systems* installed above a *roof assembly* shall comply with Sections 1511.9.1 through 1511.9.5.

1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend above the plane of the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.
   Exception: Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification. The *raised-deck system* shall be tested, listed and labeled with a fire classification in accordance with Section 1505. The fire classification of the *raised deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.

Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.

1511.9.3 Pedestals or supports. The pedestals or supports for the *raised deck system* shall be installed in accordance with manufacturer's installation instructions.

1511.9.4 Structural requirements. The *raised-deck system* shall be designed for wind loads in accordance with Chapter 16 and Section 1504.5. The *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.

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R11105Text Modification

1511.9.5 Roof drainage. The *raised-deck system* shall not impede the operation of the roof drainage system as required by Section 1502 and the *International Plumbing Code*.

1511.9.6 Access and Egress. Access to the *raised-deck system* shall be in accordance with Chapter 11 and egress shall be in accordance with Chapter 10.

Reason: Currently the IBC does not have any specific provisions for the design and installation of raised-deck systems. These provisions should be a subsection to Section 1511 because these systems are a roof structure over a roof assembly. A definition of "raised deck systems" is needed to ensure correct application of new requirements for these systems. This term is applicable only to Chapter 15 (same "Chapter 15 restriction" as the definition for roof assembly).
Fire test requirements for the raised deck systems are based on research studies performed for PV panels on low and steep-sloped roofs; which have general applicability to Raised Deck Systems. The following is a link to the reports for those studies: http://www.solarabcs.org/about/publications/reports/flammability-testing/index.html. These studies showed that when fire was able to enter the space between the roof assembly and the panel above, it could significantly alter the original test results for the fire classification of the roof assembly. By providing a protective barrier at the perimeter such as a parapet wall, roof curb or intersection with vegetative roof to prevent fire intrusion into the space, there would not be any concern with affects to the fire classification of the roof assembly underneath.

The manufacturer's installation instructions cover how the pedestals and supports are to be installed for these systems.

Three pointers (code references) for structural; roof water drainage; and access and egress are provided to ensure that these other safety and performance requirements essential for roofs are applied to Raised Deck Systems. The pictures included with this code change illustrate examples of what a typical raised deck system consists of, including a photograph of an actual rooftop pool deck, two cross-sections of a typical raised deck system, and an isometric view of the typical components.

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



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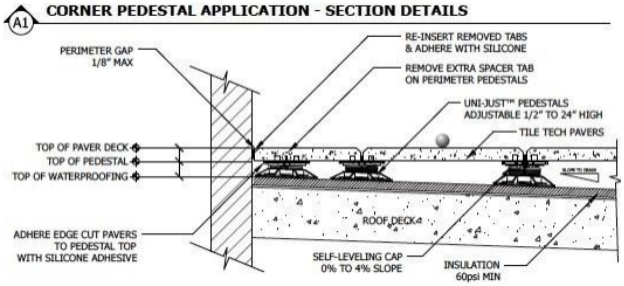
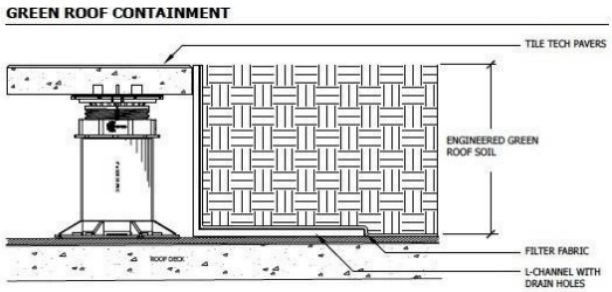
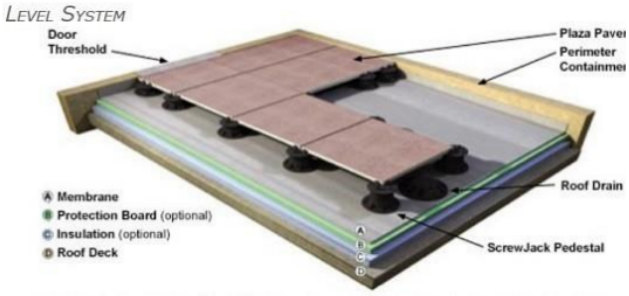
R11105Text Modification







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

The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: 1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend ~~above the plane of~~ at least to the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception:
   Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.

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3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification. The *raised-deck system* shall be ~~tested,~~ listed and ~~labeled~~ identified with a fire classification in accordance with Section 1505 and shall be tested in accordance with either Section 1511.9.2.1 or Section 1511.9.2.2.. ~~The fire classification of the *raised-deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.~~

~~**Exception:** Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.~~

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly. The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.
Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, fire testing of the raised deck system is not required.

1511.9.2.2Fire testing of the raised deck system together with the roof assembly. The roof assembly and the raised deck system shall be tested together.

1511.9.4 Structural requirements. The *raised-deck system* shall be designed for ~~wind~~ all applicable loads in accordance with Chapter 16 and performance requirements in Section 1504.5. T~~he *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.~~

Committee Reason: The committee determined the modification corrects terminology problems, identified multiple test path methods, and corrects wind and seismic load requirements. The proposal provides design options and reduces the potential hazard. One of the committee members asked the proponent to address the following in the public comment phase:
1) Identify parapet.
2) Section 1511.9.5 needs to address the snow accumulation issue.
3) Section 1511.9.1, #4 needs to address obstruction of roof drainage.
4) Section 1511.9.2 exception could include a material standard for thickness.
5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath.
6) Consider the dead load of this system on the roof structure.
For the group B hearing, one of the committee members suggested that the proponent consider introducing more details for Ballasted photovoltaic panel systems. The only reference for those systems is in section 1607.14.4.5, Ballasted photovoltaic panel systems).(Vote: 12-1)

Public Comments

Public Comment 1

Proponents: Mike Nugent, ICC Building Code Action Committee, ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

R11105Text Modification

1511.9.1 Installation . The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by ~~parapet~~ walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The ~~parapet~~ wall or enclosure shall extend at least from the roof assembly to the top surface of the *raised deck system*. The enclosure shall not impede roof drainage in accordance with Section 1511.9.5.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception: Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not ~~obstruct or block~~ impede the operation of plumbing or mechanical vents, exhaust, ~~or~~ air inlets, or roof drains. Where required, access for inspection, cleaning or maintenance shall be provided.

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly . The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.

Exception: Where the ~~top surface~~ decking or pavers of the raised deck system consists of brick, masonry, ~~or~~ concrete ~~materials~~, or other noncombustible materials, fire testing of the raised deck system is not required.

1511.9.5 Roof drainage . The raised-deck system, including the wall or enclosure between the roof assembly and the raised deck, shall be designed and installed to ~~not impede~~ allow for the operation of the roof drainage system as required by Section 1502 and the International Plumbing Code. The roof structure shall be designed to support any standing water resulting from the installation of the raised-deck system.

1511.9.6 ~~Access~~ Accessibility and Egress . ~~Access to the the~~ The raised-deck system shall be accessible in accordance with Chapter 11 and means of egress shall be provided in accordance with Chapter 10.

Commenter's Reason: This Public Comment is in response to the request from the Code Development Committee (CDC) to further refine the proposed new section for raised deck systems. The BCAC worked with the CDC member to make sure the specific concerns were properly addressed.
Fundamentally, the concerns were to clarify necessary roof drainage and roof structure support, while not adversely impacting fire safety, which were specifically addressed as follows:

1) Identify parapet. – The term "parapet" is proposed to be removed from Section 1511.9.1. This action re-focuses the purpose of the enclosure surrounding the raised deck system. The "enclosure" is intended to serve as a flame "shield" to prevent flame propagation underneath the raised deck.

2) Section 1511.9.5 needs to address the snow accumulation issue. – Snow accumulation varies depending on the location. Proposed change requires the registered design professional and the installer to appropriately design and install to address for local conditions to ensure roof drainage. The design shall consider water migration through the deck system and for water flow to drains from other portions of the roof.

3) Section 1511.9.1, #4 needs to address obstruction of roof drainage. – Roof drains have been added to the list of what shall not be obstructed. Requirement for access to be provided for inspection, cleaning, and maintenance have been added to provide suitable means to address any field issues.

4) Section 1511.9.2 exception could include a material standard for thickness. – The concern raised was to address the potential of a thin superstrate of noncombustible material, backed with combustible material, being accepted without appropriate fire testing. Instead of specifying a thickness of the top surface, where decking or pavers are noncombustible, the system is not required to be fire tested, even in those situations where the support structure underneath utilizes combustible materials.

5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath. – This is addressed through both the manufacturer's installation instructions, and also the requirements in Section 1511.9.4 for addressing all structural loading.

6) Consider the dead load of this system on the roof structure. – The floor modification at the Code Action Hearing (Thai 12), which was part of the modifications approved by the Committee addressed this in Section 1511.9.4 already.

R11105Text Modification

Additional editorial cleanup is proposed for Section 1511.9.6 for clarification and consistency with G1-21.

Cost Impact: The net effect of the Public Comment and code change proposal will increase the cost of construction
The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

Final Hearing Results

S10-21 AMPC1

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

22

R11106 | **/S11-22**

Date Submitted	03/14/2024	**Section**	1504.7	**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

FBC - B - Section 1504.6

Summary of Modification

This code change proposal is intended to clarify the code's intent by removing Section 1504.7-Physical Properties, which requires accelerated weathering for roof coverings used on low-slope roofs to demonstrate no significant loss of tensile strength or breaking strength.

Rationale

See attached

R11106Text Modification

See attached

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Mod11106_TextOfModification.pdf

R11106Text Modification

S11-22

Original Proposal

IBC: 1504.7

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Delete without substitution:

~~**1504.7 Physical properties.** *Roof coverings* installed on low-slope roofs (roof slope < 2:12) in accordance with Section 1507 shall demonstrate physical integrity over the working life of the roof based on 2,000 hours of exposure to accelerated weathering tests conducted in accordance with ASTM G152, ASTM G154 or ASTM G155. Those *roof coverings* that are subject to cyclical flexural response due to wind *loads* shall not demonstrate any significant loss of tensile strength for unreinforced membranes or breaking strength for reinforced membranes when tested as herein required.~~

Reason: This code change proposal is intended to clarify the code's intent by removing Section 1504.7-Physical Properties, which requires accelerated weathering for roof coverings used on low-slope roofs (roof slope < 2:12) to demonstrate no significant loss of tensile strength or breaking strength. The code's requirement does not specifically define "significant loss" levels. As a result, this requirement is difficult to interpret and enforce.

Section 1506.2 already requires roofing products to confirm to the applicable product standards prescribed in the code. Section 1507-Requirements for Roof Coverings defines the specific standards the products and materials. Such product standards include accelerated aging and weathering testing, and specific pass/fail criteria deemed appropriate by the standard developer for the products. For example, the product standard for TPO single-ply roof membranes, ASTM D6878, "Standard Specification for Thermoplastic Polyolefin-based Sheet Roofing," includes not only accelerated weathering resistance testing with no resulting cracks or crazing, but also ozone resistance testing (no cracks) and retention of physical properties after heat aging (max. 1.5% weight loss and no cracking when bent over a mandrel). Such testing is more severe than that currently in Section 1504.7.

Removing Section 1504.7 and relying on the testing included in the product standards already included in Section 1507 will not decrease the performance levels of roof coverings.

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

This code change proposal has no cost impact. It does not lower or raise performance levels already incorporated in the code.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this proposal clarifies the code's intent by removing Section 1504.7, which required accelerated weathering for roof coverings used on low-slope roofs to demonstrate no significant loss of tensile strength or breaking strength. The existing code requirement does not specifically define 'significant loss' levels, as a result, this requirement was difficult to interpret and enforce. (Vote: 14-0)

Final Hearing Results

S11-22 AS

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Mod_11106_Text_S11-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

23

R11107		/S12-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the FBC-B.

Summary of Modification

This proposal is needed because Table 1504.9 does not indicate that the tabulated values are based on the absence of topographic effects at the building site.

Rationale

See attached

R11107Text Modification

See attached

Page: 1

Mod11107_TextOfModification.pdf

R11107Text Modification

S12-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

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

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

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

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

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

d. The tabulated values apply only to conditions where the topographic factor (K_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} is incorporated in the mapped basic design wind speed in section 1609.

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

Reason: This proposal is needed because Table 1504.9 does not indicate that the tabulated values are based on the absence of topographic effects at the building site. Consequently, the tabulated values could be inappropriately interpreted as applying to sites where topographic effects exist (e.g., $K_{zt} > 1.0$). This could result in increased wind speed at roof height and result in a more severe condition for aggregate blow-off than considered in developing the table based on the assumption of $K_{zt} = 1.0$. This concern does not apply where topographic wind speed-up effects are incorporated into the wind map for Hawaii [2021 IBC Figures 1609.3(5) through 1609.3(12)].

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not change technical content. It adds documentation about an existing limitation associated with Table 1504.9. There should be no change in cost of construction if this proposal is approved.

Public Hearing Results

Page: 1

Mod_11107_Text_S12-22.pdf

R11107Text Modification

Committee Action **As Modified**

Committee Modification: TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

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

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

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

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

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

d. The tabulated values apply only to conditions where the topographic factor (K_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} is incorporated in the ~~mapped~~ basic ~~design~~ wind speed in section 1609.

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

Committee Reason: Approved as modified as the proposal correctly updates the language used in Table 1504.9 and clarifies that the Table applies to only sites with no topography. The committee did request for coordination with parapets as a public comment. The modification updates the terminology consistent with ASCE 7. (Vote: 14-0)

Final Hearing Results

S12-22 AM

Page: 2

Mod_11107_Text_S12-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

24

R11108		/S13-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the 2023 FBC -B.

Summary of Modification

The additional sentence clarifies treatment of the Table 1504.9 requirements for the special circumstance in which a building roof has at least one side bounded by a wall.

Rationale

See attached

R11108Text Modification

See attached

Page: 1

Mod11108_TextOfModification.pdf

R11108Text Modification

S13-22

Original Proposal

IBC: 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. Such parapets shall be provided on the perimeter of the roof at all exterior sides except where an adjacent wall extends above the roof to a height at least equivalent to that required for the parapet.

Reason: The additional sentence clarifies treatment of the Table 1504.9 requirements for the special circumstance in which a building roof has at least one side bounded by a wall.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Existing language implies a parapet is required on all roof sides. This change makes that implied requirement explicit and addresses potential confusion in interpretation of Section 1504.9. Because it improves understanding of existing provisions without creating new requirements, no change in cost of construction is associated with this proposal.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted per the provided reason statement. Some committee members were concerned with the use of 'adjacent' vs. possibly using 'adjoining' in section 1504.9. (Vote: 8-6)

Final Hearing Results

S13-22 AS

Page: 1

Mod_11108_Text_S13-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

25

R11109		/S14-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the 2023 FBC - B.

Summary of Modification

Section 1504.9. Additional sentence clarifies treatment of the Table 1504.9 requirements with respect to both roof slope and the special circumstance in which a building has roof sections at different elevations.

Rationale

See attached

R11109Text Modification

See attached

Mod11109_TextOfModification.pdf

Page: 1

R11109Text Modification

S14-22

Original Proposal

IBC: 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be provided for each roof surface elevation and at no point shall the parapet height be less than that required by Table 1504.9.

Reason: The additional sentence clarifies treatment of the Table 1504.9 requirements with respect to both roof slope and the special circumstance in which a building has roof sections at different elevations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The additional sentence in this proposal makes explicit what is already implied in Section 1504.9 without creating a new requirement. The improved understanding of existing provisions should not alter cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9. For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be ~~provided for~~ determined based on each roof surface elevation, and at no point shall the parapet height be less than that required by Table 1504.9.

Committee Reason: Approved as modified per the provided reason statement. The modification clarifies the language. (Vote:14-0)

Final Hearing Results

S14-22 AM

Page: 1

Mod_11109_Text_S14-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

26

R11110		/S15-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the 2023 FBC-B.

Summary of Modification

Table 1504.9. This proposal clarifies that interpolation is permissible for wind speed in addition to mean roof height and parapet height. It further clarifies that extrapolation beyond the limits of the table is not permitted.

Rationale

See attached

R11110Text Modification

See attached

Page: 1

Mod11110_TextOfModification.pdf

R11110Text Modification

S15-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c]

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

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

a. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.

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

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

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

Reason: This proposal clarifies that interpolation is permissible for wind speed in addition to mean roof height and parapet height. It further clarifies that extrapolation beyond the limits of the table is not permitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The modifications to the footnote provide additional explanatory information without making any technical change. No change in cost of construction is expected if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal clarifies the use of Table 1504.9. (Vote: 14-0)

Page: 1

Mod_11110_Text_S15-22.pdf

R11110Text Modification

Final Hearing Results

S15-22 AS

Mod_11110_Text_S15-22.pdf Page: 2

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

27

R11111		/S16-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the FBC-B.

Summary of Modification

Table 1504.9. The proposal provides necessary direction for measurement of the parapet height.

Rationale

See attached

R11111Text Modification

See attached

Mod11111_TextOfModification.pdf Page: 1

R11111Text Modification

S16-22

Original Proposal

IBC: TABLE 1504.9

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org); Jay Crandell, P.E., ABTG/ARES Consulting, ABTG / ARES Consulting (jcrandell@aresconsulting.biz)

2021 International Building Code

Revise as follows:

TABLE 1504.9 MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d]

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

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

a. Parapet height is measured vertically from the top surface of the coping down to the surface of the*roof covering* in the field of the roof adjacent to the parapet and outbound of any cant strip.

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

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

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

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

Reason: The proposal provides necessary direction for measurement of the parapet height.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The new footnote provides guidance for measurement of the parapet height. A few users may obtain lower parapet heights and a few may obtain higher heights if their measurement technique differs substantially from this provision, causing some to experience decreases in cost of construction and some to experience increases. The number of cases where a different height is obtained is likely to be very small, and there is no basis to believe a systematic bias exists between existing measurement techniques and the guidance provided in this proposal. Therefore, no general increase in cost of construction is anticipated.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11111_Text_S16-22.pdf

R11111Text Modification

Committee Reason: Approved as submitted as the proposal clarifies how parapet height is to be measured. (Vote: 14-0)

Final Hearing Results	
S16-22	AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

28

R11112		/S17-22			
Date Submitted	03/14/2024	**Section**	1504.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section "1504.8" is marked reserved in the FBC-B.

Summary of Modification

This code change proposal is intended to add clarity to the code by adding an exception to Section 1504.9 indicating aggregate ballasted single-ply membrane roofs are already addressed by the requirements in Section 1504.5. No changes are intended to the code's requirements.

Rationale

See attached

R11112Text Modification

See attached

Page: 1

Mod11112_TextOfModification.pdf

R11112Text Modification

S17-22

Original Proposal

IBC: 1504.9

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.

Exception: Aggregate ballasted single-ply roof coverings shall be designed and installed accordance with Section 1504.5.

Reason: This code change proposal is intended to add clarity to the code by adding an exception to Section 1504.9 indicating aggregate ballasted single-ply membrane roofs are already addressed by the requirements in Section 1504.5. No changes are intended to the code's requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is simply a clarification of the code's existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1504.9 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with Table 1504.9.
Exception: ~~Aggregate ballasted~~ Ballasted single-ply roof coverings shall be designed and installed accordance with Section 1504.5.

Committee Reason: Approved as modified per the provided reason statement. The modification adjusts the terminology for clarity. (Vote: 14-0)

Final Hearing Results

S17-22 AM

Page: 1

Mod_11112_Text_S17-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

29

R11113 | **/S18-22**

Date Submitted	03/14/2024	**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

FBC - B/Section 1505.9

Summary of Modification

Modifies text of Section 1505.8. Modifies text of definition to "BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) SYSTEM"

Rationale

See attached

R11113Text Modification

See attached

Mod11113_TextOfModification.pdf

Page: 1

R11113Text Modification

S18-22

Original Proposal

IBC: [BF] 1505.8, SECTION 202

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

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

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

Reason: The term “BIPV product” is used twice in the I-codes, both requiring fire classification for roofing applications (IBC Section 1505.8 and IRC Section R902.3). The term “BIPV system” is used eight times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IFC Sections 1205.2 and 1205.2.3; IBC Sections 3111.3.2 and 3113.3; and IRC Sections R324.5, R324.5.2, R324.6 and R324.6.3). IBC Section 3111.3.2 directs BIPV systems to have a fire classification in accordance with Section 1505.8.

The word “system” is defined by the dictionary as “a combination of things or parts forming a complex or unitary whole”, whereas the word “product” is defined as “the totality of goods or services that a company makes available; something produced”. “Product” infers a discrete piece, whereas “system” better describes a number of components that when installed function together for a specific purpose. This proposal also clarifies that these systems, when installed per the manufacturer’s installation instructions, become an integral part of the building envelope to provide a physical separator between internal and external environments.The types of BIPV systems that include “*exterior wall envelopes* and *exterior wall coverings*, and *fenestration*” are added because FS150-21 in Group A added these types of BIPV systems to Chapter 14 of the IBC.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the term as it is used throughout the family of ICC codes.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11113_Text_S18-22.pdf

R11113Text Modification

Committee Reason: Approved as submitted as the proposal clarifies the definitions consistent with the IRC code committee actions. The committee did note that in the definition of 'Building-integrated photovoltaic (BIPV) system' the phrase 'integral part' could be confusing. (Vote: 11-3).

Final Hearing Results	
S18-22	AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

30

R11114		/S19-22			
Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

This proposal adds back into the IBC an exception permitting underlayment complying with ASTM D1970 that was removed during the previous code development cycle.

Rationale

See attached

R11114Text Modification

See attached

Page: 1

Mod11114_TextOfModification.pdf

R11114Text Modification

S19-22

Original Proposal

IBC: 1507.1.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

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

Exceptions:

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

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

3. ~~2.~~ As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.

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

Reason: This proposal adds back into the IBC an exception permitting underlayment complying with ASTM D1970 that was removed during the previous code development cycle. Proposal S24-19 struck the existing exception and cited the mention of D1970 in 1507.1.1 as justification. Section 1507.1.1 states that D1970 underlayment must bear a label and refers to Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3). However, D1970 is not included in those tables, which is the reason this exception is necessary. In addition, the exception is needed to maintain some of the specific criteria for the use of this underlayment such as roof ventilation and climate exposure.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects an error by reinserting a section that should not have been removed. By doing so, it expands available underlayment options for all roof covering types that use underlayment. The cost of construction impact will be project specific and might lead to decrease or increase. When considered across many projects, cost impact of approving this proposal is expected to be neutral.

Mod_11114_Text_S19-22.pdf

R11114Text Modification

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds a needed exception which adds flexibility to the options for an underlayment. (Vote: 13-1)

Final Hearing Results

S19-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

31

R11115 | **/S20-22**

Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

This code change will align the IBC roof underlayment requirements in high wind regions with the 2021 IRC. Multiple changes throughout Section 1507.1.1 and Tables 1507.1.1(1) - Table 1507.1.1(3).

Rationale

See attached

R11115Text Modification

See attached

Page: 1

Mod11115_TextOfModification.pdf

R11115Text Modification

S20-22

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3)

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

2021 International Building Code

Revise as follows:

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

Exceptions:

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

~~1.~~ 2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane bearing a label indicating compliance to ~~complying with~~ ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering and design wind speed ~~for design wind speeds less than 120 mph (54 m/s~~) shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table 1507.1.1(2) using the application requirements for where the maximum basic design wind speed is less than 130 mph. Underlayment shall be attached in accordance with Table 1507.1.1(3) for the applicable roof covering and design wind speed.

~~2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19.1 mm) into the roof sheathing.~~

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

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V <130 140 MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, V ≥130 140 MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D6757

Page: 1

Mod_11115_Text_S20-22.pdf

R11115Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V <130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, V ≥130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type I~~ ~~ASTM D6380 Class M mineral surfaced roll roofing~~
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or IV ~~ASTM D6757~~

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 ~~140~~ MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.
Clay and concrete tile	1507.3	For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	~~For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12),~~ underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.~~
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

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

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

Page: 2

Mod_11115_Text_S20-22.pdf

R11115Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 130 140 MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 130 140 MPH IN HURRICANE-PRONE REGIONS OR V ≥ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diametermetal or plastic caps nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nail.sStaples shall be not less than 21 gage (0.032 inch). The cap nail shankand cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diametermetal or plastic caps nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shankand cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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

Reason: This code change will align the IBC roof underlayment requirements in high wind regions with the 2021 IRC. For practical purposes, this code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2021 IBC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where the design wind speed is 130 mph and greater for consistency with the 2021 IRC. This wind speed would capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for special wind regions and Alaska, the trigger remains the same consistent with the IRC.

Water infiltration due to wind driven rain has been well documented from post-hurricane damage assessments where hurricane winds were strong enough to blow off the primary roof covering, but not strong enough to blow off roof sheathing. In such instances, significant property damage and extended occupant displacement routinely occur due to water intrusion. In many cases, the building will appear relatively undamaged from the exterior except for roof covering loss. However, a closer inspection would reveal significant interior and contents damage.

Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24-48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be available for use. Recent hurricanes have not been an exception.

Tests performed by IBHS at the Research Center have consistently shown that the secondary roof underlayment strategies recommended by the IBHS Fortified Commercial - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. Two of these strategies are already recognized by the code in Exceptions 1 and 2 to Section 1507.1.1. A 2011 hurricane demonstration clearly showed the benefit of sealing the

seams of the roof deck sheathing which is one of the strategies recognized in Exception 1 to Section 1507.1.1.

A summary of the results of the demonstration can be viewed at the following link:

http://ibhstest.wpengine.com/ibhsnews-releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

Page: 3

Mod_11115_Text_S20-22.pdf

R11115Text Modification

The wind driven rain demonstration can be viewed at the following

https://disastersafety.org/thunderstorms/winddriven-rain-demo/.

A more recent study included an assessment of a new approach where the roof is covered with two layers of high-quality underlayment attached with cap nails. Based on the performance achieved with this system, it has now been added to the FORTIFIED program as a fifth option for achieving a sealed roof deck. This report is identified in the bibliography and has been included as an attachment to this code change. All of the underlayment strategies, including the two layers of felt underlayment reduced water entry into the attic space by 70% or more.

This proposal also adds one the most effective methods for preventing water intrusion back into the code. The use of fully adhered underlayment complying with ASTM D1970 has been recognized in the IBC going back to the mid-2000's. S24-19 deleted this exception permitting the use of ASTM D1970 underlayment on basis of it being redundant as it was listed in Section 1507.1.1. However, Section 1507.1.1 doesn't specifically permit this type of underlayment other than it is required to comply with the listed standard. A similar proposal for the IRC was proposed but a public comment added the exception for fully adhered underlayment back in. This proposal adds the exception for fully adhered underlayment complying with ASTM D 1970 back in the code consistent with the 2021 IRC.

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

Cost Impact: The code change proposal will increase the cost of construction
If one of the methods in Exceptions 1 or 2 of Section 1507.1.1 are used, this proposal will not increase the cost of construction.

If the double layer of underlayment option is used, for areas where design wind speeds are greater than or equal to 130 mph in the Hurricane-Prone Region (140 mph elsewhere), the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between $100 to $200. For areas where the design wind speed is less than 140 mph but equal to or greater than 130 mph in the Hurricane-Prone region, additional fasteners will be required in addition to the additional layer of underlayment.

Public Hearing Results

Committee Action **As Modified**

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

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

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Mod_11115_Text_S20-22.pdf

R11115Text Modification

2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane bearing a label indicating compliance to ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering and ~~design~~ basic wind speed shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table 1507.1.1(2) using the application requirements for where the maximum basic ~~design~~ wind speed is less than 130 mph. Underlayment shall be attached in accordance with Table 1507.1.1(3) for the applicable roof covering and ~~design~~ basic wind speed.

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

Committee Reason: Approved as modified as this proposal aligns the IBC roof underlayment requirements in high wind regions with the 2021 IRC. The modification updates the terminology consistent with ASCE 7. (Vote:12-1)

Final Hearing Results

S20-22 AM

Page: 5

Mod_11115_Text_S20-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

32

R11116		/S21-22			
Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

There are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 15 for their specific application.

Rationale

See attached

R111116Text Modification

See attached

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Mod11116_TextOfModification.pdf

R11116Text Modification

S21-22

Original Proposal

IBC: SECTION 202, SECTION 202 (New), 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), 1507.16, 1507.16.1, 1507.16.2, 1507.16.3, 1507.16.4, 1507.16.5, 1507.16.6, 1507.16.7, 1507.16.8

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Building Code

Revise as follows:

[BS] ~~PHOTOVOLTAIC SHINGLES~~. ~~A *roof covering* resembling shingles that incorporates *photovoltaic modules*.~~

Add new definition as follows:

BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING. A *BIPV system* that also functions as a *roof covering*. Coverings include, but not limited to, shingles, tiles, and roof panels.

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*~~ *BIPV roof coverings* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

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R11116Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Clay and concrete tile	1507.3	For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: Starting at the eave, a 19-inch strip of underlayment shall be applied parallel with the eave. Starting at the eave, a 36-inch-wide strip of underlayment felt shall be applied, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
~~Photovoltaic shingles~~ BIPV roof coverings	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Basic Design Wind Speed, *V* < 140 mph except all laps shall be not less than 4 inches

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

TABLE 1507.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of

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R11116Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, $V \geq$ 140 MPH
Clay and concrete tile	1507.3		plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
~~Photovoltaic~~ shingles BIPV roof coverings	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage. The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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

1507.16 ~~Photovoltaic~~ BIPV shingles. The installation of *~~photovoltaic~~ BIPV shingles* shall comply with the provisions of this section.

1507.16.1 Deck requirements. *~~Photovoltaic~~ BIPV shingles* shall be applied to a solid or closely fitted deck, except where the shingles are specifically designed to be applied over spaced sheathing.

1507.16.2 Deck slope. *~~Photovoltaic~~ BIPV shingles* shall be installed on roof slopes of not less than 2 units vertical in 12 units horizontal (2:12).

1507.16.3 Underlayment. *Underlayment* shall comply with Section 1507.1.1.

1507.16.4 Ice barrier. Where required, ice barriers shall comply with Section 1507.1.2.

Revise as follows:

1507.16.5 Fasteners. Fasteners for *~~photovoltaic~~ BIPV shingles* shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum $^3/_8$-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than $^3/_4$ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than $^3/_4$ inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667.

1507.16.6 Material standards. *~~Photovoltaic~~ BIPV shingles* shall be *listed* and labeled in accordance with UL 7103 or with both UL 61730-1 and UL 61730-2.

1507.16.7 Attachment. *~~Photovoltaic~~ BIPV shingles* shall be attached in accordance with the manufacturer's installation instructions.

1507.16.8 Wind resistance. *~~Photovoltaic~~ BIPV shingles* shall comply with the classification requirements of Table 1504.2 for the appropriate maximum nominal design wind speed.

Reason: For the definitions, there are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 15 for their specific application. This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and

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R11116Text Modification

find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology related to BIPV used as roof assemblies and roof coverings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as this appropriately updates the terms for BIPV. (Vote:13-1)

Final Hearing Results

S21-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

33

R11117		/S22-22 Part I			
Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section 1507.1.1 and Table 1507.1.1(1)

Rationale

See attached

R11117Text Modification

See attached

Mod11117_TextOfModification.pdf Page: 1

R11117Text Modification

S22-22 Part I

Original Proposal

IBC: TABLE 1507.1.1(1), 1507.1.1, ASTM Chapter 35 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257
Metal roof panels	1507.4	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257

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 or ASTM D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

Page: 1

Mod_11117_Text_S22-22 Part I.pdf

R11117Text Modification

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

2. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.

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

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section 1507.1.1-Underlayment and Table 1507.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257
Metal roof panels	1507.4	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257

R11117Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257

Committee Reason: Approved as modified as the proposal allows appropriate new options for roof underlayment. Per the request of the industry, the modification reverts the table, for wood shingles and wood shakes, back to existing wording. (Vote: 14-0)

Final Hearing Results

S22-22 Part I AM

Page: 3

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

34

R11119		/S23-22			
Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

This code change proposal is a clarification and clean-up of Table 1507.1.1(1).

Rationale

See attached

R11119Text Modification

See attached

Page: 1

Mod11119_TextOfModification.pdf

R11119Text Modification

S23-22

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757,D2626 Type I or D6380 Class M shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

1. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.
2. As an alternative, two layers of underlayment complying with ASTM D226 Type II, ~~or~~ ASTM D4869 Type IV or ASTM D6757 shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing
Metal roof panels applied to a solid or closedly fitted deck	1507.4	Manufacturer's instructions ASTM D226 Type I or II ASTM D4869, Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes applied to a solid sheathing roof deck	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV

Reason: This code change proposal is a clarification and clean-up of Table 1507.1.1(1). Specifically:

- In Section 1507.1.1, ASTM D2626, Type I and ASTM D6380, Class M are added since these already occur in the table.
- In Section 1507.1.1, Exception 2, ASTM D6757 is added since it already appears in the table and is appropriate for a two layer application.

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R11119Text Modification

- In the table in the row for clay and concrete tile roof coverings, "mineral surface roof roofing" is deleted from the description of ASTM D6380, Class M as it is unnecessary. The Class M designation already identifies the product as being mineral granule-surfacing.
- In the table in the row for metal roof panel roof coverings, underlayment is only used over solid or closely fitted decks. Where a structural metal panel roof covering is applied over open framing without a roof deck, an underlayment is not applied. Also, "Manufacturer's instructions" is stuck from the cell for maximum basic wind design wind speed, V < 140 mph. This is replaced with ASTM designation underlayment standards similar to what is already appearing in the rows for Clay and Concrete Roof Tiles through Wood Shakes.
- In the table for the row for wood shake roof coverings, underlayment is only used over solid roof deck sheathing. Where a wood shake roof covering is applied over spaced sheathing, an underlayment is not applied to allow for downward venting/drying of the wood shakes. An interlayment is unused between courses of wood shakes per Section 1507.9.6

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification and clean-up of the table.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M
Metal roof panels applied to a solid or closely fitted deck	1507.4	ASTM D226 Type I or II ASTM D4869, Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV
Wood shakes applied to a solid sheathing roof deck	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type IV

1507.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757,D2626 ~~Type I~~ or D6380 Class M shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be attached in accordance with Table 1507.1.1(3).

Exceptions:

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

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R11119Text Modification

2. As an alternative, two layers of underlayment complying with ASTM D226 Type II, ASTM D4869 Type IV or ASTM D6757 shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.
3. Structural metal panels that do not require a substrate or underlayment.

Committee Reason: Approved as modified as per the provided reason statement. The modification corrects the table as ASTM D2626 does not have types. (Vote: 14-0)

Final Hearing Results	
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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

35

R11120 | **/S24-21 Part I**

Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

Multiple modifications to Section 1507.1.1 "Underlayment". Modifications to Tables 1507.1.1(1) through Table 1507.1.1(3).

Rationale

See attached

R11120Text Modification

See attached

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Mod11120_TextOfModification.pdf

R11120Text Modification

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Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), ASTM Chapter 35 (New)

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment in accordance with this section is requiredfor asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be ~~attached~~ fastened in accordance with Table 1507.1.1(3).

Exceptions~~:~~

1. ~~As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.~~
2. ~~As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~
3. ~~3.~~ Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ - Underlayment shall be one of the following: - 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. - 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. - 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, $V \geq 140$ MPH
Clay and concrete tile	1507.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

TABLE 1507.1.1(3) UNDERLAYMENT ~~ATTACHMENT~~ FASTENING

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	Fastened sufficiently to hold in place	The Mechanically fastened underlayment shall be~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern ofmaximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3		
Photovoltaic shingles	1507.16		
Metal roof panels	1507.4	Manufacturer's installation instructions	The Mechanically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern ofmaximum 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfacedroll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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

Add new standard(s) as follows:

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R11120Text Modification

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also re-configures the expression of the options for enhanced underlayment systems in high wind areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1507.1.1 Underlayment. Underlayment in accordance with this section is required for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, ~~and~~ or D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be fastened in accordance with Table 1507.1.1(3).

Exception:

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

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally,~~ 3. ~~a.~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3	Underlayment shall be one of the following: 1. For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	Underlayment shall be one of the following: 1. For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

Committee Reason: Approved as modified as the proposal clarifies that an underlayment is required and provides updates to the appropriate ASTM's consistent with the actions on S24-22 Part II. Per the request of the industry, the modification reverts the table, for wood shingles and wood shakes, back to existing wording. (Vote: 14-0)

Final Hearing Results

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

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R11121 | **/S24-22 Part I**

Date Submitted	03/14/2024	**Section**	1507.1.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

Multiple modifications to Section 1507.1.1 "Underlayment" and Table 1507.1.1(1) through Table 1507.1.1(3).

Rationale

See attached

R11121Text Modification

See attached

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R11121Text Modification

S24-22 Part I

Original Proposal

IBC: 1507.1.1, TABLE 1507.1.1(1), TABLE 1507.1.1(2), TABLE 1507.1.1(3), ASTM Chapter 35 (New)

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.1.1 Underlayment. Underlayment in accordance with this section is requiredfor asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be ~~attached~~ fastened in accordance with Table 1507.1.1(3).

Exceptions:

1. ~~As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer modified bitumen membrane complying with ASTM D1970 and installed in accordance with the manufacturer's installation instructions for the deck material shall be applied over all joints in the roof decking. An approved underlayment for the applicable roof covering for design wind speeds less than 120 mph (54 m/s) shall be applied over the 4-inch-wide (102 mm) membrane strips.~~
2. ~~As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type IV shall be permitted to be installed as follows: Apply a 19-inch (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.254 mm). Thickness of the outside edge of plastic caps shall be not less than 0.035 inch (0.89 mm). The cap nail shank shall be not less than 0.083 inch (2.1 mm)for ring shank cap nails and 0.091 inch (2.3 mm) for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~
3. ~~3.~~ Structural metal panels that do not require a substrate or underlayment.

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ - Underlayment shall be one of the following: - 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. - 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. - 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, $V \geq 140$ MPH
Clay and concrete tile	1507.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~ in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		

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ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Photovoltaic shingles	1507.16	For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied ~~as follows~~in the following manner: Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets ~~19 inches~~ half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	~~Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches~~ Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

TABLE 1507.1.1(3) UNDERLAYMENT ~~ATTACHMENT~~ FASTENING

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles Clay and concrete tile Photovoltaic shingles	1507.2 1507.3 1507.16	Fastened sufficiently to hold in place	The ~~Mechanically fastened~~ underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of~~maximum~~ 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof panels Metal roof shingles Mineral-surfacedroll roofing Slate shingles Wood shingles Wood shakes	1507.4 1507.5 1507.6 1507.7 1507.8 1507.9	Manufacturer's installation instructions	The ~~Mechanically fastened~~ underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of~~maximum~~ 12 inches horizontally and vertically between side laps with a 6-inch spacing at side and end laps. Mechnically fastened ~~U~~underlayment shall be fastened ~~attached~~ using metal or plastic cap nails or cap staples with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage (0.0134 inch) sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Staples shall be not less than 21 gage (0.032 inch). The cap nail shank and cap staple legs shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

Add new standard(s) as follows:

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ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also re-configures the expression of the options for enhanced underlayment systems in high wind areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1507.1.1 Underlayment. Underlayment in accordance with this section is required for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* and shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, ~~and~~ or D8257 shall bear a label indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). Underlayment shall be applied in accordance with Table 1507.1.1(2). Underlayment shall be fastened in accordance with Table 1507.1.1(3).

Exception:

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

TABLE 1507.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral surfaced roll roofing ASTM D8257 ASTM D1970
Metal roof panels	1507.4	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970

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R11121Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, V < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, V ≥ 140 MPH
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Slate shingles	1507.7	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D8257 ASTM D1970
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Wood shakes	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type IV ~~ASTM D8257~~
Photovoltaic shingles	1507.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757 ASTM D8257 ASTM D1970

TABLE 1507.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Asphalt shingles	1507.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally,~~ 3. ~~a.~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch (95.25mm) wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	1507.3	Underlayment shall be one of the following: 1. For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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R11121Text Modification

ROOF COVERING	SECTION	MAXIMUM BASIC DESIGN WIND SPEED, *V* < 140 MPH	MAXIMUM BASIC DESIGN WIND SPEED, *V* ≥ 140 MPH
Metal roof panels	1507.4	Apply in accordance with the manufacturer's installation instructions	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	1507.5		
Mineral-surfaced roll roofing	1507.6		
Slate shingles	1507.7		
Wood shingles	1507.8		
Wood shakes	1507.9		
Photovoltaic shingles	1507.16	Underlayment shall be one of the following: 1. For roof slopes from 3 units vertical in 12 units horizontal (3:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. ~~Additionally, a~~ 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table 1507.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

Committee Reason: Approved as modified as the proposal clarifies that an underlayment is required and provides updates to the appropriate ASTM's consistent with the actions on S24-22 Part II. Per the request of the industry, the modification reverts the table, for wood shingles and wood shakes, back to existing wording. (Vote: 14-0)

Final Hearing Results

S24-22 Part I AM

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Mod_11121_Text_S24-22 Part I.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

37

R11123		/S26-22			
Date Submitted	03/14/2024	**Section**	1507.2.8	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC - B/Section 1507.2.9. Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word “printed” from the only instance in IBC Chapter 15 where it is used in conjunction with "instructions"

Rationale

See attached

R111123Text Modification

See attached

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Mod11123_TextOfModification.pdf

R11123Text Modification

S26-22

Original Proposal

IBC: 1507.2.8

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8 Flashings. Flashing for asphalt shingles shall comply with this section. Flashing shall be applied in accordance with this section and the asphalt shingle manufacturer's ~~printed~~ instructions.

Reason: Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word "printed" from the only instance in IBC Chapter 15 where it is used in conjunction with "instructions." Removal of the word "printed" will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal expands available options for delivering manufacturer's instructions, which allows manufacturers to select the option that best serves their customers. There is no basis to expect either a general increase or decrease in cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as manufacturer's instructions are not always 'printed'. They can be electronic. (Vote: 13-0)

Final Hearing Results

S26-22 AS

Page: 1

Mod_11123_Text_S26-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

38

R11124		/S27-22			
Date Submitted	03/14/2024	**Section**	1507.2.8.2	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC-B/Section 1507.2.9.2. Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IBC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Rationale

See attached

R11124Text Modification

See attached

Page: 1

Mod11124_TextOfModification.pdf

R11124Text Modification

S27-22

Original Proposal

IBC: 1507.2.8.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Building Code

Revise as follows:

1507.2.8.2 Valleys. Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table 1507.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing complying with ASTM D3909 or ASTM D6380 shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valleys covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380, and not less than 36 inches (914 mm) wide or types as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen *underlayment* bearing a label indicating compliance with ASTM D1970and not less than 36 inches (914 mm) wide shall be permitted in lieu of the lining material.

Reason: Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IBC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines an implied requirement to remove ambiguity. No change in cost of construction is expected if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal correctly clarifies the requirements for valleys. (Vote:14-0)

Final Hearing Results

S27-22 AS

Page: 1

Mod_11124_Text_S27-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

39

R11125	/S28-22				
Date Submitted	03/14/2024	**Section**	1507.4.3	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

This code change is intended to clarify code's requirements regarding metal sheet stock used in fabricating metal roof panels and metal roof shingles.

Rationale

See attached

R11125Text Modification

See attached

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Mod11125_TextOfModification.pdf

R11125Text Modification

S28-22

Original Proposal

IBC: 1507.4.3, TABLE 1507.4.3(1), TABLE 1507.4.3(2), 1507.5.5

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Revise as follows:

1507.4.3 Material standards. Metal-sheet *roof covering* systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* installed over structural decking shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-sheet *roof coverings* shall be naturally corrosion resistant or provided with*corrosion resistance* in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).~~

TABLE 1507.4.3~~(1)~~ METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
5% Aluminum alloy-coated steel	ASTM A875, GF60
Aluminum	ASTM B209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-coated steel	ASTM A463, T2 65
Aluminum-zinc alloy coated steel	ASTM A792 AZ 50
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A653 G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.
Lead-coated copper	ASTM B101
Prepainted steel	ASTM A755
Soft lead	3 lbs./sq. ft.
Stainless steel	ASTM A240, 300 Series Alloys
Steel	ASTM A924
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

~~**TABLE 1507.4.3(2) MINIMUM CORROSION RESISTANCE**~~

55% Aluminum-zinc alloy coated steel	ASTM A792 AZ 50
5% Aluminum alloy-coated steel	ASTM A875 GF60
Aluminum-coated steel	ASTM A463 T2 65
Galvanized steel	ASTM A653 G-90
Prepainted steel	ASTM A755 [a]

a. ~~Paint systems in accordance with ASTM A755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A463, ASTM A653, ASTM A792 or ASTM A875.~~

1507.5.5 Material standards. *Metal roof shingle roof coverings* shall comply with Table 1507.4.3~~(1)~~. ~~The materials used for metal-roof shingle *roof coverings* shall be naturally corrosion resistant or provided with*corrosion resistance* in accordance with the standards and minimum thicknesses specified in the standards listed in Table 1507.4.3(2).~~

Reason: This code change is intended to clarify code's requirements regarding metal sheet stock used in fabricating metal roof panels and metal roof shingles.

R11125Text Modification

This proposal combines existing Table 1507.4.3(1) and Table 1507.4.3(2) into a single new table, Table 1507.4.3. ASTM A792 AZ 50; ASTM G653 G90 and ASTM A755 currently occur in both tables. From existing Table 1507.4.3(2), ASTM A857 GF 60 and A463 T2 65 do not occur in Table 1507.4.3(1), so they these standards are being added to the new consolidated table.

From existing Table 1507.4.3(2), Footnote "a" is deleted. ASTM A463, ASTM A653, ASTM A792 and ASTM A875 are already incorporated into ASTM A755 and, therefore, these standards and this footnote are not necessary in the code.

There are no changes in code's technical requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification of existing provisions. There are no changes in code's technical requirements.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal cleans up the language and removes redundancies. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Mark Graham, National Roofing Contractors Association, National Roofing Contractors Association (mgraham@nrca.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1507.4.3 Material standards. Metal-sheet *roof covering* systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet *roof coverings* ~~installed over structural decking~~ shall comply with Table 1507.4.3.

TABLE 1507.4.3 METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD APPLICATION RATE/THICKNESS
5% Aluminum alloy-coated steel	ASTM A875, GF60
Aluminum	ASTM B209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-coated steel	ASTM A463, T2 65
55% Aaluminum-zinc alloy coated steel	ASTM A792 AZ 50
Cold-rolled copper	ASTM B370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.
Copper	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A653 G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.
Lead-coated copper	ASTM B101
Prepainted steel	ASTM A755
Soft lead	3 lbs./sq. ft.
Stainless steel	ASTM A240, 300 Series Alloys
Steel	ASTM A924
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A653 galvanized steel roofing shall be G-60.

Commenter's Reason: This code change proposal was Approved As Submitted by a 14-0 committee vote. In the committee's reasoning,

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R11125Text Modification

they cited "...the proposal cleans up the language and removes redundancies."
After review of my code change proposal, two additional editorial changes are suggested for further clarity.

- Strike "...installed over structural decking..." as these material standards are intended to apply to both metal-sheet roof coverings installed over open structural framing and metal-sheet roof coverings installed over solid or closely-fitted decking.
- Add "55%" to the label for aluminum-zinc alloy coated steel for consistency with the current Table 1507.4.3(1) and Table 1507.4.3(2).

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This code change proposal and this public comment are a clarification to the code's existing requirements and have no cost impact.

Final Hearing Results

S28-22 AMPC1

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

40

R11126		/S30-22			
Date Submitted	03/14/2024	**Section**	1507.8.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Section 1507.8.1 is marked reserved in the 2023 FBC -B.

Summary of Modification

When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. Proposal to address this concern.

Rationale

See attached

R111126Text Modification

See attached

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Mod11126_TextOfModification.pdf

R11126Text Modification

S30-22

Original Proposal

IBC: 1507.8.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.8.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shingles shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.

Reason: When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the IRC code committee actions. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

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Mod_11126_Text_S30-22.pdf

R11126Text Modification

1507.8.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shingles shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (14-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results

S30-22 AMPC1

Page: 2

Mod_11126_Text_S30-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

41

R11127 /S32-22

Date Submitted	03/14/2024	**Section**	1507.9.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. Proposal to address this concern.

Rationale

See attached

R11127Text Modification

See attached

Page: 1

Mod11127_TextOfModification.pdf

R11127Text Modification

S32-22

Original Proposal

IBC: 1507.9.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Building Code

Revise as follows:

1507.9.1 Deck requirements. Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. Where wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.

Reason: When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shakes to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted consistent with the committee action on S30-22. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

Page: 1

Mod_11127_Text_S32-22.pdf

R11127Text Modification

1507.9.1 Deck requirements. Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. Where wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Section 1202.2. The shakes shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (14-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results

S32-22 AMPC1

Page: 2

Mod_11127_Text_S32-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

42

R11128		/S34-22			
Date Submitted	03/15/2024	**Section**	1507.14	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC - B/Section 1507.15. Original text of mod is not consistent with that of the 2023 FBC -B This code change is already part of the FBC -B.

Summary of Modification

This proposal provides clarity and direction that is missing from section 1507.14 regarding application and flashings that other sections within 1507 currently have for those respective materials.

Rationale

See attached

R111128Text Modification

See attached

Page: 1

Mod11128_TextOfModification.pdf

R11128Text Modification

S34-22

Original Proposal

IBC: 1507.14, 1507.14.1, 1507.14.2, 1507.14.3 (New), 1507.14.4 (New)

Proponents: Chadwick Collins, Kellen Company, Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

2021 International Building Code

1507.14 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.14.1 Slope. Liquid-applied roofing shall have a design slope of not less than 1/4 unit vertical in 12 units horizontal (2-percent slope).

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 or ASTM D3468.

Add new text as follows:

1507.14.3 Application. Liquid-applied roofing shall be installed in accordance with the manufacturer's installation instructions.

1507.14.4 Flashings. Flashings shall be applied in accordance section 1507.14 and the liquid-applied roofing manufacturer's installation instructions.

Reason: This proposal provides clarity and direction that is missing from section 1507.14 regarding application and flashings that other sections within 1507 currently have for those respective materials. The manufacturer's installation instructions have the specifics for each specific product and should be the source material to consult for proper application and flashing guidance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal updates 1507.14 to mimic the format and content of sister subsections of 1507 to be consistent.

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as it does not provide any additional requirements. The requirement for being applied in accordance with the manufacturer's installation instructions is already covered elsewhere in the IBC. The reference in the proposed section 1507.14.4 to section 1507.14 creates a circular reference. (Vote: 14-0)

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)
requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

R11128Text Modification

1507.14 Liquid-applied roofing. The installation of liquid-applied roofing shall comply with the provisions of this section.

1507.14.1 Slope. Liquid-applied roofing shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).

1507.14.2 Material standards. Liquid-applied roofing shall comply with ASTM C836, ASTM C957 or ASTM D3468.

1507.14.3 Application. Liquid-applied roofing shall be installed in accordance withthis chapter and the manufacturer's installation instructions.

~~**1507.14.4 Flashings.** Flashings shall be applied in accordance section 1507.14 and the liquid-applied roofing manufacturer's installation instructions.~~

Commenter's Reason: From the Committee's feedback, RCMA recognizes the charging flashing language at the beginning of Chapter 15 and has struck the flashing paragraph from the original proposal. RCMA also reviewed the other references in chapter 15 related to application for other materials and has added language to be more alike to those instances for consistency.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This public comment and the original proposal is meant to provide clearer guidance on current applications and will not impact cost of installation.

Final Hearing Results

S34-22 AMPC1

Page: 2

Mod_11128_Text_S34-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

43

R11129		/S35-22			
Date Submitted	03/15/2024	**Section**	1507.16.6	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC-B/Section 1507.17.6. Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103.UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103

Rationale

See attached

R11129Text Modification

See attached

Page: 1

Mod11129_TextOfModification.pdf

R11129Text Modification

S35-22 Part I

Original Proposal

IBC: 1507.16.6, 1507.17.5

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, NASFM, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1507.16.6 Material standards. *Photovoltaic shingles* shall be *listed* and labeled in accordance with UL 7103~~or with both UL 61730-1 and UL 61730-2~~.

1507.17.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 7103~~or with both UL 61730-1 and UL 61730-2~~.

Reason: The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal properly references the standard for BIPV roofing systems.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the requirements in UL 61730-1 and UL 61730-2 are contained in UL 7103, making their reference redundant and unnecessary. (Vote: 14-0)

Final Hearing Results

S35-22 Part I AS

Page: 1

Mod_11129_Text_S35-22 Part I.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

44

R11131 | **/S36-22**

Date Submitted	03/15/2024	**Section**	1507.16.9	**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

Summary of Modification

This code change proposal is intended to add guidance to building officials and users of the code by specifically indicating flashings for PV shingles and BIPV roof panels be installed according to the roof covering manufacturer's installation instructions.

Rationale

See attached

R11131Text Modification

See attached

Page: 1

Mod11131_TextOfModification.pdf

R11131Text Modification

S36-22

Original Proposal

IBC: 1507.16.9 (New), 1507.17.9 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Building Code

Add new text as follows:

1507.16.9 Flashing. Flashing for *photovoltaic shingles* shall be installed in accordance with the *roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1507.17.9 Flashing. Flashing for BIPV roof panels shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

Reason: This code change proposal is intended to add guidance to building officials and users of the code by specifically indicating flashings for PV shingles and BIPV roof panels be installed according to the roof covering manufacturer's installation instructions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal adds clarity to the code; it does not change the codes existing technical requirements.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:

1507.16.9 Flashing. Flashing for ~~*photovoltaic shingles*~~ BIPV shingles shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1507.17.~~9~~7 Flashing. Flashing for BIPV roof panels shall be installed in accordance with the*roof covering* manufacturer's installation instructions to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

Committee Reason: Approved as modified as the proposal provides clear flashing requirements for BIPV. The modification provides clarity in the section numbering and clairifies that the flashing requirement is intended for BIPV shingles. (Vote: 14-0)

Final Hearing Results

S36-22 AM

Page: 1

Mod_11131_Text_S36-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

45

R11132		/S37-22			
Date Submitted	03/15/2024	**Section**	1508.2	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B. This code change is already part of the 2023 FBC-B.

Summary of Modification

new material specification of ASTM C1902, “Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications”, is being proposed that is better aligned to service the building materials market

Rationale

See attached

R11132Text Modification

See attached

Page: 1

Mod11132_TextOfModification.pdf

R11132Text Modification

S37-22

Original Proposal

IBC: TABLE 1508.2, ASTM Chapter 35 (New)

Proponents: Greg Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Building Code

Revise as follows:

TABLE 1508.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VII
Expanded polystyrene	ASTM C578
Extruded polystyrene	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4
Mineral fiber insulation board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208, Type II

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications

Reason: Today, the scope of ASTM C552, “Standard Specification for Cellular Glass Thermal Insulation”, encompasses applications where the cellular glass is intended to be used on surfaces that operate between -450 F and 800 F. While useful in industrial and pipe applications, this temperature range is much broader than needed for typical building material applications and limits the flexibility in the manufacturing operation to modify the formulation or process to tailor the properties to the needs of the building materials market. Therefore, the new material specification of ASTM C1902, “Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications”, is being proposed that is better aligned to service the building materials market. This specification would be differentiated from the existing ASTM C552 specification in the following ways:

1. Narrow the scope of the service temperature range to that of typical building applications

a. From the industrial temperature of -450 F to 800 F to the building temperature range of -50 F to 200 F

2. Remove properties that are not pertinent to the building materials market

a. Hot-surface performance warpage – This test refers primarily to high-temperature insulations that are applicable to hot-side temperatures as high as 800°F to determine material warpage or cracking and is not relevant to buildings.

b. Stress corrosion - This test is for insulation in contact with austenitic stainless-steel piping to assess corrosion of a stressed component and is not relevant to buildings.

3. Add properties that are pertinent to the building materials market

a. Dimensional stability - This is a measurement of a material’s change in dimensions in response to various environmental exposure conditions, which can be important to building systems.

Cost Impact: The code change proposal will decrease the cost of construction
The current code language requires products to be over-engineered for the building application and does not address dimensional stability, a key characteristic for building insulation. This proposed change addresses dimensional stability, over-engineering, and enables the

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Mod_11132_Text_S37-22.pdf

R11132Text Modification

product density to be reduced to enable lower cost and improved thermal resistance of the cellular glass. The improved thermal resistance further enables reduced energy usage for the occupied building.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as it appropriately adds the new ASTM C1902-20 standard as an option. (Vote: 14-0)

Final Hearing Results

S37-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

46

R11133 | **/S43-22**

Date Submitted	03/15/2024	**Section**	1511.7	**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

Summary of Modification

Adds new Section 1511.7.6 "Lightning Protection System".

Rationale

See attached

1st Comment Period History

R11133-G1

Proponent Mo Madani Submitted 6/14/2024 2:40:31 PM Attachments No

Comment:

Recommend disapproval. It is the Commission's policy not to include provisions in the FBC for lightening protection.

R11133Text Modification

See attached

Mod11133_TextOfModification.pdf

Page: 1

R11133Text Modification

S43-22

Original Proposal

IBC: [BG] 1511.7, 1511.7.6 (New), 1511.7.6.1 (New)

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

2021 International Building Code

Revise as follows:

[BG] 1511.7 Other rooftop structures. *Rooftop structures* not regulated by Sections 1511.2 through 1511.6 shall comply with Sections 1511.7.1 through 1511.7.~~5~~6, as applicable.

Add new text as follows:

1511.7.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Section 1511.7.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM 4435-ES-1 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

1511.7.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

Reason: Progress was made during the Group A cycle to include Lightning Protection Systems (LPS) and their appropriate installation standards in the IBC (G176-21). However, these standards (NFPA 780 and UL 96A) are currently silent on the impact the attachment of LPS have on the roof.

In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Even in moderate wind events, there have been documented failures of code compliant and tested roof assembly components where LPS were attached.

Roof assembly components such as coping and gutters are required by code to be tested to specific wind loads. LPS attachments to these roof component systems not only alter the wind load on of these tested components, but also alter their performance by restricting thermal movement causing galvanic reaction, leak point, etc.

This proposal clarifies that attachment of LPS to any part of the roof needs to be done in accordance with the installation instructions for the roof assembly, roof covering, metal edge systems, or gutter. Where LPS components attach to or penetrate the roof, they must be properly flashed. Reasonable and readily available methods and details exist to attach LPS systems independent of coping, fascia, gutter and roof assembly components and for flashing of existing LPS attachment methods where penetrations are required. This proposal clarifies that regardless of sequencing challenges which may exist in new or retrofit applications of LPS, the integrity of tested components and the envelope shall be maintained.

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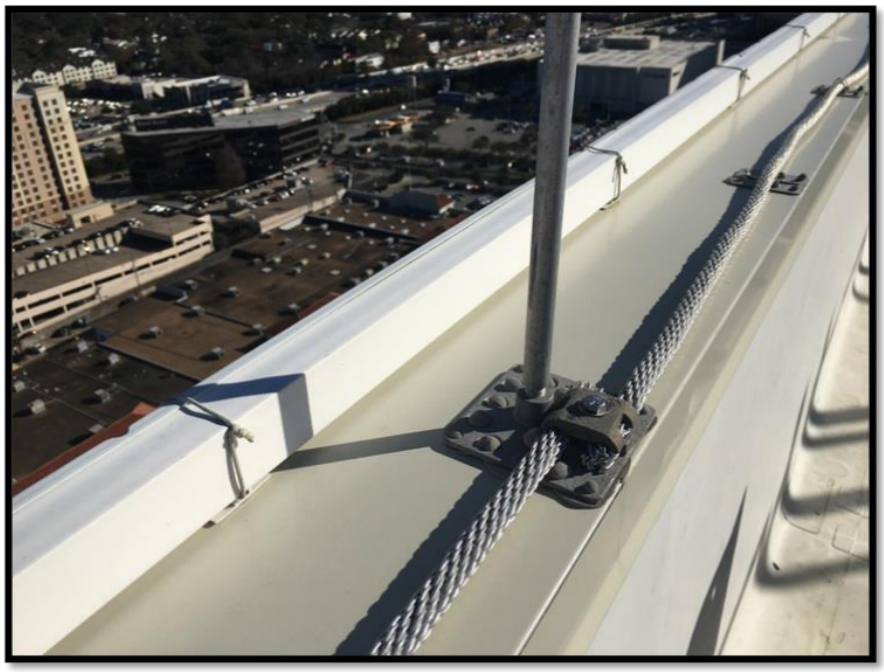
R11133Text Modification





R11133Text Modification



R11133Text Modification

Due to the installation of the Lightning Protection System components there may be certain details which require additional hot air welded patches installed under cable splices, frayed cable, and specific connections that could abrade the membrane. Hot air welded patches will provide sufficient protection to the field membrane from abrasion. Pictures below show examples of areas where additional hot air welded patches would be required.





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R11133Text Modification



Mod_11133_Text_S43-22.pdf Page: 5

R11133Text Modification



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

This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer's installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Mod_11133_Text_S43-22.pdf Page: 6

R11133Text Modification

Public Hearing Results

Committee Action **Disapproved**

Committee Reason: Disapproved as adding an exception for the attachment is inappropriate. The committee stressed that the proposal needs additional coordination between disciplines. (Vote: 13-1)

Public Comments

Public Comment 1

Proponents: Amanda Hickman, The Hickman Group, Single-Ply Roofing Industry (SPRI) (amanda@thehickmangroup.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[BG] 1511.7 Other rooftop structures. *Rooftop structures* not regulated by Sections 1511.2 through 1511.6 shall comply with Sections 1511.7.1 through 1511.7.6.2, as applicable.

1511.7.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Sections 1511.7.6.1, 1511.7.6.2 and 2703 of this code. ~~Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM 4435-ES-1 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.~~

1511.7.6.1 Installation on metal edge systems or gutters. Lightning protection system components ~~directly~~ attached to ANSI/SPRI/FM 4435/ES-1 or ANSI/SPRI GT-1 tested metal edge systems or gutters shall be installed with compatible brackets, fasteners, or adhesives, in accordance with the metal edge systems or gutter manufacturer's installation instructions. When metal edge system or gutter manufacturer is unknown, installation shall be as directed by a registered design professional.~~or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.~~

1511.7.6.2 Installation on roof coverings. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof covering. When the roof covering manufacturer is unknown, installation shall be as directed by a registered design professional.

Commenter's Reason:
Progress was made during the Group A cycle to include Lightning Protection Systems (LPS) and their appropriate installation standards in the IBC (G176-21). However, these standards (NFPA 780 and UL 96A) are currently silent on the impact the attachment of LPS have on the roof.

In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Roof assembly components such as coping, and gutters are required by code to be tested to specific wind loads. Anyattachments to these edge metal systems can alter the wind load on these tested components and therefore the performance of the systems.

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Mod_11133_Text_S43-22.pdf

R11133Text Modification

This proposal clarifies that attachment of LPS needs to be done in accordance with the manufacturer installation instructions for the roof assembly, roof covering, metal edge systems, or gutter they are being attached to. Manufacturer is defined as a person or business that produced for sale or installation, the roof components referenced above (coping, gutters, roof membranes) and is often the roofing contractor, the roofing membrane manufacturer, or another manufacturing company responsible for the manufacturing of these tested components. Where LPS components attach to or penetrate the roof, they must be properly flashed. There are situations where the manufacturer of the metal edge system, gutter, or roof covering is unknown, or out of business. In these situations, a registered design professional can provide direction on an attachment method that will retain the integrity of the roof, while allowing a lightning protection system to be installed.

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

If the Lightning protection system components are attached by adhesion or screw fasteners there will be no additional impact to costs. If the metal edge manufacturer's installation instructions require the installation of a bracket or some other device not yet developed there will be an increase in the material and labor to install the lightning protection system and/or roofing system.

Final Hearing Results

S43-22 AMPC1

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Mod_11133_Text_S43-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

47

R11134		/S44-22			
Date Submitted	03/15/2024	**Section**	1512.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC-B/Section 1511. Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

To reduce the likelihood of catastrophic roof collapses that that occur from uncontrolled ponding and/or inadequate drainage that is directly related to new live loads imposed onto existing roof structures from re-roofing.

Rationale

See attached

R11134Text Modification

See attached

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Mod11134_TextOfModification.pdf

R11134Text Modification

S44-22

Original Proposal

IBC: 1512.1

Proponents: Emily Lorenz, International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage* and meet the requirements of Section 1608.3 and Section 1611.2.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage*. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason: This additional language is necessary to ensure public life-safety. It emphasizes the IBC requirement that susceptible bays be analyzed for ponding instability during structural design/loads analyses that are required incidental to the recovering or replacement of existing *roof coverings,* which adds new live loads to existing roof structures. As the IBC has evolved through periodic updates, there have been fundamental changes in its requirements related to roof drainage, structural requirements for ponding instability, and, with climate change, significant increases in design rain loads (both rainfall intensity and duration). Annually, re-roofing projects comprise about three-quarters of U.S. low-sloped roofing projects. This additional language is needed to reduce the likelihood of catastrophic roof collapses that that occur from uncontrolled ponding and/or inadequate drainage that is directly related to new live loads imposed onto existing roof structures from re-roofing.

The following recent studies and case studies further support, in much greater detail, justification for the proposed additional language to Exception 1.

Fundamental Changes Related to Drainage

A 2012 study published by the American Society of Plumbing Engineers (ASPE) and the International Association of Plumbing and Mechanical Officials (IAPMO) concluded: “The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate.” (Ballanco 2012) In summary, the roof drains design criteria the engineering/construction industry has been using for more than 70 years is flawed. Drainage assemblies’ flow rates are based on the head of water over the drains and their geometry.

This research led to significant changes to the *IPC*. As of 2015, the IPC no longer publishes flow rates through drains. The IPC requires the designer to use “the published roof drain flow rate” for drainage design. The problem is that, at the time of this writing, there is only one drain manufacturer that publishes flow rates for their roof drains. The only published data on flow through drains is *FM Global Property Loss Prevention Data Sheets 1-54: Roof Loads for New Construction,* which essentially addresses only one type of drain. As a result of these code changes, the IIBEC-RCI Foundation recently published the second edition of *Roof Drainage* (IIBEC-RCI Foundation 2021), which provides an in-depth explanation of the new drainage design criteria and a guide for roof drainage designers. Accordingly, roof drainage systems that were designed per plumbing code requirement prior to IPC 2015 should be re-evaluated as part of roof recovering or replacement over an existing *roof covering.*

Structural Requirements for Ponding Instability

The second major change to codes involves structural requirements for ponding instability. Currently Section 1512.1 Exception 1 allows

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slopes less than ¼ inch per foot for re-roofing projects. By definition (2021 IBC Section 202), a *susceptible bay* is "a roof or portion thereof with a slope less than ¼ inch per foot." Sections 1608.3 and 1611.2 require that *susceptible b*ays be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7. This proposed change allows a slope of less than ¼ inch per foot only if the roof is not susceptible to ponding instability.

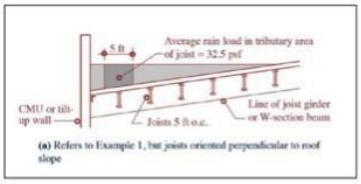
ASCE 7-16 significantly revised its "Chapter 8: Rain Loads" (ASCE 2016). Historically, ASCE and the model codes required ponding instability to be investigated when the roof slope was less than ¼ inch per foot. Ponding instability is a serious life-safety and structural issue for roofs. We have also learned that *ponding instability* is not just an issue on roofs with slopes less than ¼-inch per foot, but can also an issue on many more roof configurations. In other words, the potential for roof collapse resulting from ponding instability is more widespread than originally thought, and there are a number of roofs constructed before the 2016 design standards were enacted that have never been analyzed for ponding instability.

The most significant change in the evaluation of ponding instability addressed in ASCE 7-16 is structural orientation. The load on the joists is much greater if the joists are oriented parallel to the wall to which the water drains than if the joists are perpendicular to the wall. Below is example of a collapse in Dallas where ponding instability and structural orientation was an issue. The build-up of water on the 1st and 2nd joists running parallel to the wall was much greater than if the joists had been perpendicular to the wall. This condition resulted in excessive rainwater load on the joists. **Figure 1** (left) shows the roof collapse, and **Figure 1** (right) shows the structural orientation.





Figure 2 is an excerpt from "Roof Drainage Design, Roof Collapses, and the Code" (Patterson and Mehta 2018) illustrating the distribution on a roof with joists running parallel to the drainage wall (Patterson and Mehta 2018). In most cases these joists were designed using a live load of 16 psf, so the rainwater live load is double the design live load.



(a) Refers to Example 1, but joists oriented perpendicular to roof slope

In a paper by Coffman and Williamson (2019), they discuss ponding that can occur due to differences between "design slope" found in IBC Chapter 15 and "roof slope" used in ASCE 7. Their recommendation is "When design constraints necessitate a 1/4 in 12 design slope be used, the framing members should be cambered or investigated for ponding."

Increases in Design Rain Loads

ASCE 7-16 also recognized another important roof drainage design issue in "Section 8.2 Roof Drainage." There have been two rainfall rates used for the design of secondary drainage systems. Currently, the IPC requires a 1-hour, 100-year rainfall rate for designing the secondary drainage system, while the *National Standard Plumbing Code* requires a 15-minute, 100-year rainfall rate for designing the secondary drainage system. The original *IPC* also included the requirement to use a 15-minute, 100-year rainfall rate for designing the secondary drainage system, which was also in the *Standard Plumbing Code* before the IPC replaced it. ASCE 7-16 added the requirement that the secondary drainage system be designed based on the 15-minute, 100-year rainfall rate, which is contrary to the current *IPC* requirements. The *IPC* requirements are also in conflict in the current IBC, which is the reason why this change is important. The 15-minute, 100-year rainfall rate is double (two times) the 1-hour, 100-year rainfall rate. In other words, to comply with ASCE 7 and Section 1608.3 and Section 1611.2 of the IBC, the secondary drainage system must be designed using double the design rainfall rate required in the IPC.

As a result, the secondary drainage system design can be based on the IPC and not meet the requirements of ASCE and the IBC. Chapter 3, Sections 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. Essentially, ASCE 7 has doubled the "Rainwater Loads" on roofs.

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In addition, Levine (2021) conducted a review of US rainfall intensity data reports and various plumbing codes from 1935 to the present. He found that "plumbing codes have remained relatively static, rarely contain current rainfall intensity data, and truly represent a minimum standard with regard to the design of roof drainage systems."

Catastrophic Failures Due to Ponding

Ponding water on roofs, the accumulation of water on roofs, or*ponding instability* has the potential to cause serious structural/life safety issues, including roof collapses. There is a precedent for the ICC recognizing the significance of changes in design standards based upon new inputs, especially when related to life-safety issues. "Section 403.5 Bracing for unreinforced masonry parapets upon reroofing" and "Section 403.8 Roof diaphragms resisting wind loads in high-wind regions" in the IEBC require the correction of potentially hazardous conditions from seismic and wind forces. When reroofing a building in a high-wind region, an analysis of the structural diaphragms and correction of the deficiencies are required. IEBC Section 302.1, Dangerous Conditions, gives the building official "the authority to require the eliminate of conditions deemed *dangerous*." IEBC Section 706.2, Addition or replacement of roofing or replacement of equipment, requires replacement or alteration to structural elements when the structural element's design dead, live or snow load, including snow drift effects, is increased by 5 percent. In roof re-cover situations, the additional load from the re-cover roof is not the only increase in gravity loads, because the changes in the IBC and ASCE 7, as discussed previously, have doubled the gravity load from rainwater. These "Rain Loads" changes in ASCE 7 were made to address significant life-safety structural issues related to water accumulation on roofs. Michael O'Rourke, PhD, PE and Aaron Lewis, PE have published an excellent monograph regarding rain loads (O'Rourke and Lewis 2020).

Case Studies of Failures

Case Study 1: Roof Failure in Walhalla, South Carolina, on October 8, 2017 (**Figures 3-4**)

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Background:

Construction Science and Engineering, Inc. of Westminster, SC, performed an investigation following the collapse of a roof structure in Walhalla, SC, in October of 2017. Research was limited due to the number of weather recording stations proximate to the subject building; however, a private weather station within 3 miles of the building reported 4.3 in. of rain on the day of the event.

Findings:

In the opinion of Construction Science and Engineering, Inc., the primary cause of the roof collapse was due to excessive and rapid water accumulation on the roof during the significant weather event on October 8, 2017. The reported 5 in. of rainwater reported by the adjacent resident was similar to the 4.3 in. of rainwater measured from the closest private weather station. Additionally, the measured 3.5 in. water depth at the rear of an adjacent building 3 days after the rain event corroborated the reported rain amounts.

A 20 psf unreduced roof design load is specified as the standard in the applicable building code. An accumulation of 5 in. of rainwater equates to approximately 26 psf load on a roof structure. This roof load represents approximately 30% higher load than the current code prescribed design load. Due to the installation of the granular cap sheet below the tile parapet cap, the weight of the water is believed to have initiated the steel truss collapse by pulling a portion of the masonry brick parapet wall onto the roof. This impact force would result in the damage observed at the subject property.

Per Figure 1106.1(3), 100-Year, 1-Hour Rainfall (Inches) Eastern United States provides the 100-year hourly rainfall rate is 4.0 inches for Walhalla, South Carolina.

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Case Study 2:

Roof Failure in Kinston, North Carolina, on August 1, 2020 (**Figures 5-7**)



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Background:

REI Engineers, Inc. of Greenville, NC, performed an investigation following the collapse of a roof structure in Kinston, NC, in August of 2020.

Findings:

In the opinion of REI Engineers, Inc., the primary cause of the roof collapse was due to excessive loading of the roof framing system. Examination of the roof storm drainage system showed the primary drainage scuppers to obstructed by debris. Additionally, no secondary (emergency) drainage was observed. The combined factors of failure of the primary drainage system and lack of an overflow drainage system most likely caused the excess amount of water to accumulate on the roof, as it was contained by the structure's parapet. This additional load exceeded the structural framing's ability and a failure of the framing occurred by collapse.

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Bibliography: American Society of Civil Engineers (ASCE). 2016. *ASCE 7 -16*: *Minimum Design Loads Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. Reston, VA: ASCE.

Ballanco, Julius. 2012. *Storm Drainage System Research Project: Flow Rate Through Roof Drains.*Rosemont, IL: American Society of Plumbing Engineers (ASPE) Research Foundation.

Coffman, Scott D., and Thomas Williamson. 2019. "Low-Slope Roofs: Design Solutions for Building Code-Permitted Low-Slope Applications that Cause Ponding Water."
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Patterson, Stephen, and Medan Mehta. 2021. *Roof Drainage*. Second Edition, Raleigh, NC: IIBEC-RCI Foundation.

Patterson, Stephen L., and Madan Mehta. 2018. "Roof Drainage Design, Roof Collapses, and the Code" in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

Cost Impact: The code change proposal will increase the cost of construction
Most buildings that will be reroofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings' roofs (typically steep-slope) and commercial buildings' roofs that drain over the edge and buildings with rigid structures will not be affected.

There will be increased costs to buildings with flexible structural elements that are susceptible to*ponding instability,* which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the "Dangerous Condition" category, as defined in IEBC Section 401.3 (however, it should be noted that the IEBC is typically a voluntary code is most jurisdictions, and accordingly, this issue needs to be fully discussed in the IBC).

For these "Dangerous Condition" buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new live loading is safe. In a majority of cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient additional safety factors.In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues. In most cases, overflow drains or scuppers could be added or resized to limit the amount of water that would accumulate on the new roof. Overflow scuppers costs vary from $500 to $1,500 depending on their complexity.

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing, is necessary to protect public life-safety.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal adds requirements to increase public life-safety relative to ponding instability. The committee encouraged further coordination with the IEBC. (Vote: 9-5)

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Final Hearing Results

S44-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

48

R11135		/S45-22			
Date Submitted	03/15/2024	**Section**	1512.1	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC - B/Section 1511. Original text of mod is not consistent with that of the 2023 FBC -B.

Summary of Modification

Clarifies when the Exception 2, Section 1512.1 is applicable to prevent roof collapses/structural overload failures from uncontrolled ponding, incidental to new dead-loads imposed onto existing roof structures, etc.

Rationale

See attached

R11135Text Modification

See attached

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Mod11135_TextOfModification.pdf

R11135Text Modification

S45-22

Original Proposal

IBC: 1512.1

Proponents: Emily Lorenz, International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

2021 International Building Code

Revise as follows:

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of 1/4 unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage* and have been determined to resist all design loads. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Reason: This amended language is necessary to ensure public life-safety. It clarifies specifically when the Exception 2 is applicable so as to prevent roof collapses/structural overload failures from uncontrolled ponding, incidental to new dead-loads imposed onto existing roof structures, inadequate/missing secondary drainage assemblies at existing roofs, or alteration of drainage assemblies during re-roofing projects. This amended language is also needed to ensure preservation of physical assets or operations covered by existing roofs that are subject to re-roofing. The IBC and its predecessor building codes have long called for scuppers (or other secondary drainage measures) within all roofs that incorporate parapet walls and within other low-slope roofs, to prevent roof-structure overload and collapse. If during a low-slope re-roofing project, an owner discovers that their as-constructed roof has defective or missing code-required emergency overflow or secondary-drainage assemblies, the existing roof was most likely not code-compliant at the time of its installation and was and remains a danger to public life-safety from catastrophic collapse.
The following recent studies further support, in much greater detail, justification for the proposed additional language to Exception 2.

Secondary Drainage Should Have Been Provided During Original Construction

Chapter 15, Section 1502.2 Secondary (emergency overflow) drains or scuppers requires that, "secondary (emergency overflow) drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason." Generally, this provision only applies to low-sloped roofs with parapet walls. As the title suggests, the *secondary drainage system* is an *emergency* system that is required to prevent the roof structures from collapsing in the even of an unsafe buildup of water. The s*econdary (emergency overflow) drains or scuppers* are the safety valves for the roof structure.

Building codes have required that buildings have an
emergency overflow drainage system since modern codes were introduced. Below is an excerpt from Chapter 32 Roof Construction and Covering from the first *Uniform Building Code* (1927) requiring that, "Overflows ... (be) installed at each low point to which the water drains." (**Figure 1**)

Roof Drainage **Sec. 3206.** Roofs of all buildings shall be sloped so that they will drain to gutters and downspouts which shall be connected with conductors to carry the water down from the roof underneath the sidewalk to and through the curb. Overflows shall be installed at each low point of the roof to which the water drains.

Doesn't Apply to Roofs Designed to Drain Over Edge

The provision for an *emergency overflow drainage system* does not apply to roofs that drain over the edge, which are the vast majority of

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R11135Text Modification

buildings. These include most residential buildings, multi-family buildings, pre-engineered metal buildings, and buildings with low-slope roofs that drain over the edge into the gutters. The provision only applies to roofs where water can accumulate when the primary drains are blocked, i.e., buildings with parapet walls. A building with parapet walls and no *emergency overflow drainage system* did not meet building codes when they were built and do not meet the building codes today.

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load (**Figure 2**).

Exception: Buildings where the structure is sufficient to support the buildup of water do not require overflow. One example of this would be a concrete structure designed to be a future floor. In many cases, these roofs will support water that would build up to the top of the parapet wall. A typical parapet 2-foot wall would result in 2-feet of water buildup at the perimeter or 125 psf of Rain Load.

Secondary Drainage Essential to Structural Integrity

An *emergency overflow drainage system* is essential to the structural integrity of a building. It is the safety valve to prevent an unsafe water buildup on a roof in the case that the primary drainage system is blocked or if the rainfall rate exceeds the design rainfall rate for the primary drainage system. The head of water over an overflow drain or scupper is a critical component in the design calculus for roof structures. Both the IBC and ASCE-7 require that the roof structure be designed to support the weight (head) of water that accumulates over the *emergency overflow drainage system* assuming the primary drainage are blocked. **Figure 3** is an excerpt from Chapter 16, Section 1611.1 from the 2021 IBC describing the design requirements for "Rain Loads."

SECTION 1611
RAIN LOADS

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1(1) through 1611.1(5) shall be permitted.

Increases in Design Rain Loads

It is important to note that in the 2021 edition there was a significant change. Previously, the IBC and IPC required using the 1-hour, 100-year rainfall rate for the design of both the primary and secondary drainage systems. Section 1611.1 has changed the design rainfall rate to the 15-minute, 100-year rainfall rate. The requirement to use the 15-minute rainfall rate was made in ASCE 7-16 (ASCE 2016), so both ASCE and IBC require the 15-minute rainfall rate for designing overflow systems. The 15-minute rainfall rate is approximately double the 1-hour rainfall rate. **In other words, to comply with ASCE 7 and Section 1611.1. of the *IBC*, the secondary drainage system must be designed using double the design rainfall rate.** The result is that the new code requirement significantly increases the Rain Load on a

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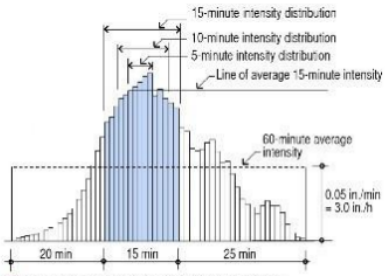
building.

The change from the 1-hour to the 15-minute duration rainfall rate is well supported in the technical literature. Chapter 3, Section 3.4 and 3.5 of *Roof Drainage* (IIBEC-RCI Foundation 2021) provides an in-depth discussion of the use and importance of the 15-minute, 100-year design standard for secondary drainage systems. There is also strong precedence in the codes for using the 15-minute rainfall rate for secondary drains. Prior to the consolidation of codes, the *Standard Plumbing Code* required using the 15-minute rainfall rates. The National Standard Plumbing Code requires using the 15-minute rainfall rate. Also, the first IPC required using the 15-minute duration rainfall rate for secondary drain systems. This requirement was changed in the 2000 IPC.

From a structural design perspective, rainfall rates commonly exceed the 1-hour, 100-year rainfall rate for short durations. **Figure 4** is an excerpt from *Roof Drainage* (IIBEC-RCI Foundation 2021) showing a typical distribution of rainfall rates occurring over 1-hour. The area above the 3.0 in/h line illustrate the time when the Rain Load would exceed the design Rain Load using the 1-hour rainfall rate. The illustration also shows (in blue) the 15-minute rainfall rate, which is about double the 1-hour rainfall rate. The Rain Load from 15-minute duration rainfall rate is now recognized as the appropriate standard. These structural design changes were made because of the serious recurring problem of roof collapses.



(a) Rainfall intensity distribution over 60 minutes. Width of each rectangle is one minute.

Climate change is causing more frequent and more intense rain events to occur. A good example was Hurricane Harvey. The flooding in Houston resulting from Hurricane Harvey contributed to the collapse of several roofs. A common scenario was that the flood water filled the storm drainage systems preventing the primary drains from functioning properly. This flooding severely tested the *secondary emergency overflow drainage system*. Most passed the test, but several roofs did not.

Another major change in the IPC significantly affects the design of a*secondary emergency overflow drainage system.* A 2012 study (Ballanco 2012) published by the American Society of Plumbing Engineers and the International Association of Plumbing and Mechanical Officials in found that, "***The research produced stunning results that verified that the sizing method for storm drainage systems, as required in the plumbing codes, is inaccurate***." In other words, **the drainage design criteria we have been using for more than 70 years is wrong … stunning indeed**. The study showed that flow rates are based on the head of water over the drains and the drain geometry, which is the very data a structural engineer must use in determining "Rain Loads." So not only have we changed the rainfall rate for designing secondary emergency drainage systems, we have an entirely different standard for determining the head (weight) of water over the drains.

As stated previously, the requirement that the re-roof system includes an appropriate*emergency overflowdrainage system* has been in the National Codes since these codes addressed reroofing. Chapter 32 Re-Roofing was added to the Appendix of the*Uniform Building Code* in 1979. Chapter 32 Re-Roof required that the new roof *conform the applicable provisions of* Chapter 32 of this code. Section 3207 (c) required Overflow Drains and Scuppers. Below is an excerpt from the 1979 UBC addressing the applicable provision related to the requirement for Overflow Drains and Scuppers. There was a reason that for almost 40 years the codes required the reroofing system to have an appropriate *secondary emergency overflow drainage system* (**Figure 5**).

(c) **Overflow Drains and Scuppers.** Where roof drains are required, overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches above the low point of the roof, or overflow scuppers having three times the size of the roof drains may be installed in adjacent parapet walls with the inlet flow line located 2 inches above the low point of the adjacent roof and having a minimum opening height of 4 inches.

Overflow drains shall be connected to drain lines independent from the roof drains.

Buildings are typically reroofed every 20 years or so. The IBC requires building permits for recovering the existing roof or for reroofing. This is typically the only time during the life of a building that the Building Official and the Code are involved with the roof. This is the appropriate time to make sure the building structure is safe and that the roof drainage system was constructed properly in accordance

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with the code. The omission of an appropriate *emergency overflow drainage system* is a design and/or construction defect that should be corrected. A building constructed without an appropriate *emergency overflow drainage system* does not meet the code now or in the past. It is critical that this provision be reinstated to ensure our buildings are safe.

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Patterson, Stephen L., and Madan Mehta. 2018. "Roof Drainage Design, Roof Collapses, and the Code" in *Proceedings of the 33rd RCI International Convention and Trade Show*, March 22-27, 2018: RCI.

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

Most buildings that will be re-roofed already meet IBC requirements, and there will be no increased costs resulting from the proposed additional language. Most residential and multi-family buildings' roofs (typically steep-slope) and commercial buildings with roofs that drain over the edge and buildings with rigid structures will not be affected. The cost of adding parapet wall emergency through-wall scuppers or other secondary drainage measures at low-slope roofs that require such assemblies, should have been borne at the time of the existing low-slope roof's original construction, based on requirements of earlier adopted building codes.

If found to missing, parapet wall through-wall scuppers or other secondary drainage measures are typically of nominal cost to retrofit into existing buildings/roofs. The costs to add or modify an emergency overflow drainage systemvaries. In many cases, all that is required is to add overflow drains or scuppers to control the volume of water that would accumulate on the roof. Overflow scupper costs vary from $500 to $1500 depending on their complexity and overflow drains vary from $1500 to $3000.

There will be increased costs to buildings with flexible structural elements that are susceptible to ponding instability,which leads to roof structure overloading and catastrophic roof collapse. These buildings would fall into the "Dangerous Condition" category, as defined in IEBC Section 302.1. For these "Dangerous Condition" buildings, additional cost would involve a structural engineering evaluation to determine that the building structure with new, added dead-loading is safe and additionally, that the new dead-loading will not alter the function of in-place secondary drainage systems. In most cases, it is presumed that structural engineering evaluation would be the extent of the additional costs, since building structures are typically designed with sufficient margin-of-safety factors.

In cases where a structural engineering evaluation indicates a building/roof structure is unsafe, there would be additional costs to strengthen, supplement, replace or otherwise alter the structure, as required to carry the additional loads. These costs would vary from building-to-building depending upon the extent of the discovered issues.

R11135Text Modification

Regardless, the costs to evaluate and/or modify a structure that has been found to be unsafe from additional loading caused by re-roofing or from inadequate or missing secondary drainage systems, is necessary to protect public life-safety and property/operations below existing roofs.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1512.1 General. Materials and methods of application used for recovering or replacing an existing*roof covering* shall comply with the requirements of Chapter 15.
Exceptions:

1. *Roof replacement* or *roof recover* of existing low-slope *roof coverings* shall not be required to meet the minimum design slope requirement of 1/4 unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide*positive roof drainage*.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for*positive roof drainage* and ~~have been determined to resist all design loads~~meet the requirements of Section 1608.3 and Section 1611.2. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

Committee Reason: Approved as modified as the proposal provides a reasonable addition, to the exception in section 1512.1, as ponding instability rarely provides warning prior to failure. The committee did note that the proposal could penalize existing buildings. The modification provides the required specific pointer. (Vote: 10-4)

Final Hearing Results

S45-22 AM

Page: 5

Mod_11135_Text_S45-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

49

R11136		/S51-22			
Date Submitted	03/15/2024	**Section**	1512.2	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B. FBC - B/Section 1511.

Summary of Modification

While the code requires materials and methods for roof replacement to comply with Chapter 15, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes

Rationale

See attached

R111136Text Modification

See attached

Page: 1

Mod11136_TextOfModification.pdf

R11136Text Modification

S51-22

Original Proposal

IBC: 1512.2

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

2021 International Building Code

Revise as follows:

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

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

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table 1507.1.1(1), Table 1507.1.1(2), and Table 1507.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and self-adhered underlayment manufacturer,
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, and
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Reason: The use of a self-adhered polymer modified bitumen membrane complying with ASTM D1970 is one of several underlayment options permitted for roof coverings in the IBC. ASTM D1970 self-adhered membranes were first recognized in the 2000 IBC and IRC as an underlayment and as an option for an ice barrier. After 20 years of code implementation, it remains approved by shingle manufacturers, underlayment manufacturers and building codes, and has been consistently observed to perform very well as a method for preventing water intrusion in the event the roof covering is lost or damage.

While the code requires materials and methods for roof replacement to comply with Chapter 15, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes. Section 1512.2requires roof replacement to include the removal of all roof covering layers down to the roof deck. An exception permits one additional layer of an ice barrier membrane where the existing roof has an ice barrier membrane.

As currently written, the code would imply that a self-adhered membrane would have to be removed during a roof replacement. However, depending on the decking material, many self-adhered membranes can be difficult to remove. Some may not be able to be removed without damaging or removing the roof deck. Damaging the deck and/or removing the roof decking can be expensive and unnecessary.

This proposal is a collaboration between the Insurance Institute for Business and Home Safety (IBHS), the Asphalt Roofing Manufacturers Association (ARMA), and the National Roofing Contractors Association (NRCA). It provides specific requirements on acceptable methods for dealing with existing self-adhered membranes during a roof replacement. The underlayment methods in the 2021 IBC include specific methods for preventing water intrusion in the event the roof covering is damaged or lost in high wind regions. The changes proposed herein seek to maintain that level of protection during roof replacement.

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Mod_11136_Text_S51-22.pdf

R11136Text Modification

ARMA provides guidance on the removal of self-adhered membrane in their Technical Bulletin, Self-Adhering Underlayment Removal Prior to Steep Slope Re-Roofing: *"Removal of self-adhering underlayment is always recommended in situations in which it can be removed without damaging the deck….If one layer of self-adhering underlayment is in place, and it is not possible to remove it without damaging the deck, installation of a second layer of underlayment over the existing membrane may be permissible: Check with the underlayment manufacturer's installation instructions and local building codes for details. Offset end and side laps in the new and existing underlayment to minimize thickness build-up and "feather in" the new underlayment by extending the new material a minimum of 8" up the slope onto the bare deck. This will reduce the likelihood of problems with drainage and aesthetics. If two or more layers of self-adhering underlayment are in place, all layers should be removed."*

In lieu of an additional layer of self-adhered underlayment, this proposal also permits felt underlayment to be installed in accordance with Tables 1507.1.1(1), 1507.1.1(2), and 1507.1.1(3).

This proposal also provides industry recommended clarifications regarding the installation of an additional layer of an ice barrier membrane.

Cost Impact: The code change proposal will decrease the cost of construction
For existing roofs with one layer of self-adhered membrane underlayment, this proposal would reduce the cost of construction by permitting the existing layer to remain in place.

Public Hearing Results

Committee Action **As Modified**

Committee Modification:
1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.
Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the roof covering manufacturer and ~~self-adhered~~ new ice barrier underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table 1507.1.1(1), Table 1507.1.1(2), and Table 1507.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and new self-adhered underlayment manufacturer,
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, and
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Committee Reason: Approved as modified as the proposal is reasonable and consistent with industry standard practice. The modification clarifies the intent consistent with industry standard practice. (Vote: 13-1)

Final Hearing Results

S51-22 AM

Page: 2

Mod_11136_Text_S51-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

50

R11272		/S222-22			
Date Submitted	03/19/2024	**Section**	2308.2.7	**Proponent**	Mo Madani
Chapter	23	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC - B.

Summary of Modification

This proposal provides correlation between the prescriptive provisions of IBC Section 2308 and the provisions of IRC Section R301.2.2.6 Item 8, added in the 2021 IRC with the intent of improving the seismic performance of wood-light-frame hillside buildings

Rationale

See attached

R11272Text Modification

See attached

Mod11272_TextOfModification.pdf

Page: 1

R11272Text Modification

S222-22

Original Proposal

IBC: SECTION 202 (New), 2308.2.7 (New), 2308.2

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

2021 International Building Code

Add new definition as follows:

[BS] CRIPPLE WALL CLEAR HEIGHT. The vertical height of a cripple wall from the top of the foundation to the underside of floor framing above.

Add new text as follows:

2308.2.7 Hillside light-frame construction. Design in accordance with Section 2308.1.1 shall be provided for the floor immediately above the *cripple walls* or post and beam systems and all structural elements and connections from this floor down to and including connections to the foundation and design of the foundation to transfer lateral loads from the framing above in buildings where all of the following apply:

1. The grade slope exceeds 1 unit vertical in 5 units horizontal where averaged across the full length of any side of the building, and
2. The tallest *cripple wall clear height* exceeds 7 feet (2134 mm), or where a post and beam system occurs at the building perimeter, the post and beam system tallest post clear height exceeds 7 feet (2134 m), and
3. Of the total plan area below the lowest framed floor, whether open or enclosed, less than 50 percent is *occupiable space* having interior wall finishes conforming to Section 2304.7 or Chapter 25 of this code.

Exception: Light-frame buildings in which the lowest framed floor is supported directly on concrete or masonry walls over the full length of all sides except the downhill side of the building are exempt from this provision.

Revise as follows:

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of *conventional light-frame construction*, subject to the limitations in Sections 2308.2.1 through ~~2308.2.6~~ 2308.2.7.

Reason: This proposal provides correlation between the prescriptive provisions of IBC Section 2308 and the provisions of IRC Section R301.2.2.6 Item 8, added in the 2021 IRC with the intent of improving the seismic performance of wood-light-frame hillside buildings. A related modification has been made in ASCE/SEI 7-22 to provide additional guidance to engineers designing wood light-frame hillside buildings.

As part of work contributing to *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018), it was identified that for light-frame buildings on steep hillsides (Figure 1), adequate seismic performance does not occur when seismic design is based on typical seismic force distribution assumptions (tributary area, flexible diaphragm). Whether loading is in the cross-slope or out-of-hill direction (Figure 2), seismic forces follow the stiffest load path to the uphill foundation, rather than distributing uniformly to all the bracing walls in the way assumed in development of IBC Section 2308 seismic bracing provisions. For this reason, design using the IBC Section 2308 bracing provisions will not provide adequate seismic performance. This change proposal triggers an engineered lateral force design for the lower portion of hillside buildings by adding the hillside building configuration to the already existing list of Section 2308.2 limitations.

This building configuration was illustrated to be vulnerable in the 1994 Northridge, California Earthquake. The Earthquake Spectra

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R11272Text Modification

Northridge Earthquake Reconnaissance Report (Volume 2, EERI, 1996) reported 117 significantly damaged hillside buildings of the bearing wall type and 40 of the post and beam (stilt) type. Fifteen dwellings were reported to have collapsed or were so near collapse that they were immediately demolished and another fifteen came close to collapsing. HUD (1994) also reported significant damage to hillside buildings. As examples of vulnerable hillside building performance, Figure 3 illustrates a building that pulled about six inches away from the uphill foundation, but did not collapse, and Figure 4 illustrates one of the buildings that collapsed in the 1994 earthquake.

Blaney et. Al. (2018) illustrates results from numerical studies used in development of FEMA P-1100. Figure 18 of this reference indicates that for a studied hillside building, the probability of collapse in the risk-adjusted maximum considered earthquake (MCE_R) was reduced by more than a factor of seven by changing from typical prescriptive bracing practice to an engineered methodology that considered the seismic response. More background on building past performance and the numerical studies are found in FEMA P-1100.

The Item 1 grade slope trigger is used to limit applicability of this provision to buildings that are on sites with a significant slope (Figure 5). Averaging the grade slope along the side of the building is intended to focus on the overall drop in grade elevation across the building and not trigger the irregularity based only on limited areas of higher grade slope. This is consistent with the numerical studies that form the basis of this proposal. For most buildings this criterion will be evaluated by looking at each of the four primary elevations. For large and more complex buildings, additional “sides” will need to be evaluated.

Item 2 adds a second trigger of downhill cripple wall height greater than 7’-0” (Figure 6) or downhill post clear height in post and pier building (Figure 7) based on the FEMA P-1100 numerical studies. The studies showed that for buildings with cripple walls greater than 7’-0” prescriptive design can lead to significantly diminished seismic performance. The reduction in performance was not as great with cripple walls of seven feet or less.

Item 3 adds a trigger where a significant portion of the underfloor area does not have interior finishes, as the strength and stiffness of seismic bracing are significantly diminished when interior finish materials are not present. Figure3 shows a dwelling where none of the underfloor area is enclosed. Figure 1 shows a dwelling where 100% of this underfloor area is enclosed. If this has interior finishes than Item 3 would not be applicable. If Figure 1 does not have interior finished then Item 3 would be applicable.

All three items must be applicable in order for dwelling to require engineered design. These triggers were observed to be the points at which damage and displacements at the uphill foundation were thought to significantly increase the likelihood of collapse.

The exception scopes out engineered design of hillside buildings that have full-height concrete or masonry walls (Figure 8) because this configuration was not part of the numerical studies that form the basis of this proposal. For a building with a simple rectangular floor plan, full height concrete or masonry walls would need to occur on three sides to qualify for the exception. For a more complex building plan configuration, additional concrete or masonry walls would be required to qualify for the exception. Buildings are permitted to have doors and windows in the concrete or masonry walls and still qualify for the exception. In all buildings the concrete or masonry walls will need to conform to applicable IBC provisions.



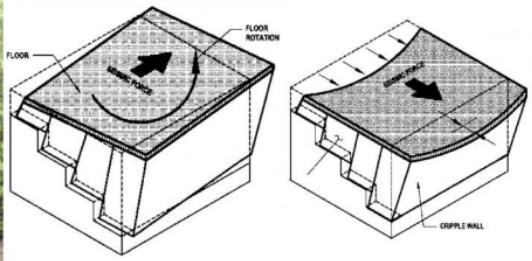

Figure 1 Hillside light-frame structure. Figure 2. Hillside structure cross-slope and out-of-hill loading.

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R11272Text Modification

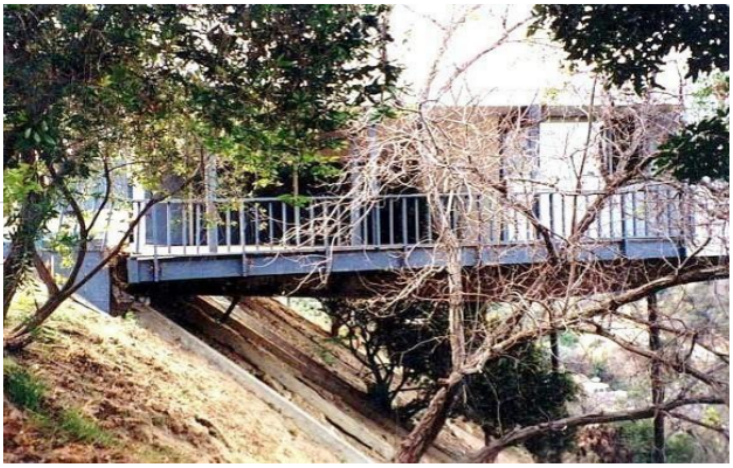

Figure 3. Hillside building pulled away from uphill foundation in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety). Red arrow shows location where floor framing has pulled six to eight inches away from the uphill foundation.



Figure 4. Hillside building collapse in the 1994 Northridge, California Earthquake (Credit: City of Los Angeles Department of Building and Safety).

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R11272Text Modification

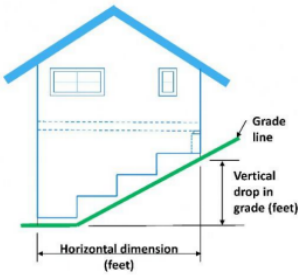


Figure 5. Grade slope triggering the hillside building engineered design exceeds 1 vertical in 5 horizontal across the full width of any side of the building.

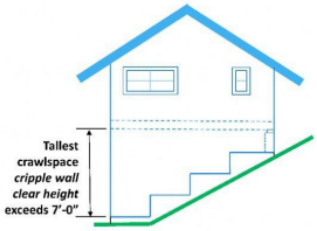


Figure 6. Downhill cripple wall height triggering the hillside building engineered design.

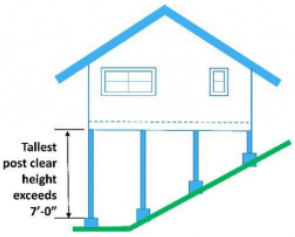
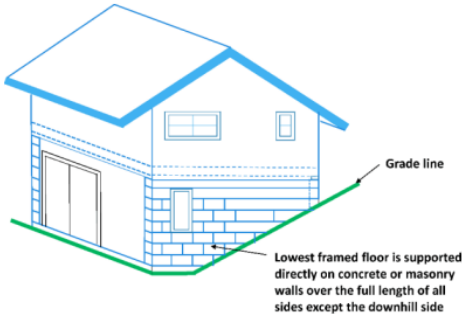


Figure 7. Downhill post height triggering the hillside building engineered design.



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R11272Text Modification

Figure 8. Concrete or masonry wall configuration that does not tripper the hillside building engineered design.

Cost Impact: The code change proposal will increase the cost of construction
This proposal is anticipated to increase the number of dwellings required to have an engineered lateral force design for moderately steep to very steep sites. In regions where these dwellings are believed to already be predominantly engineered, the cost impact is thought to be negligible. In other regions where these dwellings are not predominantly engineered, additional costs will be incurred for engineered design and more robust anchorage to the foundation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as the proposal appropriately adds requirements for hillside light-frame construction and per the first paragraph of the provided reason statement. (Vote: 13-1)

Final Hearing Results

S222-22 AS

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Mod_11272_Text_S222-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Building

51

R11673		/ADM52-22			
Date Submitted	05/14/2024	**Section**	35	**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 No

Related Modifications

Summary of Modification

Modification lists the updated standards in the IBC.

Rationale

See attached

R11673Text Modification

See attached

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Mod11673_TextOfModification.pdf

R11673Text Modification

ADM52-22

ACCA	Air Conditioning Contractors of America		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/ACCA 1 Manual D—~~2016~~ 2023	Residential Duct Systems	IMC	IRC
ANSI/ACCA 10 Manual SPS —~~2010 RA~~ 2017	~~HVAC~~ Design for Swimming Pools and Spas	IMC	
ANSI/ACCA 3 Manual S—~~14~~ 2023	Residential Equipment Selection	IECC®	
ANSI/ACCA 3 Manual S—~~2014~~ 2023	Residential Equipment Selection	IRC	
ANSI/ASHRAE/ACCA 183—2007 (reaffirmed 2014)	Peak Cooling and Heating Load Calculations in Buildings Except Low-rise Residential Buildings	IMC	

AFSI	Architectural Fabric Structures Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~FSAAS—16~~ AFSI-77	~~Fabric Structures Associated Air Structures 2016~~ Air Structures Design and Standards Manual	IFC

AHAM	Association of Home Appliance Manufacturers	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AHAM RAC-1—~~2015~~ 2020	Room Air Conditioners	IECC®

AHRI	Air-Conditioning, Heating, & Refrigeration Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
1160 (I-P) —~~2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	IECC®
1160 (I-P)—~~2014~~ 2022	Performance Rating of Heat Pump Pool Heaters ~~(with Addendum 1)~~	ISPSC

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R11673Text Modification

1200 (I-P)—~~2013~~ 2022	Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets	IECC®
1230 (I-P)—~~2014~~ 2021	Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-Conditioning and Heat Pump Equipment ~~(with Addendum 1)~~	IECC®
1250 (I-P)—~~2014~~ (2020)	Standard for Performance Rating in Walk-in Coolers and Freezers	IECC®
1360 (I-P)—2017	Performance Rating of Computer and Data Processing Room Air Conditioners	IECC®
210/240—~~2017 and~~ 2023 (2020)	Performance Rating of Unitary Air-conditioning and Air-source Heat Pump Equipment	IECC®
340/360—~~2019~~ 2022	Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment	IECC®
390 (I-P)—~~2003~~ 2021	Performance Rating of Single Package Vertical Air-conditioners and Heat Pumps	IECC®
440 (I-P)—~~2008~~ 2019	Performance Rating of Room Fan Coils ~~—with Addendum 1~~	IECC®
550/590 (I-P)—~~2018~~ 2022	Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle	IECC®
560—~~2018~~ 2000	Absorption Water Chilling and Water Heating Packages	IECC®
700—~~2017~~ 2019	~~with Addendum 1:~~ Specifications for Refrigerants	IMC
910 (I-P)—2014	Performance Rating of Indoor Pool Dehumidifiers	IECC®
920 (I-P)—~~2015~~ 2020	Performance Rating of DX-Dedicated Outdoor Air System Units	IECC®

R11673Text Modification

AISC	American Institute of Steel	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/AISC 341—~~16~~ 22	Seismic Provisions for Structural Steel Buildings	IBC
ANSI/AISC 360—~~16~~ 22	Specification for Structural Steel Buildings	IBC
ANSI/AISC 358—~~16/s1—18~~ 22	Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ~~IncludingSupplement No. 1~~	IBC

AISI	American Iron and Steel Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AISI S100—16 (2020) w/S2—20:	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IBC
AISI S100—16 (2020) w/S2—20	~~North American~~ Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition (Reaffirmed 2020), with Supplement 2, 2020 Edition	IRC®

ALI	Automotive Lift Institute, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ALI ALCTV—~~2016~~ 2022	Standard for Automotive Lifts—Safety Requirements for Construction, Testing and Validation (ANSI)	IBC

AMCA	Air Movement and Control Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~ANSI~~/AMCA 550—~~09 (Rev. 09/18)~~ 22	Test Method for High Velocity Wind Driven Rain Resistant Louvers	IMC

R11673Text Modification

ANSI/AMCA 220—~~19~~ 21	Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Rating	IECC®	
ANSI/AMCA 230—~~15~~ 23	Laboratory Methods of Testing Air Circulating Fans for Rating and Certification	IMC	IECC®
ANSI/AMCA 540—~~13~~ 23	Test Method for Louvers Impacted by Wind Borne Debris	IBC	
ANSI/AMCA 210-ANSI/ASHRAE 51—~~16~~ 23	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IRC®	
ANSI/AMCA 210—16/ANSI/ASHRAE 51—16	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating	IMC	

ANSI	**American National Standards Institute**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI LC 4/CSA 6.32—2012~~ CSA/ANSI LC 4:23/CSA 6.32:23	Press-connect Metallic Fittings and valves for Use in Fuel Gas Distribution Systems	IFGC	IRC	
~~ANSI/CSA FC 1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100: Stationary Fuel Cell Power Systems—Safety	IFGC	IMC	IRC®
~~LC1/CSA 6.26—2016~~ CSA/ANSI LC 1:19/CSA 6.26:19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)	IFGC	IRC®	
ANSI Z21.41 (R2019)/CSA 6.9-~~2014~~ (R2019)	Quick Disconnect Devices for Use with Gas Fuel Appliances	IFGC	IRC®	
ANSI Z21.22—~~99 (R2003)~~ 2015 (R2020)/CSA 4.4-2015(R2020)	Relief Valves for Hot Water Supply Systems~~ with Addenda Z21.22a—2000 (R2003) and Z21.22b—2001 (R2003)~~	IPC	IRC®	
ANSI Z21.24 -2015(R2020)/CSA 6.10— 2015(R2020)	Connectors for Gas Appliances	IFGC	IRC®	
ANSI Z21.40.1-1996 (R2017)/CGA 2.91—~~1996~~ M96(R2017)	Gas-fired Heat Activated Air Conditioning and Heat Pump ~~Appliances~~	IFGC	IRC	

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ANSI Z21.50 :19/CSA 2.22—~~2016~~ :19	Vented Decorative Gas Fireplaces	IFGC		IRC®
ANSI Z21.69 -2015 (R2020)/CSA 6.16—2015 (R2020)	Connectors for Movable Gas Appliances	IFGC		IRC®
ANSI Z21.75 -2016/CSA 6.27—2016 (R2020)	Connectors for Outdoor Gas Appliances and Manufactured Homes	IFGC		IRC®
ANSI Z83.11 -2016 (R2021)/CSA 1.8—2016 (R2021)	Gas Food Service Equipment	IFGC		
ANSI Z83.18—2017 (R2021)	Recirculating Direct Gas-fired Heating and Forced Ventilation Appliances for Commercial and Industrial Applications	IFGC		
CSA/ANSI Z21.11.2—~~2016~~ :19	Gas-fired Room Heaters—Volume II—Unvented Room Heaters	IFGC		IRC®
CSA/ANSI Z21.56 :19/CSA 4.7—~~17~~ :19	Gas-fired Pool Heaters	IFGC	ISPSC	IRC®
CSA/ANSI Z21.10.3 :19/CSA 4.3—~~2017~~ :19	Gas Water Heaters—Volume III—Storage, Water Heaters with Input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous	IFGC	IECC®	IRC®
CSA/ANSI Z21.15 :22/CSA 9.1—~~09(R2014)~~ :22	Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves	IFGC		IRC®
CSA/ANSI Z21.19 :19/CSA 1.4—~~2014~~ :19	Refrigerators Using Gas Fuel	IFGC		
CSA/ANSI Z21.42—~~20~~13 (R2018)	Gas-fired Illuminating Appliances	IFGC		IRC®
CSA/ANSI Z21.47 :21/CSA 2.3—~~16~~ :21	Gas-fired Central Furnaces	IECC®		
CSA/ANSI Z21.58 :22/CSA 1.6—~~2015~~ :22	Outdoor Cooking Gas Appliances	IFGC		IRC®
CSA/ANSI Z21.80 :19CSA 6.22—~~11(R2016)~~ :19	Line Pressure Regulators	IFGC		IRC®

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CSA/ANSI Z21.90 :19/CSA 6.24~~-2015~~ :19	Gas Convenience Outlets and Optional Enclosures	IRC®	
CSA/ANSI Z21.91~~—2017~~ :20	Ventless Firebox Enclosures for Gas-fired Unvented Decorative Room Heaters	IFGC	IRC®
CSA/ANSI Z21.10.1 :19/CSA 4.1 ~~—2017~~ :19	Gas Water Heaters—Volume I—Storage, Water Heaters with Input Ratings of 75,000 Btu per Hour or Less	IFGC	IRC®
CSA/ANSI Z21.54 :19~~—2014~~ /CSA 8.4:19	Gas Hose Connectors for Portable Outdoor Gas-fired Appliances	IFGC	IRC®
A108.11~~—10~~ 18	Interior Installation of Cementitious Backer Units	IRC®	
A108.4~~—09~~ 19	Installation of Ceramic Tile with Organic Adhesives or Water-cleanable Tile-setting Epoxy Adhesive	IBC	IRC®
A108.5~~—19~~ 21	~~Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-Portland Cement Mortar~~ Setting of Ceramic Tile with Dry-Set Cement Mortar, Modified Dry Set Cement Mortar, EGP (Exterior Glue Plywood) Modified Dry-Set Cement Mortar, or Improved Modified Dry-Set Cement Mortar	IBC	IRC®
A108.6~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant, Water Cleanable Tile-setting and -grouting Epoxy	IBC	IRC®
A108.8~~—19~~ 99(R2019)	Installation of Ceramic Tile with Chemical-resistant Furan Resin Mortar and Grout	IBC	
A108.9~~—19~~ 99(2019)	Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout	IBC	
A118.10— 14(R2019)	Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin- Set Ceramic Tile and Dimension Stone Installation	IPC	IRC®

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A118.1—~~18~~ 19	American National Standard Specifications for Dry-set ~~Portland~~ Cement Mortar	IBC	IRC®
A118.3—~~20~~ 21	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—~~18~~ 19	American National Standard Specifications for Modified Dry-set Cement Mortar	IBC	IRC®
A118.5—99(R2021)	American National Standard Specifications for Chemical Resistant Furan Mortar and Grouts for Tile Installation	IBC	
A118.6—19	American National Standard Specifications for Standard Cement Grouts for Tile Installation	IBC	
A136.1—~~19~~ 20	American National Standard Specifications for Organic Adhesives for ~~the~~ Installation of Ceramic Tile	IBC	IRC®
A137.1—~~19~~ 22	American National Standard Specifications for Ceramic Tile	IBC	IRC®
A137.3—~~17~~ 22	American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panel/Slabs	IBC	
ANSI E1.21—~~2013~~ 2020	Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Events	IFC	
CSA/ANSI NGV 5.1—~~2016~~ :22	Residential Fueling Appliances	IFGC	
CSA/ANSI NGV 5.2—~~2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	
CSA/ANSI Z21.88:19/CSA 2.33—~~16~~ : 19	Vented Gas Fireplace Heaters	IFGC	IRC®

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LC 1/CSA 6.26~~—2016~~ :19	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing ~~(CSST)~~	IFGC		
LC4/CSA 6.32—12	Press-connect Metallic Fittings for Use in Fuel Gas Distribution Systems	IRC®		
Z21.1/CSA 1.1—~~2016~~ 2018	Household Cooking Gas Appliances	IFGC	IMC	IRC
Z21.40.2/CGA 2.92—1996 (R2017)	Gas-fired Work Activated Air Conditioning and Heat Pump Appliances (Internal Combustion)	IFGC		
Z21.40.2/CSA 2.92—96 (R2017)	Gas-fired Work Activated Air-conditioning and Heat Pump Appliances (Internal Combustion)	IRC®		
Z21.41(R2019)/CSA 6.9—2014 (R2019)	Quick Disconnect Devices for use with Gas Fuel Appliances	IFGC		
Z21.47/CSA 2.3—2016	Gas-fired Central Furnaces	IFGC	IRC®	
Z21.56/CSA 4.7—2017	Gas-fired Pool Heaters	IFGC		
Z21.56a:19/CSA 4.7—~~2017~~ :19	Gas Fired Pool Heaters	ISPSC		
Z21.88/CSA 2.33—~~2016~~ :19	Vented Gas Fireplace Heaters	IFGC		
Z21.8—~~1994 (R2012)~~ 94(R2017)	Installation of Domestic Gas Conversion Burners	IFGC	IMC	IRC
Z83.20—~~08~~ 2016	Gas-fired Tubular Low-intensity Infrared Heaters Outdoor Decorative Appliances	IFGC	IRC®	
Z97.1—~~2014~~ 2015(R2020)	Safety Glazing Materials Used in Buildings—Safety Performance Specifications and Methods of Test	IBC	IRC®	

APA	APA - Engineered Wood Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/A190.1—~~2017~~ 2022	Product Standard for Structural Glued-laminated Timber	IRC®

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ANSI/APA A190.1—~~2017~~ 2022	Product Standard for Structural Glued Laminated Timber	IBC
ANSI/APA PRR 410—~~16~~ 2021	Standard for Performance-Rated Engineered Wood Rim Boards	IBC
ANSI/APA PRR 410—~~2016~~ 2021	Standard for Performance-rated Engineered Wood Rim Boards	IRC®
ANSI/APA PRS 610.1—~~2018~~ 2023	Standard for Performance-Rated Structural Insulated Panels in Wall Applications	IRC®
APA PDS Supplement 1—~~12~~ 23	Design and Fabrication of Plywood Curved Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 2—~~12~~ 23	Design and Fabrication of Plywood-lumber Beams ~~(revised 2013)~~	IBC
APA PDS Supplement 3—~~12~~ 23	Design and Fabrication of Plywood Stressed-skin Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 4—~~12~~ 23	Design and Fabrication of Plywood Sandwich Panels ~~(revised 2013)~~	IBC
APA PDS Supplement 5—~~16~~ 23	Design and Fabrication of All-plywood Beams ~~(revised 2013)~~	IBC
APA T300—~~16~~ 23	Glulam Connection Details	IBC
APA X440—~~17~~ 23	Product Guide: Glulam	IBC
APA X450—~~18~~ 23	Glulam in Residential Construction—Building—Construction Guide	IBC
API	**American Petroleum Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~Publ~~ RP 2028 ~~3rd~~ 4th Edition—~~(2002, R2010)~~ (2024)	Flame Arrestors in Piping Systems	IFC
~~Publ~~ RP 2009—~~7th~~ 8th Edition ~~(2002, R2012)~~ (2022)	Safe Welding and Cutting Practices in Refineries, Gas Plants and Petrochemical Plants	IFC

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Publ 2201 ~~5th~~ 6th Edition~~—(2003, R2010)~~ (2023)	Procedures for Welding or Hot Tapping on Equipment in Service	IFC
RP 1604—3rd Edition ~~(1996 R2010)~~ (1996) (4th edition 2021)	Closure of Underground Petroleum Storage Tanks	IFC
RP 1615—(1996) (6th Edition R2020) ~~(2011)~~	Installation of Underground-petroleum Storage Systems	IFC
RP 2001—~~9th~~ 10th Edition ~~(2012)~~ (2022)	Fire Protection in Refineries~~, 8th Edition~~	IFC
RP 2003—~~8th~~ 9th Edition ~~(2015)~~ (2023)	Protection Against Ignitions Arising out of Static, Lightning and Stray Currents	IFC
RP 2023—~~3rd~~ 4th Edition ~~(2001, R2006)~~ (2023)	Guide for Safe Storage and Handling of Heated Petroleum-derived Asphalt Products and Crude-oil Residue	IFC
RP 651—~~4th~~ 5th Edition ~~(2014)~~ (2022)	Cathodic Protection of Aboveground Petroleum Storage Tanks	IFC
RP 752— ~~3rd~~ 4th Edition ~~(2009)~~ (2022)	Management of Hazards Associated with Location of Process Plant Buildings, CMA Managers Guide	IFC
Std 2000~~—7th Edition (2014)~~ (7th edition R2020) 8th edition (2023)	Venting Atmosphere and Low-pressure Storage Tanks: Nonrefrigerated and Refrigerated	IFC
Std 2015~~—8th Edition 2001 (2018)~~ (2023)	Requirements for Safe Entry and Clearing of Petroleum Storage Tanks	IFC
Std 2350— ~~4th~~ 5th Edition ~~(2012)~~ (2021)	Overfill Protection for Storage Tanks in Petroleum Facilities	IFC
Std 653 Addendum 3,~~—~~5th Edition ~~(2018)~~ (2022)	Tank Inspection, Repair, Alteration and Reconstruction	IFC

ASABE	**American Society of Agricultural and Biological Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
EP 484.3 DEC2017 (R2022)	Diaphragm Design of Metal-clad, Wood-frame Rectangular Buildings	IBC

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EP 486.3 SEP2017 (R2021)	Shallow-post and Pier Foundation Design	IBC			
EP 559.1 ~~W/Corr.~~ AUG2010~~(R2014)~~ (R2019)	Design Requirements and Bending Properties for Mechanically Laminated Wood Assemblies	IBC			
S640—JUL2017 (R2022)	Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms)	IECC®			
ASCE/SEI	**American Society of Civil Engineers Structural Engineering Institute**				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
19~~—16~~ 22	Structural Applications of Steel Cables for Buildings	IBC			
29~~—19~~ 05	Standard Calculation Methods for Structural Fire Protection	IBC			
49~~—12~~ 21	Wind Tunnel Testing for Buildings and Other Structures	IBC			
55~~—16~~ 22	Tensile Membrane Structures	IBC			
7~~—16~~ 22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	IBC	IRC®		
8~~—20~~ 21	Standard Specification for the Design of Cold-formed Stainless Steel Structural Members	IBC			
ASCE/SEI 24~~—20~~ 14	Flood Resistant Design and Construction	IFC	IRC	ISPSC	IBC
ASHRAE	**ASHRAE**				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
140~~—2014~~ 2020	~~Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs~~ Method of Test for Evaluating Building Performance Simulation Software	IECC®			

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146~~—2011~~ 2020	~~Testing~~ Method of Test for Rating Pool Heaters	IECC®		
15~~—2019~~ 2022	Safety Standard for Refrigeration Systems	IMC	IFC	
170~~—2017~~ 2021	Ventilation of Health Care Facilities	IMC	IBC	IFC
34~~—2019~~ 2022	Designation ~~and Safety~~ Classification of Refrigerants	IMC	IRC®	
55~~—2017~~ 2020	Thermal Environmental Conditions for Human Occupancy	IECC®		
62.1~~-2019~~ 2022	Ventilation for Acceptable Air Quality	ISPSC		
62.1~~—2019~~ 2022	Ventilation for Acceptable Indoor Air Quality	IMC	IEBC	IECC®
90.1~~—2016~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IMC	IECC®	
90.1~~—2019~~ 2022	Energy Standard for Buildings Except Low-rise Residential Buildings	IECC®		
90.4~~—2016~~ 2022	Energy Standard for Data Centers	IECC®		
ANSI/ASHRAE/ACCA Standard 183~~—(RA2017)~~ 2007 (RA 2020)	Peak Cooling and Heating Load Calculations in Buildings~~,~~ Except Low-rise Residential Buildings	IECC®		

ASME	American Society of Mechanical Engineers	
Standard Reference Number	**Title**	**Referenced in Code(s):**
A112.1.3—2000 (~~Reaffirmed 2020~~ 2024)	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IRC®
A112.1.3~~—2000 (R2020)~~ 2024	Air Gap Fittings for Use with Plumbing Fixtures, Appliances and Appurtenances	IPC

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A112.14.1—2003 (R2022)	Backwater Valves	IPC	
A112.14.1—2003 ~~(R2017)~~ (2022)	Backwater Valves	IRC®	
A112.14.3—~~2021~~ 2023	Grease Interceptors	IPC	
A112.14.4—2001-~~(R2017)~~ (R2022)	Grease Removal Devices	IPC	
A112.14.6—2010 ~~(R2020)~~ (R2024)	FOG (Fats, Oils and Greases) Disposal Systems	IPC	
A112.18.1—~~2020~~ /CSA B125.1 —~~2020~~ 2023	Plumbing Supply Fittings	IPC	IRC®
A112.18.2—~~2019~~ 2023/CSA B125.2—~~19~~ 2023	Plumbing Waste Fittings	IPC	
A112.18.2—~~2019~~ 2023 /CSA B125.2—~~2019~~ 2023	Plumbing Waste Fittings	IRC®	
A112.18.3~~M~~—2002~~(R2020)~~ (R2022)	Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings	IRC®	
A112.18.6—2021/CSA B125.6—21	Flexible Water Connectors	IPC	IRC®
A112.19.12—~~2019~~ 2024	Wall Mounted and Pedestal Mounted, Adjustable, Elevating, Tilting and Pivoting Lavatory, Sink, and Shampoo Bowl Carrier Systems and Drain Waste Systems	IPC	IRC®
A112.19.14—2013 (R~~2018~~ 2023)	Six-Liter Water Closets Equipped with Dual Flushing Device	IRC®	
A112.19.14—2013 ~~(R2018)~~ (R2023)	Six-liter Water Closets Equipped with a Dual Flushing Device	IPC	
A112.19.15—~~2012 () R201~~ 2012 (R2022)	Bathtub/Whirlpool Bathtubs with Pressure Sealed Doors	IPC	IRC
A112.19.19 ~~2016 (R2021)~~ — 2021	Vitreous China Nonwater Urinals	IPC	
A112.19.1—~~2020~~ 2022/CSA B45.2—~~20~~ 2022	Enameled Cast Iron and Enameled Steel Plumbing Fixtures	IPC	

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A112.19.1—~~2020~~ 2022/CSA B45.2—~~2020~~ 2022	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
A112.19.2—/CSA B45.1—~~20 2020 20~~ 2021	Ceramic Plumbing Fixtures	IPC	
A112.19.2—~~2020~~ 2021/CSA B45.1—~~2020~~ 2021	Ceramic Plumbing Fixtures	IPC	IRC®
A112.19.3—2021/CSA B45.4—~~08 (R~~2021~~)~~	Stainless Steel Plumbing Fixtures	IPC	IRC®
A112.19.5—~~2021~~ 2022/CSA B45.15—~~2021~~ 2022	Flush Valves and Spuds for Water Closets, Urinals, and Tanks	IPC	IRC®
A112.19.7-~~2012~~ 2023/CSA B45.10—~~2012 (R2021)~~ 2023	Hydromassage Bathtub Systems	IRC®	
A112.19.7—CSA B45.10—~~R 2012/ 2012 (2021)~~ 2012(R2023)	Hydromassage Bathtub Systems	IPC	
A112.21.3—~~1985 (R2017)~~ 2022	Hydrants for Utility and Maintenance Use	IPC	
A112.3.4—~~2020~~ 2022/CSA B45.9—~~20~~ 2022	Macerating Toilet Systems and Related Components	IRC®	
A112.36.2M—1991 ~~(R2017)~~ (R2022)	Cleanouts	IPC	IRC®
A112.4.14—~~2004 (R2019)~~ 2022	Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.14—~~2019~~ 2022/CSA B125.14-~~19~~ 2022	Manually Operated Valves for Use in Plumbing Systems	IPC	IRC®
A112.4.1—~~2019~~ 2024	Water Heater Relief Valve Drain Tubes	IRC®	
A112.4.2—~~2020~~ 2021/CSA B45.16—~~20~~ 2021	Water Closet Personal Hygiene Devices	IPC	
A112.4.3—~~1999 (R2020)~~ 2024	Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System	IPC	IRC®

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A112.4.4—~~2017~~ 2022	Plastic Push-Fit Drain, Waste, and Vent (DWV) Fittings	IPC		IRC®	
A112.6.1M — ~~1997(R2017)~~ 2022	Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use	IPC			
A112.6.2—~~2017~~ 2022	Framing-Affixed Supports for Off-the-Floor Water Closets with Concealed Tanks	IPC		IRC®	
A112.6.3—~~2019~~ 2022	Floor and Trench Drains	IPC		IRC®	
A112.6.4—~~2003 (R2012)~~ (R2020)	Roof, Deck, and Balcony Drains	IPC			
A112.6.7—2010 ~~(R2020)~~ (R2024)	Sanitary Floor Sinks	IPC			
A112.6.9—2005 ~~(R2020)~~ (R2024)	Siphonic Roof Drains	IPC			
A17.1—~~2019~~ 2022/CSA B44—~~19~~ 2022	Safety Code for Elevators and Escalators	IBC	IEBC	IFC	IRC®
A17.3—~~2020~~ 2023	Safety Code for Existing Elevators and Escalators	IEBC		IFC	
A18.1—~~2020~~ 2023	Safety Standard for Platform Lifts and Stairway Chairlifts	IBC	IEBC	IRC®	
ASME A17.1—~~2019~~ 2022/CSA B44—~~19~~ 2022	Safety Code for Elevators and Escalators	IPMC		IECC®	
ASME A17.1—~~2019~~ 2022/CSA B44—~~2019~~ 2022	Safety Code for Elevators and Escalators	IRC®			
ASSE 1016—~~2020~~ 2021/ASME 112.1016—~~2020~~ 2021/CSA B125.16—~~2020~~ 2021	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC		IRC®	
B1.13M—~~2006~~ 2020	Metric Screw Threads: M Profile	IMC			
B1.1—~~2003~~ 2024	Unified Inch Screw Threads, UN and UNR Thread Form	IMC			
B1.20.1—~~2019~~ 2023	Pipe Threads, General Purpose (inch)	IFGC	IMC	IPC	IRC®

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B1.20.3—~~1976~~ 2023	Dryseal Pipe Threads, Inch	IMC				
B16.12—~~2009 (R2019)~~ 2024	Cast Iron Threaded Drainage Fittings	IPC	IRC®			
B16.15—~~2013~~ 2023	Cast Alloy Threaded Fittings: ~~Classes 125 and 250~~	ISPSC				
B16.15—~~2018~~ 2023	Cast Alloy Threaded Fittings: ~~Classes 125 and 250~~	IMC	IPC	IRC®		
B16.18—~~2018~~ 2023	Cast Copper Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.22—~~2018~~ 2023	Wrought-Copper and Copper-Alloy Solder Joint Pressure Fittings	IMC	IPC	IBC	IFC	IRC®
B16.26—~~2018~~ 2023	Cast Copper Alloy Fittings for Flared Copper Tubes	IMC	IPC	IRC®		
B16.29—~~2017~~ 2022	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings (DWV)	IPC	IRC®			
B16.33—~~2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IRC®				
B16.33—~~2012(2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes $^1/_2$ through 2)	IFGC				
B16.34—~~2020~~ 2023	Valves—Flanged, Threaded and Welding End	IPC	IRC®			
B16.44—~~2012 (R2017)~~ 2022	Manually Operated Metallic Gas Valves for Use in Above-ground Piping Systems up to 5 psi	IFGC	IRC®			
B16.47—~~2020~~ 2023	Large Diameter Steel Flanges: NPS 26 through NPS 60 Metric/Inch Standard	IFGC				
B16.5—~~2019~~ 2024	Pipe Flanges and Flanged Fittings: NPS $^1/_2$ through NFPS 24 Metric/Inch Standard	IFGC	IMC			

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B16.9—~~2018~~ 2023	Factory-Made Wrought Steel Buttwelding Fittings	IMC	IPC	IRC®
B20.1—~~2021~~ 2024	Safety Standard for Conveyors and Related Equipment	IBC		
B251/B251M—2017	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube	IPSDC		
B31.12—~~2019~~ 2024	Hydrogen Piping and Pipelines	IFGC		
B31.1—~~2020~~ 2022	Power Piping	IFC		
B31.3—~~2020~~ 2022	Process Piping	IFGC	IBC	IFC
B31.4—~~2019~~ 2022	Pipeline Transportation Systems for Liquids and Slurries	IFC		
B31.5—~~2019~~ 2022	Refrigeration Piping and Heat Transfer Components	IMC	IPC	
B31.9—~~2020~~ 2023	Building Services Piping	IMC	IFC	
B36.10M—~~2018~~ 2023	Welded and Seamless Wrought-steel Pipe	IFGC	IRC®	
BPVC—~~2019~~ 2023	ASME Boiler and Pressure Vessel Code (Sections I, II, IV, V & VI, VIII)	IFGC	IMC	IFC	IRC®
CSD-1—~~2021~~ 2024	Controls and Safety Devices for Automatically Fired Boilers	IFGC	IMC	IRC®	

ASPE	**American Society of Plumbing Engineers**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
45—~~2013~~ 2018	Siphonic Roof Drainage ~~Systems~~	IPC
ASPE/IAPMO Z1034—2015 (R2020)	Test Method for Evaluating Roof Drain Performance	IPC

ASSE	**ASSE International**	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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1003—~~09~~ 2020	Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution	IPC	
1003—~~2011~~ 2020	Performance Requirements for Water-pressure-reducing Valves for Domestic Water Distribution Systems	IRC®	
1008—~~06~~ 2020	Performance Requirements for Plumbing Aspects of Food Waste Disposer Units	IPC	
1008—~~2006~~ 2020	Performance Requirements for Plumbing Aspects of Residential Food Waste Disposer Units	IRC®	
1013—~~2017~~ 2021	Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies ~~Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers~~	IRC®	
1015—~~2017~~ 2021	Performance Requirements for Double Check Backflow Prevention Assemblies ~~and Double Check Fire Protection Backflow Prevention Assemblies~~	IPC	IRC®
1018—~~2001~~ 2021	Performance Requirements for Trap Seal Primer Valves; Potable Water Supplied	IPC	IRC®
1019—~~2011~~ ~~(R2016)~~	~~Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type~~ Performance Requirements for Freeze-resistant, Wall Hydrants, Vacuum Breaker, Draining Types	IPC	IRC®
1020—~~04~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IPC	
1020—~~2004~~ 2020	Performance Requirements for Pressure Vacuum Breaker Assembly	IRC®	
1022—~~2017~~ 2021	Performance Requirements for Backflow Preventer for Beverage Dispensing Equipment	IPC	

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1023—~~1979~~ 2020	Performance Requirements for Electrically Heated or Cooled ~~Hot~~ Water Dispensers~~, Household storage type—Electrical~~	IRC®	
1024—~~2017~~ 2021	Performance Requirements for Dual Check Valve Type Backflow Preventers, Anti-siphon-type, Residential Applications	IPC	IRC®
1035—~~08~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IPC	
1035—~~2008~~ 2020	Performance Requirements for Laboratory Faucet Backflow Preventers	IRC®	
1044—~~2015~~ 2020	Performance Requirements for Trap Seal Primer Devices—Drainage Types and Electronic Design Types	IPC	IRC®
1047—~~2011~~ 2021	Performance Requirements for Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1048—~~2011~~ 2021	Performance Requirements for Double Check Detector Fire Protection Backflow Prevention Assemblies	IPC	IRC®
1049—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Chemical Waste Systems	IPC	
1050—~~2009~~ 2021	Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems	IPC	IRC®
1051—~~2009~~ 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems ~~fixture and Branch Devices~~	IPC	IRC®
1056—~~2013~~ 2021	Performance Requirements for Spill-Resistant Vacuum Breaker	IPC	IRC®

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1060—~~2016~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid-conveying Components	IRC®		
1060—~~2017~~ 2020	Performance Requirements for Outdoor Enclosures for Fluid Conveying Components	IPC		
1061—~~2015~~ 2020	Performance Requirements for Push Fit Fittings	IMC	IPC	IRC®
1062—~~2017~~ 2021	Performance Requirements for Temperature Actuated, Flow Reduction (TAFR) Valves to Individual Supply Fittings	IPC	IRC®	
1064—~~2006 (R2011)~~ 2020	Performance Requirements for Backflow Prevention Assembly Field Test Kits	IPC		
1069—~~05~~ 2020	Performance Requirements for Automatic Temperature Control Mixing Valves	IPC		
1071—~~2012~~ 2021	~~Performance Requirements for~~ Temperature Actuated Mixing Valves for Plumbed Emergency Equipment	IPC		
1072—~~07~~ 2020	Performance Requirements for Barrier Type Floor Drain Tap Seal Protection Devices	IPC		
1072—~~2007~~ 2020	Performance Requirements for Barrier-type Trap Seal Protection for Floor Drain s ~~Trap Seal Protection Devices~~	IRC®		
1079—~~2005~~ 2021	Performance Requirements for Dielectric Pipe Unions	IMC	IPC	
1081—~~2014~~ 2020	Performance Requirements for Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems	IPC	IRC®	

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5013—2015	~~Performance Requirements for Testing~~ Reduced Pressure Principle Backflow ~~Prevention Assembly~~ Preventers (RPA) and Reduced Pressure Principle Fire Protection Backflow Preventers (RFP)	IPC
ASSE/IAPMO 1055—~~2018~~ 2020	Performance Requirements for Chemical Dispensing Systems with Integral Backflow Protection	IPC

ASSP	American Society of Safety Professionals		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/ASSP Z359.1 -2020	The Fall Protection Code	IFGC	
ANSI/ASSE Z359.1—~~2019~~ 2020	The Fall Protection Code	IBC	
ANSI/ASSP Z359.1—~~2019~~ 2020	The Fall Protection Code	IMC	IFC

ASTM	ASTM International			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
A105/A105M—~~18~~ 21	Standard Specification for Carbon Steel Forgings for Piping Applications	IMC		
A106/A106M—~~2018~~ 2019a	Specification for Seamless Carbon Steel Pipe for High-temperature Service	IFGC	IMC	IRC®
A126—04(~~2014~~ 2019)	Standard Specification for Gray Iron Castings for Valves, Flanges , and Pipe Fittings	IMC	IRC®	
A181/A181M—14(2020)	Standard Specification for Carbon Steel Forgings, for General-purpose Piping	IMC		
A182/A182M—~~2018A~~ 21	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-temperature Service	ISPSC		

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A193/A193M—~~19~~ 20	Standard Specification for Alloy-steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications	IMC			
A234/A234M—~~18A~~ 19	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service	IMC			
A240/A240M—~~17~~ 20a	Standard Specification for Chromium and Chromium-~~n~~ Nickel Stainless Steel Plate, Sheet , and Strip for Pressure Vessels and for General Applications	IMC	IBC	ISPSC	IRC®
A252—~~2010(2018)~~ /A252M-19	Specification for Welded and Seamless Steel Pipe Piles	IBC			
A254—~~2010(2018)~~ /A254M-12(2019)	Specification for Copper Brazed Steel Tubing	IFGC	IMC	IRC®	
A268/A268M—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IRC®			
A268/A268—~~2010(16)~~ 20	Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service	IFGC			
A269/A269M-15a 2019	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service	IFGC	IMC	IPC	IRC®
A307—~~2014E1~~ 21	Specification for Carbon Steel Bolts ~~and~~ Studs, and Threaded Rod 60,000 ~~psi~~ PSI Tensile Strength	IRC®			
A312/A312M— ~~2018~~ 21	Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IPC			
A312/A312M—~~2018~~ 21	Standard Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IFGC	ISPSC		

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A312/A312M ~~—17~~ 21	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	IMC	
A312/A312M~~—2018~~ 21	Specification for Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes	IRC®	
A334/A334M—04a(~~2016~~ 2021)	Standard Specification for Seamless and Welded Carbon and Alloy-steel Tubes for Low-temperature Service	IMC	
A36/A36M~~—14~~ 19	Specification for Carbon Structural Steel	IBC	IRC®
A395/A395M—99(~~2014~~) 2018	Standard Specification for Ferritic Ductile Iron Pressure-retaining Castings for Use at Elevated Temperatures	IMC	
A403/A403M~~—2018A~~ 20	Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings	ISPSC	
A416/A416M~~—2017A~~ 18	Standard Specification for Low-Relaxation , ~~Uncoated~~ Seven-W~~w~~ire Steel Strand for Prestressed Concrete	IBC	
A420/A420M~~—2016~~ 20	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-temperature Service	IMC	
A463/A463M—15 (2020)e1	Standard Specification for Steel Sheet, Aluminum-coated, by the Hot-dip Process	IBC	IRC®
A53/A53M— ~~2018~~ 2020	Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated Welded and Seamless	IPC	
A53/A53M~~—2018~~ 2020	Specification for Pipe, Steel, Black and Hot Dipped Zinc-coated Welded and Seamless	IFGC	IMC IRC®
A536—84~~(2014)~~ (2019)e1	Standard Specification for Ductile Iron Castings	IMC	
A563/A563M~~—15~~ 21a	Standard Specification for Carbon and Alloy Steel Nuts	IRC®	

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A572/A572M—~~2018~~ 21e1	Specification for High-strength Low-alloy Columbium-Vanadium Structural Steel	IBC	
A588/A588M—~~15~~ 19	Standard Specification for High-~~s~~Strength Low-~~a~~ Alloy Structural Steel , ~~with~~ up to 50 ksi ~~(~~ [345 MPa~~)~~] Minimum Yield Point with Atmospheric Corrosion Resistance	IBC	
A6/A6M—~~2017A~~ 2019	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling	IBC	
A615/A615M—~~15ae1~~ 20	StandardSpecification for Deformed and Plain Carbon-~~s~~ Steel Bars for Concrete Reinforcement	IBC	
A615/A615M—~~2015aE1~~ 20	Standard Specification for Deformed and Plain Carbon- s Steel Bars for Concrete Reinforcement	IRC®	
A641/A641M—~~09a(2014)~~ 19	Specification for Zinc-coated (Galvanized) Carbon Steel Wire	IRC®	
A653/A653M—~~2017~~ 2020	Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-iron Alloy-coated (Galvannealed) by the Hot-dip Process	IRC®	
A653/A653M—~~2017~~ 2020	Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process	IBC	
A706/A706M—2016	Standard Specification for Deformed and Plain Low-~~a~~ Alloy Steel Bars for Concrete Reinforcement	IBC	IRC®
A74— ~~17~~ 2021	Specification for Cast-iron Soil Pipe and Fittings	IPC	
A74—2017	Specification for Cast-iron Soil Pipe and Fittings	IRC®	

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A755/A755M—~~2016E1~~ 18	Specification for Steel Sheet, Metallic-coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IBC	
A755M/A755M—~~2016E1~~ 18	Specification for Steel Sheet, Metallic Coated by the Hot-dip Process and Prepainted by the Coil-coating Process for Exterior Exposed Building Products	IRC®	
A778/A778M— 16(2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IPC	
A778M/A778M—~~20~~16 (2021)	Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products	IRC®	
A792/A792M—~~10(2015)~~ 21a	Specification for Steel Sheet, 55% Aluminum-zinc Alloy-coated by the Hot-dip Process	IBC	IRC®
A875/A875M—~~13~~ 21	Standard Specification for Steel Sheet, Zinc-5%, Aluminum Alloy-coated by the Hot-dip Process	IBC	IRC®
A888— ~~2018~~ 21a	Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Application	IPC	IRC®
A924/A924M—~~2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IBC	
A924M—~~2017A~~ 20	Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process	IRC®	
B101—12(2019)	Specification for Lead-coated Copper Sheet and Strip for Building Construction	IBC	IRC®
B152/B152M—~~13~~ 19	Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar	IPC	
B209—~~14~~ 21	Specification for Aluminum and Aluminum Alloy Steel and Plate	IBC	IRC®

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B210/B210M—19a	Standard Specification for Aluminum and Aluminum-alloy Drawn Seamless Tubes	IFGC				IMC		
B280—~~18~~ 20	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service	IFGC	IMC	IFC	IRC	IBC		
B306—~~13~~ 20	Specification for Copper Drainage Tube (DWV)	IPC				IRC®		
B32—~~08(2014)~~ 20	Specification for Solder Metal	IMC		IPC		IRC®		
B370—12(2019)	Specification for Copper Sheet and Strip for Building Construction	IBC				IRC®		
B42—~~15a~~ 20	Specification for Seamless Copper Pipe, Standard Sizes	IMC	IPC	IFC	IRC	IBC		
B43—~~15~~ 20	Specification for Seamless Red Brass Pipe, Standard Sizes	IMC	IPC	IBC	IFC	IRC®		
B447—12a(2021)	Specification for Welded Copper Tube	IPC		ISPSC		IRC®		
B68/B68M—~~11~~ 19	Standard Specification for Seamless Copper Tube, Bright Annealed ~~(Metric)~~	IMC		IBC		IFC		
B75/B75M—~~11~~ 20	Specification for Seamless Copper Tube	IMC		IPC		IRC®		
B819—~~2018~~ 19	Standard Specification for Seamless Copper Tube for Medical Gas Systems	IMC						
B88—~~2016~~ 20	Specification for Seamless Copper Water Tube	IFGC	IMC	IPC	IBC	IFC	ISPSC	IRC®
C1002—~~2018~~ 20	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®		
C1007—~~11a(2015)~~ 20	Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories	IBC						

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C1029—~~15~~ 20	Specification for Spray-applied Rigid Cellular Polyurethane Thermal Insulation	IBC		IRC®
C1047—~~14a~~ 19	Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base	IRC®		
C1063—~~2018B~~ 21	Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-based Plaster	IBC		IRC®
C1088—~~2018~~ 20	Specification for Thin Veneer Brick Units Made from Clay or Shale	IBC		IRC®
C1107/C1107M—~~2017~~ 20	Standard Specification for Packaged Dry, Hydraulic-cement Grout (Nonshrink)	IRC®		
C1157/C1157M—~~2017~~ 20a	Standard Performance Specification for Hydraulic Cement	IBC		
C126—~~2017~~ 19	Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	IRC®		
C1277—~~2018~~ 20	Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	IPC	IPSDC	IRC®
C1280—~~13a~~ 18	Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing	IBC		
C1283—2015(2021)	Practice for Installing Clay Flue Lining	IBC		IRC®
C1288—2017	Standard Specification for ~~Discrete Nonasbestos~~ Fiber-~~c~~ Cement Interior Substrate Sheets	IBC		IRC®
C1289—~~2018~~ 21	Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	IBC		IRC®
C1313/C1313M—13(2019)	Standard Specification for Sheet Radiant Barriers for Building Construction Applications	IBC		

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C1325—~~2018~~ 21	Standard Specification for Nonasbestos Fiber-mat Reinforced Cement Backer Units	IBC		IRC®
C1328/C1328M—~~12~~ 19	Specification for Plastic (Stucco Cement)	IBC		IRC®
C1363—~~11~~ 19	Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	IECC®		IRC®
C1364—~~2017~~ 19	Standard Specification for Architectural Cast Stone	IBC		IRC®
C140/C140M—~~2018~~ 21	Test Method Sampling and Testing Concrete Masonry Units and Related Units	IBC		
C1405—~~2016~~ 20a	Standard Specification for Glazed Brick (Single Fired, Brick Units)	IRC®		
C143/C143M—~~15A~~ 20	Test Method for Slump of Hydraulic Cement Concrete	IRC®		
C1440— ~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste, and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IPC	IPSDC	IRC
C1440—~~2017~~ 21	Specification for Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	IRC®		
C1460— ~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IPC	IPSDC	IRC®
C1460—~~2017~~ 21	Specification for Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	IRC®		

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C1461— ~~2008(2017)~~ 21	Specification for Mechanical Couplings Using Thermoplastic Elastomeric (TPE) Gaskets for Joining Drain, Waste and Vent (DWV) Sewer, Sanitary and Storm Plumbing Systems for Above and Below Ground Use	IPC	
C14—~~15a~~ 20	Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe	IPC	IRC®
C150/C150M—~~2018~~ 21	Specification for Portland Cement	IBC	IRC®
C1540— ~~2018~~ 20	Specification for Heavy Duty Shielded Couplings Joining Hubless Cast-iron Soil Pipe and Fittings	IPC	
C1563— 2008~~(201 7)~~ (2021)	Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent and Storm Piping Applications	IPC	
C1568—08~~(2013)~~ (2020)	Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method)	IBC	
C1600/C1600M—~~2017~~ 19	Standard Specification for Rapid Hardening Hydraulic Cement	IBC	
C1629/C1629M—~~2018A~~ 19	Standard Classification for Abuse-resistant Nondecorated Interior Gypsum Panel Products and Fiber-reinforced Cement Panels	IBC	
C1634—~~2017~~ 20	Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units	IRC®	
C1658/C1658M—~~2018~~ 19e1	Standard Specification for Glass Mat Gypsum Panels	IBC	IRC®
C1668—~~13a~~ 20	Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems	IRC®	

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C1670/1670M—~~2018~~ 2021a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IRC®			
C1670/C1670M—~~2018~~ 21a	Standard Specification for Adhered Manufactured Stone Masonry Veneer Units	IBC			
C1766—2015(2019)	Standard Specification for Factory-laminated Gypsum Panel Products	IBC	IRC®		
C1788—~~14~~ 20	Standard Specification for Non Metallic Plaster Bases (Lath) Used with Portland Cement Based Plaster in Vertical WallApplications	IBC			
C208—2012(2017)~~E1~~ e2	Specification for Cellulosic Fiber Insulating Board	IBC	IRC®		
C212—~~2017~~ 21	Standard Specification for Structural Clay Facing Tile	IRC®			
C216—~~2017A~~ 21	Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)	IBC	IRC®		
C22/C22M—00~~(2015)~~ (2021)	Specification for Gypsum	IBC	IRC®		
C270—~~14A~~ 19ae1	Specification for Mortar for Unit Masonry	IRC®			
C28/C28M—10~~(2015)~~ 2020	Specification for Gypsum Plasters	IBC	IRC®		
C31/C31M—~~2018B~~ 21a	Practice for Making and Curing Concrete Test Specimens in the Field	IBC			
C315—2007~~(2016)~~ (2021)	Specification for Clay Flue Liners and Chimney Pots	IFGC	IMC	IBC	IRC®
C317/C317M—2000 ~~(2015)~~ (2019)	Specification for Gypsum Concrete	IBC			
C34—2017	Standard Specification for Structural Clay ~~Load-bearing~~ Loadbearing Wall Tile	IRC®			

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C35/C35M—~~(2014)~~ 01(2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IRC®		
C35/C35—01~~(2014)~~ (2019)	Specification for Inorganic Aggregates for Use in Gypsum Plaster	IBC		
C411—~~2017~~ 2019	Test Method for Hot-surface Performance of High-temperature Thermal Insulation	IMC	IRC®	
C425— ~~2004(2018)~~ 21	Specification for Compression Joints for Vitrified Clay Pipe and Fittings	IPC	IPSDC	IRC
C443— ~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IPC		
C443—~~2012(2017)~~ 20	Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	IRC®		
C472—~~99(2014)~~ 20	Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete	IBC		
C473—~~2017~~ 2019	Test Methods for Physical Testing of Gypsum Panel Products	IBC		
C474—15(2020)	Test Methods for Joint Treatment Materials for Gypsum Board Construction	IBC		
C475M—2017	Specification for Joint Compound and Joint Tape for Finishing Gypsum Wallboard	IRC®		
C476—~~2018~~ 2020	Specification for Grout for Masonry	IRC®		
C503M/C503M—2015	Standard Specification for Marble Dimension Stone	IRC®		
C514—04~~(2014)~~ (2020)	Specification for Nails for the Application of Gypsum Board	IBC	IRC®	
C516—~~2008(2014)E1~~ 19	Specifications for Vermiculite Loose Fill Thermal Insulation	IBC		

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C547—~~2017~~ 19	Specification for Mineral Fiber Pipe Insulation	IBC	
C549—~~06(2012)~~ 18	Specification for Perlite Loose Fill Insulation	IBC	
C552—~~2017E1~~ 21a	Standard Specification for Cellular Glass Thermal Insulation	IBC	IRC®
C564—~~14~~ 20a	Specification for Rubber Gaskets for Cast-iron Soil Pipe and Fittings	IPC	IRC®
C578—~~2018~~ 19	Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation	IBC	IRC®
C59/C59M—00~~(2015)~~ (2020)	Specification for Gypsum Casting Plaster and Molding Plaster	IBC	IRC®
C595/C595M—~~2018~~ 21	Specification for Blended Hydraulic Cements	IBC	IRC®
C61/C61M—00~~(2015)~~ (2020)	Specification for Gypsum Keene's Cement	IBC	IRC®
C631—09~~(2014)~~ 2020	Specification for Bonding Compounds for Interior Gypsum Plastering	IBC	IRC®
C636/C636M—~~13~~ 19	Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels	IBC	
C652—~~2017A~~ 21	Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)	IBC	IRC®
C67/C67M—~~2018~~ 21	Test Methods of Sampling and Testing Brick and Structural Clay Tile	IBC	
C754—~~2018~~ 20	Specification for Installation of Steel Framing Members to Receive Screw-attached Gypsum Panel Products	IBC	
C76—~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	

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C76—~~2018A~~ 20	Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	IPC	IPSDC	IRC®
C840—~~2018A~~ 20	Specification for Application and Finishing of Gypsum Board	IBC		
C842—05~~(2015)~~ (2021)	Specification for Application of Interior Gypsum Plaster	IBC		IRC®
C844—2015 (2021)	Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster	IBC		IRC®
C847—~~14a~~ 2018	Specification for Metal Lath	IBC		
C887—~~13~~ 20	Specification for Packaged, Dry Combined Materials for Surface Bonding Mortar	IBC		IRC®
C897—15 (2020)	Specification for Aggregate for Job-mixed Portland Cement-based Plaster	IBC		IRC®
C926—~~2018B~~ 20b	Specification for Application of Portland Cement-based Plaster	IBC		IRC®
C932—06~~(2013)~~ (2019)	Specification for Surface-applied Bonding Compounds for Exterior Plastering	IBC		
C94/C94M—~~17A~~ 21b	Specification for Ready-mixed Concrete	IEBC		
C94/C94M—~~2017A~~ 21b	Specification for Ready-mixed Concrete	IBC		IRC®
C956—04~~(2015)~~ (2019)	Specification for Installation of Cast-in-place Reinforced Gypsum Concrete	IBC		
D1003—~~13~~ 21	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics	IECC®		
D1143/D1143M—~~2007(2013)E1~~ 20	Standard Test Methods for Deep Foundations~~~~ Elements Under Static Axial Compressive Load	IBC		

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D1227—13(2019)e1	Specification for Emulsified Asphalt Used as a Protective Coating for Roofing	IBC	IRC®	
D1557—12~~e1~~ (2021)	Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lb/ft^3 (2,700 kN m/m^3)]	IBC		
D1593—~~13~~ 19	Standard Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting	ISPSC		
D1693—15e1	Test Method for Environmental Stress-cracking of Ethylene Plastics	IMC	IRC®	
D1784—~~11~~ 20	Standard ~~Specification~~ Classification System and Basis for Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds	IRC®		
D1785— ~~2015E1~~ 21a	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IPC		
D1785—15E1	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120	IMC	ISPSC	IRC®
D1929—~~16~~ 20	Standard Test Method for Determining Ignition Temperature of Plastics	IBC		
D1970/D1970M—~~2017A~~ 21	Specification for Self-adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roof Underlayment for Ice Dam Protection	IBC	IRC®	
D2178/D2178M—15A(2021)	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	IBC	IRC®	
D2239—~~12A~~ 21	Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter	IRC®		

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D2241—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Pressure-rated Pipe (SDR-Series)	IMC	IPC	ISPSC	IRC®
D2412—~~11(2018)~~ 21	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-plate Loading	IMC			
D2466— ~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	IPC	ISPSC	IRC
D2466—~~2017~~ 21	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	IMC	ISPSC	IRC®	
D2467—~~15~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
D2487—~~2017~~ 17e1	Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	IBC			
D2513—~~2018A~~ 20	Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing and Fittings	IFGC		IRC®	
D2564— ~~2012(2018)~~ 20	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems	IMC	IPC	IRC	
D2609—~~15~~ 21	Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	IPC		IRC®	
D2626/D2626M—04 ~~(2012)e1~~ (2020)	Specification for Asphalt-saturated and Coated Organic Felt Base Sheet Used in Roofing	IBC		IRC®	
D2665— ~~2014~~ 20	Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC			
D2672—~~14~~ 20e1	Specification for Joints for IPS PVC Pipe Using Solvent Cement	IPC	ISPSC	IRC®	
D2680—~~01(2014)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping	IPC		IRC®	

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D2683—~~14~~ 20	Specification for Socket-type Polyethylene Fittings for Outside Diameter-controlled Polyethylene Pipe and Tubing	IMC	IPC	IRC®
D2737—~~12a~~ 21	Standard Specification for Polyethylene (PE) Plastic Tubing	IMC	IPC	IBC
D2822/D2822M—2005(2011)e1	Specification for Asphalt Roof Cement, Asbestos Containing	IBC		IRC®
D2843—~~16~~ 19	Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics	IBC		
D2846/D2846M— ~~2017BE1~~ 19a	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems	IPC		
D2846/D2846M—2017BE1	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-water Distribution Systems	IMC	ISPSC	IRC®
D2855— ~~2015~~ 2020	~~Standard Practice for Making Solvent-cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings~~ Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	IPC		
D2859—2016	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IBC		
D2859—~~16~~ 2016(2021)	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials	IFC		
D2949—~~10~~ 18	Specification for 3.25-in. Outside Diameter Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	IPC		IRC®
D3035—~~15~~ 21	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter	IMC	IPC	IRC®

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D312/D312M—2016~~M~~ a	Specification for Asphalt Used in Roofing	IBC	IRC®	
D3138—04(2011)	Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Non-Pressure Piping Components	IRC®		
D3139—~~98(2011)~~ 19	Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	IPC		
D3161/D3161M—~~2016A~~ 20	Test Method for Wind Resistance of Steep Slope Roofing Products (Fan Induced Method)	IBC	IRC®	
D3201/D3201M—~~13~~ 20	Test Method for Hygroscopic Properties of Fire-retardant-treated Wood and Wood-based Products	IBC	IRC®	
D3212—~~07(2013)~~ 20	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	IPC	IRC®	
D323—~~15A~~ 20a	Test Method for Vapor Pressure of Petroleum Products (Reid Method)	IFC		
D3278—~~96(2011)~~ 21	Test Methods for Flash Point of Liquids by Small Scale Closed-cup Apparatus	IMC	IBC	IFC
D3350—~~14~~ 21	Specification for Polyethylene Plastic Pipe and Fitting Materials	IRC®		
D3462/D3462M—2016	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IBC		
D3462/D3462M—~~10A~~ 19	Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	IRC®		
D3468/D3468M—99~~(2013)E1~~ (2020)	Specification for Liquid-applied Neoprene and Chlorosulfanated Polyethylene Used in Roofing and Waterproofing	IBC	IRC®	

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D3498—~~03(2011)~~ 19a	~~Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems~~ Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing	IBC	
D3679—~~2017~~ 21	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	IBC	IRC®
D3957—2009~~(2015)~~ (2020)	Standard Practices for Establishing Stress Grades for Structural Members Used in Log Buildings	IBC	
D4434/D4434M—~~2015~~ 21	Specification for Poly (Vinyl Chloride) Sheet Roofing	IBC	IRC®
D449/D449M—~~03(2014)E1~~ 2003(2021)	Specification for Asphalt Used in Dampproofing and Waterproofing	IRC®	
D4601/D4601M—04~~(2012)e1~~ (2020)	Specification for Asphalt-coated Glass Fiber Base Sheet Used in Roofing	IBC	IRC®
D4829—~~11~~ 21	Test Method for Expansion Index of Soils	IBC	IRC®
D4869/D4869M—2016A(2021)	Specification for Asphalt-saturated (Organic Felt) Underlayment Used in Steep Slope Roofing	IBC	IRC®
D4990—1997a~~(2013)~~ (2020)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IRC®	
D4990—97a(2013)	Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing	IBC	
D5055—~~2016~~ 2019e1	Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-joists	IBC	IRC®
D5456—~~2018~~ 21e1	Specification for Evaluation of Structural Composite Lumber Products	IBC	IRC®

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D56—2016A	Test Method for Flash Point by Tag Closed Cup Tester	IMC	IBC
D56—~~16a~~ 21	Test Method for Flash Point by Tag Closed Cup Tester	IFC	
D5726—98~~(2013)~~ (2020)	Specification for Thermoplastic Fabrics Used in Hot-applied Roofing and Waterproofing	IBC	IRC®
D6083/D6083M—~~2018~~ 21	Specification for Liquid Applied Acrylic Coating Used in Roofing	IBC	IRC®
D6305—~~08(2015)E1~~ 21	Practice for Calculating Bending Strength Design Adjustment Factors for Fire-retardant-treated Plywood Roof Sheathing	IRC®	
D635—~~14~~ 18	Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	IBC	
D6841—~~2016~~ 21	Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-retardant Treated Lumber	IBC	IRC®
D6878/D6878M—~~2017~~ 19	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	IBC	IRC®
D7147—~~2011(2018)~~ 21	Specification for Testing and Establishing Allowable Loads of Joist Hangers	IBC	
D7158/D7158M—~~2019~~ 20	Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)	IBC	IRC®
D7254—~~2017~~ 20	Standard Specification for Polypropylene (PP) Siding	IBC	IRC®
D7425/D7425M—13(2019)	Standard Specification for Spray Polyurethane Foam Used for Roofing Applications	IBC	IRC®
D7672—~~14E1~~ 19	Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies	IBC	IRC®

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D86~~—2017~~ 20b	Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	IBC				
D93~~—18~~ 20	Test Method for Flash Point by Pensky-Martens Closed Up Tester	IMC	IFC			
D93~~—2018~~ 20	Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	IMC	IBC	IFC		
E1007~~—16~~ 21	Test Method f or Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures	IBC				
E108~~—17~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IEBC	IFC	IRC	
E108~~—2017~~ 20a	Standard Test Methods for Fire Tests of Roof Coverings	IWUIC	IBC	IRC®		
E119~~—2018B~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IMC	IWUIC	IBC	IRC®	
E119~~—2018b~~ 20	Standard Test Methods for Fire Tests of Building Construction and Materials	IWUIC				
E136—2019a	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IFGC	IMC	IWUIC	IBC	IRC®
E136~~—16A~~ 19a	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	IEBC				
E1677~~—11~~ 19	Specification for Air Barrier (AB) Material or Systems for Low-rise Framed Building Walls	IECC®				
E1886~~—2013A~~ 19	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®			

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E1918—~~06(2016)~~ 21	Standard Test Method for Measuring Solar Reflectance of Horizontal or Low-sloped Surfaces in the Field	IECC®		
E1966—15(2019)	Standard Test Method for Fire-resistant Joint Systems	IFC	IBC	
E1980—11(2019)	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-sloped Opaque Surfaces	IECC®		
E1996—~~2017~~ 20	Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes	IBC	IRC®	
E2174—~~2018~~ 20a	Standard Practice for On-site Inspection of Installed Fire Stops	IBC		
E2178—~~13~~ 21a	Standard Test Method~~ for Air Permeance of Building Materials~~ for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials	IBC	IRC	IECC®
E2178—~~2013~~ 21a	Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permanence of Building Materials	IECC®	IRC®	
E2231—~~2018~~ 19	Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics	IMC	IRC®	
E2307—~~15BE1~~ 20	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using the Intermediate-scale, Multistory Test Apparatus	IBC		
E2336—~~16~~ 20	Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems	IMC		
E2353—~~2016~~ 21	Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards and Balustrades	IBC		

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E2393—~~10a(2015)~~ 20a	Standard Practice for On-site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers	IBC	
E2570/E2570M—07~~(2014)E1~~ (2019)	Standard Test Methods for Evaluating Water-resistive Barrier (WRB) Coatings Used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage	IRC®	
E2573—~~17~~ 19	Standard Practice for Specimen Preparation and Mounting of Site-fabricated Stretch Systems to Assess Surface Burning Characteristics	IFC	
E2579—~~15~~ 21	Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics	IFC	IBC
E2652—~~16~~ 18	Standard Test Method for ~~Behavior~~ Assessing Combustibility of Materials Using ~~in~~ a Tube Furnace with a Cone-shaped Airflow Stabilizer at 750°C	IBC	
E283/E283M—~~04(2012)~~ 19	Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences across the Specimen	IBC	
E2925—~~17~~ 19a	Standard Specification for Manufactured Polymeric Drainage and Ventilation Materials Used to Provide a Rainscreen Function	IBC	IRC®
E3082—~~17~~ 20	Standard Test Methods for Determining the Effectiveness of Fire-retardant Treatments for Natural Christmas Trees	IFC	

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E336—~~17a~~ 20	Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings	IBC	
E408—13(2019)	Test Methods for Total Normal Emittance of Surfaces Using Inspection-meter Techniques	IECC®	
E605/E605M—~~93(2015)e1~~ 19	Test Method for Thickness and Density of Sprayed Fire-resistive Material (SFRM) Applied to Structural Members	IBC	
E648—~~17a~~ 19ae1	Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source	IFC	
E736/E736M—~~2017~~ 19	Test Method for Cohesion/Adhesion of Sprayed Fire-resistive Materials Applied to Structural Members	IBC	
E779—2010(2018)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	IRC®
E779—~~10(2018)~~ 19	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	IECC®	
E84—~~18b~~ 21a	Standard Test Method for Surface Burning Characteristics of Building Materials	IFC	
E903—~~2012~~ 20	Standard Test Method Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres ~~(Withdrawn 2005)~~	IECC®	
E96/E96M—2016	Standard Test Methods for Water Vapor Transmission of Materials	IBC	IRC®
F1085—~~14~~ 19	Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels	IFC	
F1361—~~2017~~ 21	Standard Test Method for Performance of Open ~~Deep Fat~~ Vat Fryers	IECC®	

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F1476—07~~(2013)~~ (2019)	Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications	IMC	IPC
F1488—~~14E1~~ 14(2019)	Specification for Coextruded Composite Pipe	IRC®	
F1495—~~2014a~~ 20	Standard Specification for Combination Oven Electric or Gas Fired	IECC®	
F1496—~~2013~~ 13(2019)	Standard Test Method for Performance of Convection Ovens	IECC®	
F1504—~~2014~~ 21	Standard Specification for Folded Poly (Vinyl Chloride) (PVC) for Existing Sewer and Conduit Rehabilitation	IRC®	
F1554—~~2018~~ 20	Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength	IRC®	
F1667—~~2018~~ 21	Specification for Driven Fasteners: Nails, Spikes and Staples	IBC	IRC®
F1696—~~2018~~ 20	Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines	IECC®	
F1807— ~~2018~~ 19b	Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC	
F1871—~~2011~~ 20	Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation	IRC®	
F1920—~~2015~~ 20	Standard Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines	IECC®	

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F1924—~~12~~ 19	Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing	IMC	IRC®		
F1960— ~~2018~~ 21	Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC			
F1970— ~~2018~~ 19	Special Engineered Fittings, Appurtenances or Valves for Use in Poly (Vinyl Chloride) (PVC) OR Chlorinated Poly (Vinyl Chloride) (CPVC) Systems	IPC			
F1974—09~~(2015)~~ (2020)	Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Cross-linked Polyethylene/ Aluminum/Cross-linked Polyethylene Composite Pressure Pipe	IPC	IRC®		
F2006—~~17~~ 21	Standard/Safety Specification for Window Fall Prevention Devices for Nonemergency Escape (Egress) and Rescue (Ingress) Windows	IBC	IEBC	IFC	
F2080— ~~2016~~ 2019	~~Specifications for Cold-expansion Fittings with Metal Compression-sleeves for Cross-linked Polyethylene (PEX) Pipe~~ Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe	IMC	IPC	IRC	
F2090—~~17~~ 21	Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms	IBC	IEBC	IFC	IRC®
F2098— ~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Fittings	IPC			

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F2098—~~2015~~ 2018	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Insert Fittings	IMC		IRC®
F2144—~~2017~~ 21	Standard Test Method for Performance of Large Open Vat Fryers	IECC®		
F2159— ~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring , or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2159—~~2018~~ 21	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring or Alternate Stainless Steel Clamps for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	IMC		IRC®
F2200—~~17~~ 20	Standard Specification for Automated Vehicular Gate Construction	IFC		
F2306/F2306M— ~~2018~~ 20	12″ to 60″ Annular Corrugated Profile-wall Polyethylene (PE) Pipe and Fittings for Gravity Flow Storm Sewer and Subsurface Drainage Applications	IPC		
F2389— ~~2017A~~ 21	Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems	IPC		
F2389—2017A	Specification for Pressure-rated Polypropylene Piping Systems	IMC		IRC®
F2434—~~14~~ 19	Standard Specification for ~~Metal~~ Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing	IMC	IPC	IRC®

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F2561—~~17~~ 20	Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner	IPC		
F2599—~~16~~ 20	Standard Practice for The Sectional Repair of Damaged Pipe by Means of an Inverted Cured-in-Place Liner	IPC		
F2623—~~14~~ 19	Standard Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications ~~SDR9 Tubing~~	IMC	IRC®	
F2648/F2648M— ~~2017~~ 20	Standard Specification for 2 to 60 inch [50 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications	IPC		
F2735— ~~2009 (2016)~~ 21	Standard Specification for Plastic Insert Fittings for SDR9 Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	IPC		
F2764/F2764M— ~~2018~~ 19	~~Standard Specification for 30 to 60 in. [750 to 1500 mm] Polypropylene (PP) Triple Wall Pipe and Fittings for Non-pressure Sanitary Sewer Applications~~ Standard Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications	IPC		
F2769— 2018	Standard Specification for Polyethylene or Raised Temperature (PE-RT) Plastic Hot- and Cold-water Tubing and Distribution Systems	IMC	IPC	IRC
F2806—~~10(2015)~~ 20	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (Metric SDR-PR)	IMC	IRC®	

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F2831— ~~2012(2017)~~ 19	Standard Practice for Internal Non Structural Epoxy Barrier Coating Material Used in Rehabilitation of Metallic Pressurized Piping Systems	IPC			
F2855—~~12~~ 19	Standard Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing	IMC	IPC	IRC®	
F2861—~~2017~~ 20	Standard Test Method for Enhanced Performance of Combination Oven in Various Modes	IECC®			
F2881 /F2881M— ~~2018~~ 21	Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-pressure Storm Sewer Applications	IPC			
F2969—12(2020)	Standard Specification for Acrylonitrile-butadiene-styrene (ABS) IPS Dimensioned Pressure Pipe	IRC®			
F3226/F3226M—~~16~~ 19	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	IPC	IRC®		
F3240—~~17~~ 19e1	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines	IPC			
F3253—~~2017~~ 19	Standard Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot- and Cold-water Hydronic Distribution Systems	IMC	IRC®		
F437—~~15~~ 21	Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®

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F439—~~13~~ 19	Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	IMC	IPC	ISPSC	IRC®
F441/F441M—~~15~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80	IMC	IPC	IRC®	
F442/F442M—~~13E1~~ 20	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)	IRC®			
F477—14(2021)	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe	IPC	IRC®		
F493—~~14~~ 20	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings	IMC	IPC	IRC®	
F656— ~~2015~~ 21	Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings	IPC			
F667 /F667M — ~~20~~16 (2021)	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings	IPC			
F714—~~13~~ 21a	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	IMC	IRC®		
F844—~~07a(2013)~~ 19	Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use	IRC®			
F876— ~~2017~~ 20b	Specification for Cross-linked Polyethylene (PEX) Tubing	IPC			
F876—2018A	Specification for Cross-linked Polyethylene (PEX) Tubing	IMC			
F877— ~~2018A~~ 20	Specification for Cross-linked Polyethylene (PEX) Hot- and Cold-water Distribution Systems	IPC			

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G152—13(2021)	Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials	IBC
G154—2016~~A~~	Standard Practice for Operating Fluorescent Ultraviolet (UV) ~~Light~~ Lamp Apparatus for ~~UV~~ Exposure of Nonmetallic Materials	IBC
G155—~~13~~ 21	Standard Practice for Operating Xenon Arc ~~Light~~ Lamp Apparatus for Exposure of ~~Nonmetallic~~ Materials	IBC

AWC	American Wood Council		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/AWC NDS—~~2018~~ 2024	National Design Specification (NDS) for Wood Construction—with 2018 NDS Supplement	IBC	IRC®
ANSI/AWC WFCM—~~2018~~ 2024	Wood Frame Construction Manual for One- and Two-Family Dwellings	IBC	IRC®
AWC STJR—~~2021~~ 2024	Span Tables for Joists and Rafters	IBC	IRC®

AWPA	American Wood Protection Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
M4—~~15~~ 21	Standard for the Handling, Storage, Field Fabrication, and Field Treatment of ~~Care~~ of Preservative-treated Wood Products	IBC	IRC®
U1—~~20~~ 23	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):**
A5.8/A5.8—~~2011-AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IMC

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A5.8M/A5.8~~—2011-AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IPC
A5.8M/A5.8~~—2011—AMD1~~ :2019	Specifications for Filler Metals for Brazing and Braze Welding	IRC®
D1.4/D1.4M—2018-AMD1	Structural Welding Code—Steel Reinforcing Bars	IBC

AWWA	American Water Work Association			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
C110/A21.10~~—12~~ 21	~~Standard for~~ Ductile Iron & Gray Iron Fittings	IMC	IPC	IRC®
C115/A21.15~~—11~~ 20	~~Standard for~~ Flanged Ductile-iron Pipe with Ductile Iron or Grey-iron Threaded Flanges	IMC	IPC	IRC®
C153/A21.53~~—11~~ 19	Ductile-iron Compact Fittings for Water Service	IMC		IRC®
C500~~—09~~ 19	Standard for Metal-seated Gate Valves for Water Supply Service	IPC		IRC®
C507~~—15~~ 18	Standard for Ball Valves, 6 In. Through 60 in. (150 mm through 1,500 mm).	IPC		IRC®
C510~~—07~~ 17	Double Check Valve Backflow Prevention Assembly	IRC®		
C652~~—11~~ 19	Disinfection of Water-storage Facilities	IPC		
C901~~—16~~ 20	Polyethylene (PE) Pressure Pipe and Tubing, 3/4 in. (19 mm) through 3 in. (76 mm) for Water Service	IMC	IPC	IRC®
C903~~—16~~ 21	Polyethylene-aluminum-polyethylene (PE-AL-PE) Composite Pressure Pipe, 12 mm ($^1/_2$ in.) through 50 mm (2 in.), for Water Service	IRC®		

CGA	Compressed Gas Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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ANSI/CGA P-18—~~(2013)~~ (2018)	Standard for Bulk Inert Gas Systems	IFC	
C-7—~~(2014)~~ (2020)	Guide to Classification and Labeling of Compressed Gases	IFC	
S-1.1—~~(2011)~~ (2019)	Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases	IFGC	IFC
S-1.2—~~(2009)~~ 2019	Pressure Relief Device Standards—Part 2—Cargo and Portable Tanks for Compressed Gases	IFGC	IFC
S-1.3—~~(2008)~~ (2020)	Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases	IFGC	IFC
V-1—~~(2013)~~ (2021)	Standard for Gas Cylinder Valve Outlet and Inlet Connections	IFC	

CISPI	**Cast Iron Soil Pipe Institute**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
301—~~18~~ 21	Standard Specification for Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®
310—~~18~~ 20	Standard Specification for Coupling for Use in Connection with Hubless Cast-iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications	IPC	IPSDC	IRC®

CPA	**Composite Panel Association**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI A135.4—2012 (R2020)	Basic Hardboard	IBC	IRC®
ANSI A135.5—2012 (R2020)	Prefinished Hardboard Paneling	IBC	IRC®
ANSI A135.6—~~2012~~ (R2020)	Engineered Wood Siding	IBC	IRC®

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ANSI A135.7—2012 (R2020)	Engineered Wood Trim	IRC®		
CRRC	**Cool Roof Rating Council**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI/CRRC-S100—~~2020~~ 2021	Standard Test Methods for Determining Radiative Properties of Materials	IECC®		
CSA	**Canadian Standards Association**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~ANSI/CSA FC 1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-2-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems—Safety	IFGC	IMC	IRC®
~~ANSI/CSA FC1—2014~~ CSA/ANSI FC 1:21/CSA C22.2 NO. 62282-3-100:21	Fuel Cell Technologies—Part 3-100; Stationary fuel cell power systems-Safety	IFGC	IMC	
~~ANSI/CSA~~ CSA/ANSI NGV 5.1—~~2016~~ :22	Residential Fueling Appliances	IFGC		
~~CAN/~~CSA-C22.2 No. 60335-2-40 —~~2012~~ :19	~~Safety of~~ Household and Similar Electrical Appliances, Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers	IMC	ISPSC	IRC®
A257.1—~~14~~ :19	Non-reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC		
A257.2—~~14~~ :19	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings	IPC	IPSDC	IRC®
A257.3—~~14~~ : 19	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets	IPC	IPSDC	IRC®
AAMA/WDMA/CSA 101/I.S.2/A440—~~17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®
ANSI Z21.69-2015 (R2020)/CSA 6.16—~~2015~~ (R2020)	Connectors for Movable Gas Appliances	IFC	IRC	

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ANSI Z83.26/CSA 2.37—2014	Gas-fired Outdoor Infrared Patio Heaters	IFC	
ANSI/CSA/IGSHPA C448 Series —16 (R2021)	Design and Installation of Ground Source Heat Pump Systems for Commercial and Residential Buildings	IMC	IRC®
ASME A112.18.1—~~2018~~ 2022/CSA B125.1—~~18~~ :22	Plumbing Supply Fittings	IPC	
ASME A112.18.1—~~2018~~ 2023/CSA B125.1—~~2018~~ :23	Plumbing Supply Fittings	IRC®	
ASME A112.18.2—2019/CSA B125.2—~~2019~~ 2023	Plumbing Waste Fittings	IRC®	
ASME A112.18.2—~~2015~~ 2023/CSA B125.2—~~2015~~ 2023	Plumbing Waste Fittings	IPC	
ASME A112.18.6—~~2017~~/CSA B125.6— 17(R2022)	Flexible Water Connectors	IPC	
ASME A112.19.1—~~2018~~ 2023/CSA B45.2—~~18~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IRC®	
ASME A112.19.1—~~2020~~ 2023/CSA B45.2—~~20~~ :23	Enameled Cast-iron and Enameled Steel Plumbing Fixtures	IPC	
ASME A112.19.2—~~2018~~ 2023/CSA B45.1—~~18~~ :23	Ceramic Plumbing Fixtures	IRC®	
ASME A112.19.2—~~2020~~ :23/B45.1—~~2020~~ :23	Ceramic Plumbing Fixtures	IPC	
ASME A112.19.3—~~2017~~ 2022/CSA B45.4—~~2017~~ 22	Stainless Steel Plumbing Fixtures	IRC®	
ASME A112.19.3—~~2021~~ 2022/CSA B45.4— ~~2021~~ :22	Stainless Steel Plumbing Fixtures	IPC	
ASME A112.19.5—~~2021~~ 22/CSA B45.15—~~21~~ 22	Flush Valves and Spuds for Water Closets, Urinals and Tanks	IPC	
ASME A112.19.7—2020/CSA B45.10 :20~~1221 2012 (R20)~~	Hydromassage Bathtub Systems	IPC	

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ASME A112.3.4~~—2013~~ 2018/CSA B45.9—18 (R2023)	Macerating Toilet Systems and Related Components	IRC®		
ASME A112.3.4—2018/CSA B45.9— 2018 ~~18~~ (R2023)	Macerating Toilet Systems and Waste Pumping Systems for Plumbing Fixtures	IPC		
ASME A112.4.2~~—2020~~ 2021/CSA B45.16—~~20~~ 21	Personal Hygiene Devices for Water Closet s	IPC		
ASME A112.4.2~~—2015~~ 2021/CSA B45.16—~~15~~ 21	Personal Hygiene Devices for Water-closet s	IRC®		
ASME A17.1/CSA B44~~—2019~~ 2022	Safety Code for Elevators and Escalators	IRC®		
ASME A17.1—~~2019~~ 2023/CSA B44-— 23	Safety Code for Elevators and Escalators	IBC		
ASME A17.7—2007/CSA B44.7 —~~07(R2017)~~ 07(R2021)	Performance-based Safety Code for Elevators and Escalators	IBC		
ASSE 1002—2020/ASME A112.1002—2020/CSA B125.12 —2020	Anti-Siphon Fill Valves for Water Closet Tanks	IPC		
ASSE 1016—2017/ASME 112.1016—2017/CSA B125.16 —~~2017~~ (R2022)	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	IPC	IRC®	
ASSE 1037—~~2015~~ 2020/ASME A112.1037—~~2015~~ 2020/CSA B125.37—~~15~~ :20	Performance requirements for Pressurized Flushing Devices for Plumbing Fixtures	IPC		
ASSE 1070—2020/ASME A112.1070—2020/CSA B125.~~1070~~— :20	Performance requirements for Water Temperature Limiting Devices	IPC		
ASSE 1070—~~2015~~ 2020/ASME A112.1070—~~2015~~ 2020/CSA B125.70—~~15~~ :20	Performance Requirements for Water-temperature-limiting Devices	IRC®		
B125.3—~~18~~ :23	Plumbing Fittings	IPC	IRC®	
B137.10—~~17~~ :23	Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Composite Pressure-pipe Systems	IMC	IPC	IRC®

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B137.11~~—17~~ :23	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	IMC	IPC		IRC®
B137.18~~—17~~ :23	Polyethylene of Raised Temperature Resistance (PE-RT) Tubing Systems for Pressure Applications	IMC	IPC		IRC®
B137.1~~—17~~ : 23	Polyethylene (PE) Pipe, Tubing and Fittings for Cold-water Pressure Services	IMC	IPC		IRC®
B137.2~~—17~~ :23	Polyvinylchloride (PVC) Injection-moulded Gasketed Fittings for Pressure Applications	IMC	IPC	ISPSC	IRC®
B137.3~~—17~~ :23	Rigid ~~Poly (Vinyl Chloride)~~ polvinylchloride (PVC) Pipe and Fittings for Pressure Applications	IMC	IPC	IPSDC ISPSC	IRC®
B137.5~~—17~~ :23	Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications	IMC	IPC		IRC®
B137.6~~—17~~ :23	Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot- and Cold-water Distribution Systems	IMC	IPC	ISPSC	IRC®
B137.9~~—17~~ :23	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-pipe Systems	IMC	IPC		IRC®
B181.1~~—18~~ :21	Acrylonitrile-Butadiene-Styrene ABS Drain, Waste and Vent Pipe and Pipe Fittings	IPC	IPSDC		IRC®
B181.2~~—18~~ :21	Polyvinylchloride PVC and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings	IPC	IPSDC		IRC®
B181.3~~—18~~ :21	Polyolefin and Polyvinylidene Fluoride (PVDF) Laboratory Drainage Systems	IPC			IRC®
B182.13~~—18~~ :21	Profile Polypropylene (PP) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC			
B182.1~~—18~~ :21	Plastic Drain and Sewer Pipe and Pipe Fittings	IPC	IPSDC		IRC®

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B182.2~~—18~~ :21	PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.4~~—18~~ :21	Profile Polyvinylchloride PVC Sewer Pipe and Fittings	IPC	IPSDC	IRC®
B182.6~~—18~~ :21	Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-proof Sewer Applications	IPC		IRC®
B182.8~~—18~~ :21	Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings	IPC		IRC®
B481.1—12(R2017)	Testing and Rating of Grease Interceptors Using Lard	IPC		
B481.3—12(R2017)	Sizing, Selection, Location and Installation of Grease Interceptors	IPC		
B483.1~~—07(R2017)~~ :22	Drinking Water Treatment Systems	IPC		IRC®
B55.1—~~2015~~ 20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		IRC®
B55.2—~~2015~~ :20	Drain Water Heat Recovery Units	IRC®		
B602~~—16~~ :20	Mechanical Couplings for Drain, Waste and Vent Pipe and Sewer Pipe	IPC	IPSDC	IRC®
B64.1.1~~—11(R2016)~~ :21	Atmospheric Type Vacuum Breakers, (AVB)	IPC		IRC®
B64.1.2~~—11(R2016)~~ :21	Pressure Vacuum Breakers, (PVB)	IPC		IRC®
B64.1.3~~—11(R2016)~~ :21	Spill-r~~R~~esistant p~~P~~ressure v~~V~~acuum b~~B~~reakers (SRPVB)	IPC		IRC®
B64.10—17	~~Manual for the~~ Selection and Installation of Backflow ~~Prevention Devices~~ Preventers	IPC		
B64.2.1.1~~—11(2016)~~ :21	Hose Connection Dual Check Vacuum Breakers (HCDVB)	IPC		IRC®

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B64.2.1~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, (HCVB) with Manual Draining Feature	IPC	
B64.2.1~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers (HCVB) with Manual Draining Feature	IRC®	
B64.2.2~~—11(2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB) with Automatic Draining Feature	IPC	IRC®
B64.2~~—11(R2016)~~ :21	Hose Connection Vacuum Breakers, ~~Type~~ (HCVB)	IPC	IRC®
B64.3~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)	IRC®	
B64.3~~—11(R2016)~~ :21	Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP)	IPC	
B64.4.1~~—11(2016)~~ :21	Reduced Pressure Principle backflow preventers for Fire ~~Sprinklers (RPF)~~ protection systems (RPF)	IPC	IRC®
B64.4.1~~—11(R2016)~~ :21	Reduced Pressure Principle for Fire Sprinklers (RPF)	IPC	
B64.4~~—11(2016)~~ :21	Reduced Pressure Principle ~~Type~~ (RP) Backflow Preventers~~,~~	IRC®	
B64.4~~—11(R2016)~~ :21	Backflow Preventers, Reduced Pressure Principle Type (RP)	IPC	
B64.5.1~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)	IPC	
B64.5.1~~—11(2016)~~ :21	Double Check Valve Backflow Preventers, Type for Fire Systems (DCVAF)	IRC®	
B64.5~~—11(R2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IPC	
B64.5~~—11(2016)~~ :21	Double Check Valve Backflow Preventers (DCVA)	IRC®	

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B64.6~~—11(2016)~~ :21	Dual Check Valve Backflow Preventers (DuC)	IRC®		
B64.6~~—11(R2016)~~ :21	Dual Check Valve (DuC) Backflow Preventers	IPC		
B64.7~~—11(2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IRC®		
B64.7~~—11(R2016)~~ :21	Laboratory Faucet Vacuum Breakers (LFVB)	IPC		
B79—08(R2018)	Commercial and Residential Drains and Cleanouts	IPC		
C22.2 No. 108—14(R2019)	Liquid Pumps	ISPSC		
C22.2 No. 236—15	Heating and Cooling Equipment	IMC	ISPSC	IRC®
CSA B45.5~~—17~~ :22/IAPMO Z124 ~~—2017 with errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IPC		
CSA B45.5~~—2017~~ :22/IAPMO Z124~~—2017 with Errata dated August 2017~~ 2022	Plastic Plumbing Fixtures	IRC®		
CSA B55.1~~—2015~~ :20	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	IECC®		
CSA B55.2~~—2015~~ :20	Drain Water Heat Recovery Units	IECC®	IRC®	
CSA B805~~-18-~~ 17/ICC 805-2018 (R2023)	Rainwater Harvesting Systems	IPC		
CSA O325~~—16~~ :21	Construction Sheathing	IRC®		
CSA/ANSI NGV 2~~—2016~~ :19	Compressed Natural Gas Vehicle Fuel Containers	IFC		
CSA/ANSI NGV 5.1~~—2016~~ :22	Residential Fueling Appliances	IFC		
CSA/ANSI NGV 5.2~~—2017~~ :22	Vehicle Fueling Appliances (VFA)	IFGC	IFC	
Z21.56a/CSA 4.7—2017	Gas Fired Pool Heaters	ISPSC		

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CTI	Cooling Technology Institute		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ATC 105DS—~~2018~~ 2019	Acceptance Test Code for Dry Fluid Coolers	IECC®	
ATC 105S—~~11~~ 2021	Acceptance Test Code for Closed Circuit Cooling Towers	IECC®	
CTI STD 201 RS~~(17)~~ 2021	Performance Rating of Evaporative Heat Rejection Equipment	IECC®	

DASMA	Door & Access Systems Manufacturers Association International		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/DASMA 105—~~2017~~ 2020	Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors	IECC®	IRC®
ANSI/DASMA 107—~~2017~~ 2020	Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation	IBC	

DHA	Decorative Hardwoods Association		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/HPVA HP-1—~~2016~~ 2022	American National Standard for Hardwood and Decorative Plywood	IBC	IRC®

DOC	U.S. Department of Commerce		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
PS 1—~~19~~ 22	Structural Plywood	IBC	IRC®
PS 20—~~05~~ 20	American Softwood Lumber Standard	IBC	IRC®
PS 2—18	Performance Standard for Wood-~~based~~ Structural-~~use~~ Panels	IBC	IRC®

FEMA	Federal Emergency Management Agency

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Standard Reference Number	Title	Referenced in Code(s):	
FEMA TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Area	IRC®	
FEMA TB-2—~~08~~ 23	Flood Damage-resistant Materials Requirements	IRC®	
FEMA-TB-11—~~01~~ 23	Crawlspace Construction for Buildings Located in Special Flood Hazard Areas	IBC	
FGIA	**Fenestration & Glazing Alliance (formerly AAMA)**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
711—~~20~~ 23	Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products	IBC	IRC®
712—~~14~~ 23	Voluntary Specification for Mechanically Attached Flexible Flashing	IRC®	
714—~~20~~ 23	Voluntary Specification for Liquid Applied Flashing Used to Create a Water-resistive Seal around Exterior Wall Openings in Buildings	IBC	IRC®
AAMA/NSA 2100—~~20~~ 22	Specifications for Sunrooms	IRC®	
AAMA/WDMA/CSA 101/I.S.2/A ~~C~~440—~~17~~ 22	North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights	IECC®	
FM	**FM Approvals**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
4474—~~2011~~ 2020	American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures	IBC	IRC®
GA	**Gypsum Association**		

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Standard Reference Number	Title	Referenced in Code(s):
GA 216—~~2018~~ 2021	Application and Finishing of Gypsum Panel Products	IBC
GA 600—~~2018~~ 2021	Fire-resistance and Sound Control Design Manual, ~~22nd~~ 23rd Edition	IBC
GA-253—~~2018~~ 2021	Application of Gypsum Sheathing	IRC®

IAPMO	IAPMO Group	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/CAN/IAPMO Z1001—~~2016~~ 2021	Prefabricated Gravity Grease Interceptors	IPC
ASPE/IAPMO Z1034-2015(R2020)	Test Method for Evaluating Roof Drain Performance	IPC
CSA B45.5—~~17~~ :22 /IAPMO Z124—~~2017~~ 2022 ~~with errata dated August 2017~~	Plastic Plumbing Fixtures	IPC
IAPMO Z124.7—2013(R2018)	Prefabricated Plastic Spa Shells	ISPSC
IAPMO/ANSI Z1157—2014e1(R2019)	Ball Valves	IPC

IES	Illuminating Engineering Society	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/ASHRAE/IES~~NA~~ 90.1—~~2019~~ 2022	Energy Standard for Buildings, Except Low-rise Residential Buildings	IECC®

IIAR	International Institute of Ammonia Refrigeration	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IIAR 2—~~2014, including Addendum A~~ 2021	Design of Safe Closed-circuit Ammonia Refrigeration Systems	IFC

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ANSI/IIAR 9—~~2018~~ 2020	~~Standard for Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) for Existing Closed-circuit Ammonia Refrigeration Systems~~ Minimum System Safety Requirements for Existing Closed-Circuit Ammonia Refrigeration Systems	IFC

IKECA	International Kitchen Exhaust Cleaning Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/IKECA C10—~~2016~~ 2021	Standard for the Methodology for Cleaning of Commercial Kitchen Exhaust Systems	IFC

MHI	Material Handling Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI MH29.1—~~08~~ 2020	Safety Requirements for Industrial Scissors Lifts	IBC
ANSI/MH16.1—~~12~~ 2021	Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

MSS	Manufacturers Standardization Society of the Valve and Fittings Industry			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
ANSI SP 58—~~2018~~ 2023	Pipe Hangers and Supports—Materials, Design and Manufacture, Selection, Application and Installation	IFGC	IMC	IRC®
SP-110—~~2010~~ 2023	Ball Valves, Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends (incl. a 2010 Errata Sheet)	IPC		IRC®
SP-122—~~2017~~ 2023	Plastic Industrial Ball Valves	IPC		IRC®
SP-139—~~2014~~ 2022	Copper Alloy Gate, Globe, Angle and Check Valves for Low Pressure/Low Temperature Plumbing Applications	IPC		IRC®

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SP-42—~~2013~~ 2022	Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends (Glasses 150, 300 & 600)	IRC®	
SP-67—~~2011~~ 2022	Butterfly Valves	IPC	IRC
SP-70—~~2011~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	IRC®
SP-70—~~2013~~ 2023	Gray Iron Gate Valves, Flanged and Threaded Ends	IPC	
SP-72—~~2010a~~ 2023	Ball Valves with Flanged or Butt-welding Ends for General Service	IPC	IRC®
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IPC	
SP-78—~~2011~~ 2023	Cast Iron Plug Valves, Flanged and Threaded Ends	IRC®	
SP-80—~~2013~~ 2019	Bronze Gate, Globe, Angle and Check Valves	IPC	IRC®

NBBI	National Board of Boiler and Pressure Vessel Inspectors	
Standard Reference Number	**Title**	**Referenced in Code(s):**
NBIC—~~2017~~ 2023	National Board Inspection Code, Part 3 (ANSI/NB23)	IMC

NCMA	National Concrete Masonry Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
TEK 5—~~84~~ B(2005)	~~Details~~ Detailing ~~for~~ Concrete Masonry Fire Walls	IBC

NEMA	National Electrical Manufacturers Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
250—~~2018~~ 2020	Enclosures for Electrical Equipment (1,000 Volt Maximum)	IFC
~~NEMA~~ ANSI Z535.1—2017	~~ANSI/NEMA Color Chart~~ American National Standard for Safety Colors	ISPSC

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NEMA MG1—2016	Motors and Generators	IECC®

NFPA	National Fire Protection Association				
Standard Reference Number	**Title**	**Referenced in Code(s):**			
02—~~19~~ 23	Hydrogen Technologies Code	IFC			
04—~~21~~ 24	Standard for Integrated Fire Protection and Life Safety System Testing	IBC	IFC		
105—~~19~~ 22	Standard for Smoke Door Assemblies and Other Opening Protectives	IMC	IPMC	IBC	IFC
10—~~21~~ 22	Standard for Portable Fire Extinguishers	IPMC	IBC	IFC	
110—~~19~~ 22	Standard for Emergency and Standby Power Systems	IBC	IFC		
111—~~19~~ 22	Standard on Stored Electrical Energy Emergency and Standby Power Systems	IBC	IFC		
1123—~~18~~ 22	Code for Fireworks Display	IFC			
1124—~~06~~ 22	Code for the Manufacture, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles	IFC			
1124—~~17~~ 22	Code for the Manufacture, Transportation and Storage of Fireworks and Pyrotechnic Articles	IBC	IFC		
1125—~~17~~ 22	Code for the Manufacture of Model Rocket and High-power Rocket Motors	IFC			
1142—~~17~~ 22	Standard on Water Supplies for Suburban and Rural Fire Fighting	IFC			
11—~~16~~ 21	Standard for Low-, Medium, and High Expansion Foam	IBC	IFC		
12A—~~18~~ 22	Standard on Halon 1301 Fire Extinguishing Systems	IPMC	IBC	IFC	

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12~~—15~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IBC			
12~~—18~~ 22	Standard on Carbon Dioxide Extinguishing Systems	IPMC	IFC		
13D~~—19~~ 22	Standard for the Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes	IBC	IFC	IRC®	
13R~~—19~~ 22	Standard for the Installation of Sprinkler Systems in Low-rise Residential Occupancies	IBC	IFC	IRC®	
13~~—19~~ 22	Standard for Installation of Sprinkler Systems, 2022 and 2019 editions	IBC	IFC		
14~~—19~~ 22	Standard for the Installation of Standpipe and Hose System	IBC	IFC		
15~~—17~~ 22	Standard for Water Spray Fixed Systems for Fire Protection	IFC			
170~~—18~~ 21	Standard for Fire Safety and Emergency Symbols	IBC	IFC		
2001~~—18~~ 22	Standard on Clean Agent Fire Extinguishing Systems	IPMC	IBC	IFC	
204~~—18~~ 21	Standard for Smoke and Heat Venting	IPMC	IFC		
20~~—19~~ 22	Standard for the Installation of Stationary Pumps for Fire Protection	IBC	IFC		
211~~—19~~ 22	Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances	IFGC	IMC	IBC	IRC®
221~~—21~~ 24	Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls	IBC			
22~~—18~~ 23	Standard for Water Tanks for Private Fire Protection	IFC			
232~~—17~~ 22	Standard for the Protection of Records	IFC			

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241—~~19~~ 22	Standard for Safeguarding Construction, Alteration and Demolition Operations	IFC	
24—~~19~~ 22	Standard for Installation of Private Fire Service Mains and Their Appurtenances	IFC	
252—~~17~~ 22	Standard Methods of Fire Tests of Door Assemblies	IBC	
253—~~19~~ 23	Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	IBC	IFC
257—~~17~~ 22	Standard for Fire Test for Window and Glass Block Assemblies	IBC	
259—~~18~~ 23	Standard Test Method for Potential Heat of Building Materials	IBC	IRC®
25—~~20~~ 23	Standard for the Inspection, Testing and Maintenance of Water-based Fire Protection Systems	IPMC	IFC
260—~~19~~ 23	Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture	IFC	
261—~~18~~ 23	Standard Method of Test for Determining Resistance of Mock-up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes	IFC	
262—~~19~~ 23	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces	IMC	
265—~~19~~ 23	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

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268—~~19~~ 22	Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source	IBC	
275—~~17~~ 22	Standard Method of Fire Tests for the Evaluation of Thermal Barriers	IBC	IRC®
276—19	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components	IBC	
276—~~15~~ 23	Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	IRC®	
285—~~19~~ 22	Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior ~~Nonload-bearing Wall Assemblies Containing Combustible Components~~	IBC	
286—~~15~~ 23	Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth	IBC	
288—~~17~~ 22	Standard Methods of Fire Tests of Horizontal Fire Door Assemblies Installed in Horizontal in Fire-resistance ~~related floor Systems~~ Rated Assemblies	IBC	
289—~~19~~ 23	Standard Method of Fire Test for Individual Fuel Packages	IBC	IFC
2—19	Hydrogen Technologies Code	IFGC	IMC
30A—~~21~~ 24	Code for Motor Fuel Dispensing Facilities and Repair Garages	IFGC / IMC	IBC / IFC
30B—~~19~~ 23	Code for the Manufacture and Storage of Aerosol Products	IFC	
30—~~21~~ 24	Flammable and Combustible Liquids Code	IBC	IFC

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318—~~18~~ 22	Standard for the Protection of Semiconductor Fabrication Facilities	IFC		
32—~~16~~ 21	Standard for Dry Cleaning Facilities	IBC	IFC	
33—~~18~~ 21	Standard for Spray Application Using Flammable or Combustible Materials	IFC		
34—~~18~~ 21	Standard for Dipping, Coating and Printing Processes Using Flammable or Combustible Liquids	IFC		
35—~~16~~ 21	Standard for the Manufacture of Organic Coatings	IFC		
37—~~18~~ 21	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	IFGC	IMC	
385—~~17~~ 22	Standard for Tank Vehicles for Flammable and Combustible Liquids	IFC		
400—~~19~~ 22	Hazardous Materials Code	IFC		
407—~~17~~ 22	Standard for Aircraft Fuel Servicing	IFC		
409—~~16~~ 22	Standard ~~for~~ on Aircraft Hangars	IFGC	IBC	IFC
40—~~19~~ 22	Standard for the Storage and Handling of Cellulose Nitrate Film	IBC	IFC	
418—~~16~~ 21	Standard for Heliports	IBC		
45—~~19~~ 23	Standard on Fire Protection Laboratories Using Chemicals (2015 Edition)	IBC	IFC	
484—~~19~~ 22	Standard for Combustible Metals	IBC	IFC	
495—~~18~~ 23	Explosive Materials Code	IFC		
498—~~18~~ 23	Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives	IFC		

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501—~~17~~ 22	Standard on Manufactured Housing	IRC®			
505—~~18~~ 23	Fire Safety Standard for Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance and Operation	IFC			
51—~~18~~ 23	Design and Installation of Oxygen-fuel Gas Systems for Welding, Cutting and Allied Processes	IFGC	IPC	IFC	
52—~~19~~ 22	Vehicular Gaseous Fuel System Code	IFC			
55—~~19~~ 23	Compressed Gases and Cryogenic Fluids Code	IPC	IFC		
56—~~20~~ 23	Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems	IFC			
58—~~17~~ 23	Liquefied Petroleum Gas Code	IFGC			
58—~~20~~ 23	Liquefied Petroleum Gas Code	IMC	IBC	IFC	IRC®
59A—~~19~~ 22	Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG)	IFC			
655—~~17~~ 19	Standard for the Prevention of Sulfur Fires and Explosions	IBC	IFC		
68—~~13~~ 23	Standard on Explosion Protection by Deflagration Venting	IFC			
701—~~19~~ 23	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	IBC	IFC		
703—~~21~~ 24	Standard for Fire Retardant-treated Wood and Fire-retardant Coatings for Building Materials	IFC			
704—~~17~~ 22	Standard System for the Identification of the Hazards of Materials for Emergency Response	IMC	IBC	IFC	

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72—~~19~~ 22	National Fire Alarm and Signaling Code	IMC				
750—~~19~~ 23	Standard on Water Mist Fire Protection Systems	IPMC	IBC	IFC		
76—~~16~~ 20	Standard for the Fire Protection of Telecommunications Facilities	IFC				
77—~~14~~ 24	Recommended Practice on Static Electricity	IFC				
780—~~17~~ 23	Standard for the Installation of Lightning Protection Systems	IFC				
80—~~19~~ 22	Standard for Fire Doors and Other Opening Protectives	IMC	IPMC	IBC	IFC	
85—~~19~~ 23	Boiler and Combustion System Hazards Code	IFGC	IMC	IBC	IFC	IRC®
86—~~19~~ 23	Standard for Ovens and Furnaces	IFC				
88A—~~19~~ 23	Standard for Parking Structures	IFGC				
914—~~19~~ 23	Code for Fire Protection of Historic Structures	IFC				
92—~~18~~ 21	Standard for Smoke Control Systems	IMC	IBC	IFC		
96—~~20~~ 24	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations	IMC	IFC			
99—~~21~~ 24	Health Care Facilities Code	IMC	IPC	IBC	IFC	
~~1221~~ 1225—~~19~~ 2022	Standard for the ~~Installation, Maintenance and Use of~~ Emergency Services Communications ~~Systems~~	IFC				
NFPA 101—~~21~~ 24	Life Safety Code	IEBC				
NFPA 13R—19	Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height	IEBC				

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NFPA 99—21	Health Care Facilities Code	IEBC	
NFRC	**National Fenestration Rating Council, Inc.**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
100—~~2020~~ 2023	Procedure for Determining Fenestration Products *U*-factors	IECC®	IRC®
200—~~2020~~ 2023	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence	IECC®	IRC®
203—~~2017~~ 2023	~~Procedure for Determining Translucent Fenestration Product Visible Transmittance at Normal Incidence~~ Procedure for Determining Visible Transmittance of Tubular Daylighting Devices	IECC®	
400—~~2020~~ 2023	Procedure for Determining Fenestration Product Air Leakage	IECC®	IRC®
NSF	**NSF International**		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
14—~~2017~~ 2020	Plastic Piping System Components and Related Materials	IMC	IRC®
14—~~2018~~ 2020	Plastic Piping System Components and Related Materials	IPC	
184—~~2014~~ 2019	Residential Dishwashers	IPC	
18—~~2016~~ 2020	Manual Food and Beverage Dispensing Equipment	IPC	
350—~~2017a~~ 2020	Onsite Residential and Commercial Water Reuse Treatment Systems	IPC	IRC®
358-1—~~2017~~ 2021	Polyethylene Pipe and Fittings for Water-based Ground-source "Geothermal" Heat Pump Systems	IMC	IRC®

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358-3~~—2016~~ 2021	Cross-linked Polyethylene (PEX) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
358-4~~—2017~~ 2018	Polyethylene of Raised Temperature (PE-RT) Pipe and Fittings for Water-based Ground-source (Geothermal) Heat Pump Systems	IMC	IRC®
359~~—2011(R2016)~~ 2018	Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems	IPC	IRC®
372~~—2016~~ 2020	Drinking Water Systems Components—Lead Content	IPC	IRC®
3~~—2017~~ 2019	Commercial Warewashing Equipment	IPC	
40~~—2018~~ 2020	Residential Wastewater Treatment Systems	IPSDC	
41~~—2016~~ 2018	Nonliquid Saturated Treatment Systems (Composing Toilets)	IPSDC	IRC®
42~~—2017~~ 2021	Drinking Water Treatment Units—Aesthetic Effects	IRC®	
50~~—2017~~ 2020	Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities	IPC	IRC®
53~~—2017~~ 2020	Drinking Water Treatment Units—Health Effects	IPC	IRC®
58~~—2017~~ 2020	Reverse Osmosis Drinking Water Treatment Systems	IPC	IRC®
61~~—2018~~ 2020	Drinking Water System Components—Health Effects	IPC	IRC®
62~~—2017~~ 2021	Drinking Water Distillation Systems	IPC	IRC®

PDI	Plumbing and Drainage Institute	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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PDI G101 ~~(2012)~~ (2017)	Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of ~~Sizing and~~ Installation ~~Data~~ and Maintenance	IPC

PHTA	Pool & Hot Tub Alliance (formerly APSP)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/APSP/ICC 15~~—2011~~ 2021	American National Standard for Residential Swimming Pool and Spa Energy Efficiency ~~Includes Addenda A Approved January 9, 2013~~	ISPSC
ANSI/APSP/ICC 16~~—2017~~ 2022	American National Standard for Suction Outlet Fittings (SOFA) for Use in Pools, Spas, and Hot Tubs	ISPSC
ANSI/APSP/ICC 4~~—2012~~ 2022	American National Standard for Aboveground/Onground Residential Swimming Pools~~—Includes Addenda A Approved April 4, 2013~~	ISPSC
ANSI/APSP/ICC/NPC 12 - ~~2016~~ 2023	American National Standard for the Plastering of Swimming Pools	ISPSC

PLIB	Pacific Lumber Inspection Bureau (formerly WCLIB)	
Standard Reference Number	**Title**	**Referenced in Code(s):**
AITC 200~~—09~~ 20	Manufacturing Quality Control Systems Manual for Structural Glued Laminated Timber	IBC

PSAI	Portable Sanitation Association International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~PSAI/ANSI~~ ANSI/PSAI Z4.3~~—~~2016	American National Standard: for Sanitation: ~~for~~ Non-sewered Waste-disposal Systems : Minimum Requirements	IPC

RESNET	Residential Energy Services Network, Inc.	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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ANSI/RESNET/ICC 301—~~2019~~ 2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index	IECC®
ANSI/RESNET/ICC 380—~~2019~~ 2022	Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems	IECC®

RMI	**Rack Manufacturers Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/MH16.1—~~12~~ 21	~~Specification for~~ Design, Testing and Utilization of Industrial Steel Storage Racks	IBC

SDI	**Steel Deck Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SDI-~~QA/QC~~ SD—~~2017~~ 2022	~~Standard for Quality Control and Quality Assurance for Installation of Steel Deck~~ Standard for Steel Deck	IBC

SJI	**Steel Joist Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
SJI 100—2020	45th Edition Standard Specifications, Load Tables and Weight Tables for K-Series, LH-Series, DLH-Series and Joist Girders	IBC

SMACNA	**Sheet Metal and Air Conditioning Contractors' National Association, Inc.**			
Standard Reference Number	**Title**	**Referenced in Code(s):**		
~~SMACNA/ANSI~~ ANSI/SMACNA 4th Edition—~~2016~~ 2020	HVAC Duct Construction Standards—Metal and Flexible, ~~4th Edition (ANSI)~~ (ANSI/SMACNA 006-2020)	IFGC	IMC	IRC®

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~~SMACNA/ANSI~~ ANSI/SMACNA ~~—~~ 2nd edition 2013	Round Industrial Duct Construction Standards~~, 3rd Edition~~ (ANSI/SMACNA 005-2013)	IMC
~~SMACNA/ANSI~~ ANSI/SMACNA ~~—2011~~ 2nd Edition 2004	Rectangular Industrial Duct Construction Standards, ~~2nd Edition~~ (ANSI/SMACNA 002-2004)	IMC
SMACNA~~—~~ 1st edition 2015	~~SMACNA~~ Phenolic Duct Construction Standards~~, 1st Edition (ANSI)~~ (ANSI/SMACNA 022-2015)	IMC
SMACNA~~—10~~ 2021	Fibrous Glass Duct Construction Standards ~~7th~~ 8th edition	IRC®
SMACNA~~—2010~~ 2021	Fibrous Glass Duct Construction Standards~~, 7th Edition~~ 8th edition	IMC
SMACNA~~—~~2nd edition 2012	HVAC Air Duct Leakage Test Manual ~~Second Edition~~ (ANSI/SMACNA 016-2012)	IECC®

SPRI	**Single-Ply Roofing Institute**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/SPRI GT-1~~—2016~~ 21	Test Standard for Gutter Systems	IBC
ANSI/SPRI VF-1~~—17~~ 21	External Fire Design Standard for Vegetative Roofs	IBC
ANSI/SPRI/FM 4435-ES-1~~—17~~ 21	Wind Test Design Standard for Edge Systems Used with Low Slope Roofing Systems	IBC

TIA	**Telecommunications Industry Association**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI/TIA 222-~~H—2017~~ I-2023	Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures	IBC

TMS	**The Masonry Society**

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Standard Reference Number	Title	Referenced in Code(s):	
216—~~2013~~ 14 (19)	~~Standard Method~~ Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies	IBC	
302—2018	Standard Method for Determining the Sound Transmission ~~Class~~ Rating s for Masonry ~~Walls~~ Assemblies	IBC	
402—~~2016~~ 2022	Building Code Requirements for Masonry Structures	IBC	IRC®
404—~~2016~~ 2023	Standard for the Design of Architectural Cast Stone	IBC	IRC®
504—~~2016~~ 2023	Standard for the Fabrication of Architectural Cast Stone	IBC	
602—~~2016~~ 2022	Specification for Masonry Structures	IBC	IRC®
604—~~2016~~ 2023	Standard for the Installation of Architectural Cast Stone	IBC	

TPI	Truss Plate Institute		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
ANSI/TPI 1—~~2014~~ 2022	National Design Standard for Metal-plate-connected Wood Truss Construction	IBC	IRC®

UL	UL LLC		
Standard Reference Number	**Title**	**Referenced in Code(s):**	
1004-1—12	Rotating Electrical Machines General Requirements—with revisions through ~~August 2018~~ November 2020	ISPSC	
1026—2012	Electric Household Cooking and Food Serving Appliances—with revisions through ~~July 2018~~ March 2021	IRC®	

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103—2010	Factory-built Chimneys, for Residential Type and Building Heating Appliances—with Revisions through ~~March 2017~~ September 2021	IFGC	IMC	IBC	IRC®	
1042—2009	Electric Baseboard Heating Equipment—with revisions through ~~December 2016~~ February 2021	IRC®				
1081—2016	Swimming Pool Pumps, Filters and Chlorinators—with revisions through ~~October 2017~~ July 2020	ISPSC				
109—97	Tube Fittings for Flammable and Combustible Fluids, Refrigeration Service and Marine Use with revisions through May 2020	IMC				
10A—2009	Tin Clad Fire Doors—with Revisions through July 20, 2018	IBC				
10B—2008	Fire Tests of Door Assemblies—with Revisions through ~~February 2015~~ May 2020	IBC				
10C—2016	Positive Pressure Fire Tests of Door Assemblies - with revisions through May 2021	IBC	IFC			
10D—2017	~~Standard for~~ Fire Tests of Fire Protective Curtain Assemblies	IBC				
1240—2005	Electric Commercial Clothes-Drying Equipment—with revisions through ~~March 2018~~ September 2021	IMC				
1261—2001	Electric Water Heaters for Pools and Tubs—with revisions through September 2017	IMC				
1275—~~2014~~ 2021	Flammable Liquid Storage Cabinets~~—with revisions through February 2018~~	IFC				
127—2011	Factory-built Fireplaces—with Revisions through ~~July 2016~~ February 2020	IFGC	IMC	IBC	IECC®	IRC®

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1316—~~1994~~ 2018	~~Glass~~ Fiber Reinforced ~~Plastic~~ Underground ~~Storage~~ Tanks for ~~Petroleum Products~~, ~~Alcohols and Alcohol-gasoline Mixtures~~ Flammable and Combustible Liquids—with revisions through ~~May 2006~~ March 2019	IFC		
1369—18	~~Standard for~~ Aboveground Piping for Flammable and Combustible Liquids -with revisions through August 2020	IMC		
1370—11	Unvented Alcohol Fuel Burning Decorative Appliances—with revisions through March ~~25,~~ 2016	IMC		
1389—~~2017~~ 19	Plant Oil Extraction ~~Units~~ Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations - with revisions through October 2020	IFC		
142—2006	Steel Aboveground Tanks for Flammable and Combustible Liquids—with revisions through ~~August 2014~~ January 2021	IFC		
1479—2015	Fire Tests of Penetration Firestops with revisions through May 2021	IMC	IBC	IRC®
1482—2011	Solid-fuel Type Room Heaters—with Revisions through ~~August 2015~~ February 2020	IMC	IBC	IRC®
1489—2016	Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids -with revisions through October 2021	IBC	IFC	
14B—2008	Sliding Hardware for Standard Horizontally Mounted Tin Clad Fire Doors—with Revisions through ~~July 2017~~ September 2021	IBC		
14C—2006	Swinging Hardware for Standard Tin Clad Fire Doors Mounted Singly and in Pairs—with Revisions through ~~July 2017~~ October 2021	IBC		

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1563—2009	Standard for Electric Spas, Hot Tubs and Associated Equipment —with revisions through ~~October 2017~~ September 2020	IMC	ISPSC	IRC®
1703—2002	Flat-plate Photovoltaic Modules and Panels—with Revisions through ~~September 2018~~ November 2019	IBC		IRC®
1738—2010	Venting Systems for Gas Burning Appliances, Categories II, III and IV ~~with revisions through November 2014~~ August 2021	IFGC		IRC®
1741—2010	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through ~~February 2018~~ June 2021	IBC	IFC	IRC®
174—04	Household Electric Storage Tank Water Heaters—with revisions through ~~December 2016~~ October 2021	IMC		
1777—~~2007~~ 2015	Chimney Liners—with Revisions through April ~~2014~~ 2019	IFGC	IMC	IBC
1784—2015	Air Leakage Tests of Door Assemblies-with revisions through February 2020	IBC		
180—~~2012~~ 2019	Liquid-level Indicating Gauges for Oil Burner Fuels and Other Combustible Liquids—with revisions through ~~May 2017~~ August 2021	IMC		IRC®
1812—2013	Ducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
1815—2012	Nonducted Heat Recovery Ventilators—with revisions through ~~July 2018~~ April 2021	IMC		
181—~~05~~ 13	Factory-made Air Ducts and Air Connectors~~—with revisions through April 2017~~	IMC		

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1887—04	Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~July 2017~~ October 2021	IMC			
1897—2015	Uplift Tests for Roof Covering Systems with revisions through September 2020	IBC	IRC®		
1974—~~2017~~ 2018	~~Standard for~~ Evaluation for Repurposing Batteries	IFC			
1978—2010	Grease Ducts—with revisions through ~~April 2017~~ October 2021	IMC			
1994—2015	Luminous Egress Path Marking Systems with revisions through July 2020	IBC	IFC		
1996—2009	Electric Duct Heaters—with revisions through ~~July 2016~~ September 2021	IMC	IRC®		
2011—2019	Outline for investigation for Machinery with revisions through October 2020	IFC			
2017—2008	General-purpose Signaling Devices and Systems—with revisions through ~~January 2016~~ December 2016	IFC	ISPSC		
2024—2014	~~Safety Optical fiber~~ Cable Routing Assemblies and Communications Cable Raceway —with revisions through August 2015	IMC			
2075—2013	~~Standard for~~ Gas and Vapor Detectors and Sensors-with Revisions through ~~December 2017~~ August 2021	IMC	IBC	IFC	IRC®
2079—2015	Tests for Fire Resistance of Building Joint Systems - with revisions through July 2020	IBC	IFC		
207—2009	Refrigerant-containing Components and Accessories, Nonelectrical—with revisions through ~~June 2014~~ January 2020	IMC			

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2152—~~2016~~ 2021	Outline of Investigation for Special Purpose Nonmetallic Containers and Tanks for Specific Combustible or Noncombustible Liquids	IFC				
2158A—2013	~~Outline of Investigation for~~ Clothes Dryer Transition Duct—with revisions through ~~April 2017~~ October 2021	IFGC	IMC	IRC®		
2158—~~2018~~ 2021	Electric Clothes Dryers	IMC				
2162—2014	~~Outline of Investigation for~~ Commercial Wood-fired Baking Ovens—Refractory Type - with revisions through August 2019	IMC				
217—2015	Single and Multiple Station Smoke Alarms—with Revisions through ~~November 2016~~ April 2021	IBC	IFC	IRC®		
2196—2017	~~Standard for~~ Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables - with revisions through December 2020	IBC	IFC			
2200—~~2012~~ 2020	Stationary Engine Generator Assemblies~~—with Revisions through October 2015~~	IFGC	IMC	IBC	IFC	IRC®
2208—2010	Solvent Distillation Units—with revisions through June 2020	IFC				
2518—2016	Air Dispersion Systems - with revisions June 2021	IMC				
2524—2019	~~Standard for~~ In-building 2-way Emergency Radio Communication Enhancement Systems - revisions through February 2019	IFC				
263—11	Fire Test~~s~~ of Building Construction and Materials—with Revisions through ~~March 2018~~ August 2021	IBC				
268A—2008	Smoke Detectors for Duct Application—with revisions through August ~~2016~~ 2020	IMC				

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268—2016	Smoke Detectors for Fire Alarm Systems-with revisions through ~~July 2016~~ October 2019	IMC	IPMC	IBC	IFC	IRC®
2703—2014	Mounting Systems, Mounting Devices, Clamping/Retention Devices and Ground Lugs for Use with Flat-plate Photovoltaic Modules and Panels-with Revisions through ~~December 2019~~ March 2021	IBC		IRC®		
2846—2014	Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics—with revisions through ~~December 2016~~ January 2021	IMC				
300—~~2005~~ 2019	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment~~—with revisions through December 2014~~	IFC				
30—1995	Metal Safety Cans—with revisions through ~~June 2014~~ September 2019	IFC				
325—2017	Door, Drapery, Gate, Louver and Window Operations and Systems with revisions through February 2020	IBC		IFC		IRC®
343—~~2017~~ 2008	Pumps for Oil-burning Appliances with revisions through December 2017	IMC		IRC®		
372—2007	Automatic Electrical Controls for Household and Similar Use—Part 2: Particular Requirements for Burner Ignition Systems and Components—with revisions through ~~July 2012~~ June 2012	ISPSC				
391—2010	Solid-fuel and Combination-fuel Central and Supplementary Furnaces—with revisions through ~~June 2014~~ August 2019	IMC				
399—2017	Drinking-Water Coolers—with revisions through ~~August 2018~~ July 2020	IPC				

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427—11	Standard for Refrigerating Units with revisions through February 2014	IMC		
430—2015	Waste Disposers—with revisions through ~~February 2018~~ September 2021	IPC		
441—16	Gas Vents—with revisions through ~~July 2016~~ August 2019	IRC®		
471—2010	Commercial Refrigerators and Freezers—with revisions through ~~November 2018~~ September 2019	IMC		
484—14	~~Standard for~~ Room Air Conditioners with revisions through May 2019	IMC		
507—2017	Electric Fans—with revisions through ~~August 2018~~ May 2020	IMC	IRC®	
508—2018	Industrial Control Equipment with revisions through July 2021	IMC	IPC	IRC®
515—2015	~~Standard for~~ Electric~~al~~ Resistance Trace Heating for Commercial Applications	IECC®		
536—~~2014~~ 2021	Flexible Metallic Hose	IMC	IRC®	
555C—2014	Ceiling Dampers—with Revisions through ~~May 2017~~ January 2021	IMC	IBC	
555S—2014	Smoke Dampers—with Revisions through October ~~2016~~ 2020	IMC	IBC	
555—2006	Fire Dampers—with Revisions through October ~~2016~~ 2020	IBC		
55A—2004	Materials for Built-up Roof Coverings	IBC	IRC®	
580—2006	Test for Uplift Resistance of Roof Assemblies—with Revisions through ~~October 2018~~ March 2019	IBC	IRC®	

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60335-2-1000-17	~~Standard for~~ Household and Similar Electrical Appliances: Particular Requirements for Electrically Powered Pool Lifts~~,~~ ~~with revisions through September 29, 2017~~	ISPSC		
60601-1—2003	Medical Electrical Equipment, Part I: General Requirements for Safety - with revisions through April 2006	IFC		
60950-1—~~2014~~ 2007	Information Technology Equipment—Safety Requirements with revisions through May 2019	IFC		
61730-1—2017	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction - with revisions through April 2020	IBC	IRC®	
61730-2—2017	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing - with revisions through April 2020	IBC	IRC®	
62368-1—~~2014 19~~	Audio/video, Information and Communication Technology Equipment—Safety Requirements - with revisions through October 2021	IFC		
651—2011	Schedule 40 and Schedule 80~~, Type EB and A~~ Rigid PVC Conduit and Fittings—with Revisions through ~~June 2016~~ March 2020	IFGC	IRC®	
705—2017	Power Ventilators—with revisions through ~~October 2018~~ August 2021	IFGC	IMC	IRC®
710B—2011	Recirculating Systems—with Revisions through ~~August 2014~~ February 2019	IMC	IBC	IFC
710—12	Exhaust Hoods for Commercial Cooking Equipment—with Revisions through ~~November 2013~~ February 2021	IECC®		

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791—2006	~~Standard for~~ Residential Incinerators—with revisions through ~~November 2014~~ February 2021	IMC		IFC
795—2016	Commercial-Industrial Gas Heating Equipment with revisions through 2020	IFGC		IRC®
80—2007	Steel Tanks for Oil-burner Fuels and Other Combustible Liquids—with revisions through ~~January 2014~~ April 2019	IFC		IRC®
817—2015	~~Standard for~~ Cord Sets and Power-supply Cords—with revisions through ~~August 2018~~ September 2021	IFC		
834—04	Heating, Water Supply and Power Boilers Electric—with revisions through ~~September 2018~~ July 2019	IMC		
834—2004	Heating, Water Supply and Power Boilers—Electric—with revisions through ~~September 2018~~ July 2019	IRC®		
842—~~2015~~ 2019	Valves for Flammable Fluids—~~with revisions through May 2015~~	IMC		IRC®
858—2014	Household Electric Ranges—with revisions through ~~June 2018~~ September 2019	IMC		IRC®
864—2014	Control Units and Accessories for Fire Alarm Systems—with Revisions through ~~March 2018~~ May 2020	IMC	IBC	IFC
867—2011	Electrostatic Air Cleaners—with revisions through August ~~2018~~ 2021	IMC		
875—09	Electric Dry-bath Heaters—with revisions through ~~September 2017~~ January 2021	IRC®		

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87A—2015	Power-operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent—with revisions through ~~June 2017~~ September 2019	IFC		
923—2013	Microwave Cooking Appliances—with revisions through ~~July 2017~~ August 2020	IMC	IRC®	
924—2016	Standard for Safety Emergency Lighting and Power Equipment—with Revisions through May ~~2018~~ 2020	IBC	IFC	
9540A—~~2017~~ 2019	Standard for Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems	IFC		
9540—~~2016~~ 2020	Energy Storage Systems and Equipment - with revisions through April 2021	IFC	IRC®	
959—2010	Medium Heat Appliance Factory-built Chimneys—with Revisions through ~~June 2014~~ August 2019	IFGC	IMC	IRC®
9—2009	Fire Tests of Window Assemblies—with Revisions through ~~February 2015~~ March 2020	IBC		
UL/CSA 60335-2-40—~~17~~ 2019	Household and Similar Electrical Appliances—Safety—Part 2-~~40~~: Particular Requirements for ~~Electrical Heat Pumps, Air-Conditioners and Dehumidifiers~~ Motor-Compressors	IMC		
UL/CSA 60335-2-89—~~17~~ 21	Household and Similar Electrical Appliances—Safety—Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor	IMC		

WDMA	Window and Door Manufacturers Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**

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AAMA/WDMA/CSA 101/I.S.2/A440—~~17~~ 22	Specifications for Windows, Doors and Unit Skylights	IBC	IECC®	IRC®
I.S. 11—~~16~~ 23	Industry Standard Analytical Method for Design Pressure (DP) Ratings of Fenestration Products	IRC®		

WMA	**World Millwork Alliance (formerly Association of Millwork Distributors Standards AMD)**	
Standard Reference Number	**Title**	**Referenced in Code(s):**
ANSI WMA 100—~~2018~~ 2023	Standard Method of Determining Structural Performance Ratings of Side-Hinged Exterior Door Systems and Procedures for Component Substitution	IRC®

Reason: The CP28 Code Development Policy, Section 4.6 requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Change Proposal for consideration by the Administrative Code Change Committee. In September 2021, a letter was sent to each developer of standards that is referenced in the International Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Listed are the referenced standards that are to be updated based upon responses received from standard developers.

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

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Existing Building

52

R10774		/S58-22 Part I			
Date Submitted	03/05/2024	**Section**	109.3.5	**Proponent**	Mo Madani
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -EB.

Summary of Modification

Clarifies gypsum as a panel product

Rationale

See attached

R10774Text Modification

See attached

Mod10774_TextOfModification.pdf

Page: 1

R10774Text Modification

S58-22 Part I

Original Proposal

IBC: [A] 110.3.6, 1512.3; IEBC: [A] 109.3.5, [BS] 705.3

Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC STRUCTURAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-B CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Existing Building Code

Revise as follows:

[A] 109.3.5 Lath or gypsum ~~board~~panel product inspection. Lath and gypsum ~~board~~panel inspections shall be made after lathing and gypsum ~~board~~ panel products, interior and exterior, is in place but before any plastering is applied or before gypsum~~board~~ panel product joints and fasteners are taped and finished.

Exception: Gypsum ~~board~~panels that ~~is~~ are not part of a fire-resistance-rated assembly or a shear assembly.

[BS] 705.3 Roof recovering. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum ~~board~~panel products, mineral fiber, glass fiber or other*approved* materials securely fastened in place.

Reason: Gypsum board is a type of gypsum panel product. These two sections erroneously use the term board instead of panel. Exterior products are often glass mat, which are panels but not boards, so panel is the appropriate term here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Simple editorial cleanup with no impact on cost.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: Approved as submitted as per the provided reason statement. (Vote: 14-0)

Final Hearing Results

S58-22 Part I AS

Page: 1

Mod_10774_Text_S58-22 Part I.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Existing Building

53

R10647 | **/EB35-22**

Date Submitted	03/04/2024	**Section**	401.2	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Pending Review				
Commission Action	Pending Review			Staff Classification	Correlates Directly

Comments

General Comments No

Related Modifications

This section is covered under section 401.3 of the 2023 FBC - EB.

Summary of Modification

The clarification that work needed to facilitate repairs should not be considered an alteration project is added to Section 401.2.

Rationale

See attached

R10647Text Modification

See attached

Page: 1

Mod10647_TextOfModification.pdf

R10647Text Modification

EB35-22

Original Proposal

IEBC: 401.2

Proponents: David Bonowitz, David Bonowitz, S.E., FEMA-ATC Seismic Code Support Committee (dbonowitz@att.net); Kelly Cobeen, Wiss Janney Elstner Associates, Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, FEMA, FEMA (mike.mahoney@fema.dhs.gov)

2021 International Existing Building Code

Revise as follows:

401.2 Compliance. The work shall not make the building less complying than it was before the *repair* was undertaken. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to requirements for alterations.

Reason: This proposal restores a useful provision from the 2015 IEBC Prescriptive and Work Area methods that was lost when repair provisions were consolidated into what is now Chapter 4.
The provision in question was not intentionally deleted when that consolidation was made by EB10-15, whose reason statement does not mention it at all. Rather, it was inadvertently dropped when the EB10-15 proponents selected the Work Area method as the basis for the new Repairs chapter, because that method was more complete in general. The loss of this useful provision came to light only in 2019 when the 2018 IEBC started to be adopted and used.

The clarification that work needed to facilitate repairs should not be considered an alteration project is added to Section 401.2. This provision was previously in 2015 IEBC Sections 404.1 and 502.3, excerpted below for reference. The wording proposed here is essentially identical.

For reference, here is the text of 2015 IEBC Sections 404.1 and 502.3:
404.1 General. Buildings and structures, and parts thereof, shall be repaired in compliance with Sections 401.2 and 404. **Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter.** Routine maintenance required by Section 401.2 [sic], ordinary repairs exempt from permit in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

502.3 Related work. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the provisions of Chapter 7, 8, 9, 10, or 11.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal should not change the cost of any construction because it merely reflects a common understanding that was in the IEBC until it was inadvertently removed in 2018. If anything, the proposal could reduce the cost of some repairs if code officials are interpreting the current code differently.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee felt that this was a reasonable allowance. Work only being done as a result of a repair should not be considered an alteration. Classifying as an alteration could unnecessarily trigger other code requirements. (Vote: 14-0)

Page: 1

Mod_10647_Text_EB35-22.pdf

R10647Text Modification

Final Hearing Results

EB35-22 AS

Mod_10647_Text_EB35-22.pdf Page: 2

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

54

R11383		/RB20-22			
Date Submitted	03/26/2024	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Section R902.3 is marked reserved in the 2023 FBC -R.

Summary of Modification

Modifies text of Definition to "BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) SYSTEM". Modifying reference in Section R902.3.

Rationale

See attached

R11383Text Modification

See attached

Mod11383_TextOfModification.pdf

Page: 1

R11383Text Modification

RB20-22

Original Proposal

IRC: SECTION 202, R902.3

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

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

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

Reason: The term “BIPV product” is used twice in the I-codes, both requiring fire classification for roofing applications (IBC Section 1505.8 and IRC Section R902.3). The term “BIPV system” is used four times in the I-codes, addressing roof access, rapid shutdown systems, and fire classification for roofing applications (IBC Sections 1205.2, 1205.2.3, 3111.3.2, 3113.3). IRC Section R324.5.2 directs BIPV systems to have a fire classification in accordance with Section R902.3.
The word “system” is defined by the dictionary as “a combination of things or parts forming a complex or unitary whole”, whereas the word “product” is defined as “the totality of goods or services that a company makes available; something produced”. “Product” infers a discrete piece, whereas “system” better describes a number of components that when installed function together for a specific purpose. This proposal also clarifies that these systems, when installed per the manufacturer’s installation instructions, become an integral part of the building envelope to provide a physical separator between internal and external environments.

The types of BIPV systems that include “*exterior wall envelopes* and *exterior wall coverings*, and *fenestration*” are added because FS150-21 in Group A added these types of BIPV systems to Chapter 14 of the IBC, and there is another proposal for this cycle to add these types of systems to Chapter 7 of the IRC.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

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

This proposal clarifies the term as it is used in the codes.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11383_Text_RB20-22.pdf

R11383Text Modification

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

Final Hearing Results

RB20-22 AS

Mod_11383_Text_RB20-22.pdf Page: 2

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

55

R11571 | **/RB261-22**

Date Submitted	04/01/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.

Rationale

See attached

R11571Text Modification

See attached

Page: 1

Mod11571_TextOfModification.pdf

R11571Text Modification

RB261-22

Original Proposal

IRC: SECTION 202, R324.5.1, R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), R905.16, R905.16.1, R905.16.2, R905.16.4, R905.16.5, R905.16.6, TABLE R905.16.6,

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Delete without substitution:

~~[RB] PHOTOVOLTAIC SHINGLES~~. ~~A *roof covering* that resembles shingles and that incorporates *photovoltaic modules*.~~

Add new definition as follows:

BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING. A BIPV system that also functions as a roof covering. Coverings include, but not limited to, shingles, tiles, and roof panels.

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*~~ *BIPV roof coverings* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV

Page: 1

Mod_11571_Text_RB261-22.pdf

R11571Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
~~Photovoltaic shingles~~ BIPV roof coverings	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from $2\frac{1}{2}$ units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		
~~Photovoltaic shingles~~ BIPV roof coverings	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

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

R905.16 ~~Photovoltaic~~ BIPV shingles. The installation of ~~*photovoltaic*~~ BIPV shingles shall comply with the provisions of this section, Section R324 and NFPA 70.

R905.16.1 Deck requirements. ~~*Photovoltaic*~~ BIPV shingles shall be applied to a solid or closely-fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.

R905.16.2 Deck slope. ~~*Photovoltaic*~~ BIPV shingles shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

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Mod_11571_Text_RB261-22.pdf

R11571Text Modification

R905.16.4 Material standards. ~~*Photovoltaic*~~ BIPV shingles shall be *listed* and *labeled* in accordance with UL 7103 or with both UL 61730-1 and UL 61730-2.

R905.16.5 Attachment. ~~*Photovoltaic*~~ BIPV shingles shall be attached in accordance with the manufacturer's installation instructions.

R905.16.6 Wind resistance. ~~*Photovoltaic*~~ BIPV shingles shall comply with the classification requirements of Table R905.16.6 for the appropriate maximum basic wind speed.

TABLE R905.16.6 Classification of ~~Photovoltaic~~ BIPV Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD}, FROM TABLE R301.2.1.3 (mph)	UL 7103 SHINGLE CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mile per hour = 1.609 kph.

R324.5.1 ~~Photovoltaic~~ BIPV shingles. ~~Photovoltaic~~ BIPV shingles shall comply with Section R905.16.

Reason: For the definitions, there are different forms of BIPV roof coverings, just as there are different forms of traditional roof coverings. The code defines roof coverings in general, and the different forms are described in Chapter 9 for their specific application. This change aligns with the change to the definition of BIPV Systems, which clarifies this type of photovoltaic solar energy system.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This provides clarity and consistency in terminology related to BIPV used as roof assemblies and roof coverings.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal aligns the text with the change to the definition of BIPV systems. The proposal also corrects the terminology related to BIPV used as roof assemblies and roof coverings (Vote: 10-0)

Page: 3

Mod_11571_Text_RB261-22.pdf

R11571Text Modification

Final Hearing Results

RB261-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

56

R11478		/RB146-22			
Date Submitted	03/27/2024	**Section**	324.5	**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 No

Related Modifications

Summary of Modification

This proposal recognizes that BIPV systems can be in the form of roofing, exterior wall coverings, or fenestration.

Rationale

See attached

R11478Text Modification

See attached

Mod11478_TextOfModification.pdf

Page: 1

R11478Text Modification

RB146-22

Original Proposal

IRC: R324.5, R324.5.1, R324.5.2, R324.5.3, R324.5.2 (New)

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, National Association of State Fire Marshals, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic (BIPV) systems ~~that serve as roof coverings~~ shall be designed and installed in accordance with Section ~~R905~~ Sections R324.5.1 through R324.5.2.

R324.5.1 ~~Photovoltaic shingles~~ BIPVroofing systems. ~~Photovoltaic shingles~~ BIPV roofing systems shall comply with Section R905.16. BIPV roof panels shall comply with Section R905.17.

~~R324.5.2~~R324.5.1.1 Fire classification. *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section R902.3.

~~R324.5.3 BIPV roof panels.~~ ~~BIPV roof panels shall comply with Section R905.17~~.

Add new text as follows:

R324.5.2 BIPV Exterior wall coverings and fenestration. BIPV exterior wall coverings and fenestration shall comply with Section R705.

Reason: This proposal recognizes that BIPV systems can be in the form of roofing, exterior wall coverings, or fenestration.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This recognizes other types of BIPV systems that are available for installation, and does not limit to just roofing applications.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded this proposal recognizes that BIPV may be more than just roof systems and makes the required adjustments to the IRC. This is a correlation with RB240-22. (Vote 10-0)

Page: 1

Mod_11478_Text_RB146-22.pdf

R11478Text Modification

Final Hearing Results

RB146-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

57

R11567		/RB254-22			
Date Submitted	04/01/2024	**Section**	302.2.3	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

The purpose of this proposal is to use common terminology throughout section 905 in regard to roof decks and sheathing. The subsections under 905 cover different roof coverings and are organized similar to each other, but with variation in titles.

Rationale

See attached

R11567Text Modification

See attached

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R11567Text Modification

RB254-22

Original Proposal

IRC: R302.2.3, R302.2.4, R902.1, R905.1.1, R905.2.1, R905.3.1, R905.3.2, R905.3.6, R905.4.1, R905.4.2, R905.4.4.1, R905.5.1, R905.5.2 R905.6.1, R905.6.2, R905.7.1, R905.7.1.1, R905.7.2, R905.8.1, R905.8.1.1, R905.8.2, R905.10.1, R905.16.1, R905.16.2, R905.17.1, R905.17.2

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

2021 International Residential Code

Revise as follows:

R302.2.3 Continuity. The fire-resistance-rated wall or assembly separating *townhouse units shall be continuous from the* foundation to the underside of the roof sheathing, *roof deck* or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures.*

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

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

   Exception: A parapet is not required in the preceding two cases where the roof covering complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the ~~roof decking~~ *roof deck* or sheathing is of *noncombustible materials* or fire-retardant-treated wood for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the *roof deck* are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 and R803.2.1.2.

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

R902.1 Roof covering materials. ~~Roofs~~ *Roof decks* shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the *roof deck* is less than 3 feet (914 mm) from a *lot line*. Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible *roof decks.*
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible *roof decks.*
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible *roof decks*.

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate

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and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a*label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the *roof deck* material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a*label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the *roof deck* material, shall be applied over all joints in the*roof deck* ~~decking~~. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

R905.2.1 Sheathing requirements. Asphalt shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed decks~~.

R905.3.1 ~~Deck~~ Sheathing requirements. Concrete and clay tile shall be installed~~only~~ over ~~solid sheathing.~~ *wood structural panels* or solid lumber sheathing.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in*Seismic Design Categories* A, B and C.

R905.3.2 ~~Deck slope~~ Slope. Clay and concrete roof tile shall be installed on roof slopes of $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) or greater. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (25-percent slope) to 4 units vertical in 12 units horizontal (33-percent slope), double *underlayment* application is required in accordance with Section R905.3.3.

R905.3.6 Fasteners. Nails shall be corrosion resistant and not less than 11-gage [0.120 inch (3 mm)], $^5/_{16}$-inch (11 mm) head, and of sufficient length to penetrate the *roof deck* not less than $^3/_4$ inch (19 mm) or through the thickness of the *roof deck*, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

R905.4.1 ~~Deck~~ Sheathing requirements. *Metal roof shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing ~~applied to a solid or closely fitted deck,~~ except where the roof covering is specifically designed to be applied to spaced lumber sheathing.

R905.4.2 ~~Deck slope~~ Slope. *Metal roof shingles* shall not be installed on roof slopes below 3 units vertical in 12 units horizontal (25-percent slope).

R905.4.4.1 Wind resistance of metal roof shingles.*Metal roof shingles* ~~applied~~ fastened to wood structural panels, solid lumber sheathing or closely-fitted lumber sheathing ~~a solid or closely fitted deck~~ shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. *Metal roof shingles* tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1.

R905.5.1 ~~Deck~~ Sheathing requirements. Mineral-surfaced roll roofing shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly sheathed roofs~~.

R905.5.2 ~~Deck slope~~ Slope. Mineral-surfaced roll roofing shall not be applied on roof slopes below 1 unit vertical in 12 units horizontal (8-percent slope).

R905.6.1 ~~Deck~~ Sheathing requirements. Slate shingles shall be fastened to *wood structural panels* or solid lumber sheathing. ~~solidly~~

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~~sheathed roofs.~~

R905.6.2 ~~Deck slope~~ Slope. Slate shingles shall be used only on slopes of 4 units vertical in 12 units horizontal (33-percent slope) or greater.

R905.7.1 ~~Deck~~ Sheathing requirements. Wood shingles shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~installed on solid or spaced sheathing~~. Where spaced lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

R905.7.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring the application of an ice barrier.

R905.7.2 ~~Deck slope~~ Slope. Wood shingles shall be installed on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.8.1 ~~Deck~~ Sheathing requirements. Wood shakes shall be fastened to *wood structural panels*, solid lumber sheathing, or spaced lumber sheathing. ~~used only on solid or spaced sheathing~~. Where spaced lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced lumber sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

R905.8.1.1 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, *wood structural panels* or solid lumber sheathing is required on that portion of the *roof deck* requiring an ice barrier.

R905.8.2 ~~Deck slope~~ Slope. Wood shakes shall only be used on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

R905.10.1 ~~Deck~~ Sheathing requirements. *Metal roof panel* roof coverings shall be fastened to *wood structural panels*, solid lumber sheathing, or ~~applied to solid or~~ spaced lumber sheathing, except where the roof covering is specifically designed to be applied to spaced supports.

R905.16.1 ~~Deck~~ Sheathing requirements. *Photovoltaic shingles* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the roof covering is specifically designed to be applied over spaced lumber sheathing.

R905.16.2 ~~Deck slope~~ Slope. *Photovoltaic shingles* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

R905.17.1 ~~Deck~~ Sheathing requirements. *BIPV roof panels* shall be fastened to *wood structural panels*, solid lumber sheathing, or closely-fitted lumber sheathing. ~~applied to a solid or closely-fitted deck~~, except where the *roof covering* is specifically designed to be applied over spaced lumber sheathing.

R905.17.2 ~~Deck slope~~ Slope. *BIPV roof panels* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (17-percent slope) or greater.

Reason: The purpose of this proposal is to use common terminology throughout section 905 in regard to roof decks and sheathing. The subsections under 905 cover different roof coverings and are organized similar to each other, but with variation in titles. The IRC is a professional standard, but developed piece by piece in cycles. Every so often non glamorous code proposals are necessary to correlate the mess. We just have to wait for someone to take the time to do the work.
1) "Roof deck" has been defined in the IRC since the first draft over two decades ago. However, over time, proposals have used the term "deck" or "roof" in references that would fall under the defined term. Where "roof deck" is appropriate, it has been corrected in this

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proposal.

2) Use of the term "solid sheathing" in the IRC is often misunderstood as implying "wood structural panel" and not permitting "lumber sheathing". "Spaced sheathing" in the IRC is not interpreted or understood consistently either. Many incorrectly believe this to be any "lumber sheathing" due to the inconsistencies of milled width and shrinkage that result in small gaps (1/8 to 1/4) between boards, "spaces". This incorrect interpretation has lead to many existing roof decks constructed with lumber sheathing to be unnecessarily re-sheathed with wood structural panel sheathing during roof replacement projects with asphalt shingles. This proposal clarifies three different lumber sheathing applications that affect different roof coverings.

"Spaced lumber sheathing". This term has a very specific meaning for wood shake and wood shingles. This is an installation method where the lumber boards are spaced upward of 10 inches on center and only function as nailing strips for the ends of the shingles. Spaced lumber sheathing, also referred to in the industry as "skip sheathing" is an older method of construction, but is still provided for in the IRC today. However, it is very important that the IRC be more specific in references to this sheathing method so the various provisions can be appropriately understood. It is the observation of this proponent that fewer professionals in the industry have the historical understanding of "spaced sheathing" and thus modern times require more clarification to support accurate intepretations. Please reference Sections R905.7.1 and 905.8.1 for applications of spaced sheathing.

"Solid lumber sheathing" and wood structural panel sheathing are now terms used in place of "solid sheathing" in order to clarify that this applies to both lumber sheathing and wood structural panels.

"closely-fitted lumber sheathing" is a term this proponent finds a little ambiguous and inconsistent, yet this proposal does not intend to challenge any existing intent or application. Therefore only "lumber" was added anywhere this term was used in order to stay consistent with the other installations of lumber sheathing.

3) The section titles for slope were both "Deck slope" and "Slope". This proponent simply chose one and it was "Slope". If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

4) The section titles for the "deck or sheathing requirements" were not consistent. Since these sections specifically discuss the different sheathing products and installations, this proponent chose "Sheathing requirements'. If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the current intent of the IRC roof covering applications and does not directly affect the cost of construction. However, it will reduce the cost of construction where the inconsistent terms are better understood and roof decks with lumber sheathing are no longer required to be re-sheathed due to inaccurate interpretations no longer occurring.

Public Hearing Results

Committee Action **As Modified**

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

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

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

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

R905.7.1.1 Wood Structural Panels. Wood structural panels used as sheathing for wood shingles shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.

R905.7.1.1 ~~1~~ 2 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, wood structural panels or solid lumber sheathing is required on that portion of the roof deck requiring the application of an ice barrier

R905.8.1.1 Wood Structural Panels. Wood structural panels used as sheathing for wood shakes shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.

R905.8.1.1 ~~1~~ 2 Solid sheathing required. In areas where the average daily temperature in January is 25°F (-4°C) or less, wood structural panels or solid lumber sheathing is required on that portion of the roof deck requiring an ice barrier.

Committee Reason: The committee decided that the modification corrects "decking" to "deck" and adds new sections for Wood Structural Panels. The modification also adds a reasonable reference to DOC PS1. In addition, the committee determined that the proposal as modified provides good reorganization and simplification to the sections. The proposal also brings consistency to the code requirements (Vote: 10-0).

Public Comments

Public Comment 2

Proponents: David Tyree, American Wood Council, American Wood Council (dtyree@awc.org) requests As Submitted

Commenter's Reason: The inclusion of Sections R905.7.1.1 and R905.8.1.1 "Wood Structural Panels" was recommended by the Cedar Shake and Shingle Bureau during the Committee Action Hearings. Based on their installation guidelines "plywood" is not the only material option for these applications and OSB was incorrectly struck from the proposal. Although plywood might be recommended for roof sheathing in wood shingle and shake applications, OSB is included in the installation manual and should not be deleted as an acceptable material.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction Clarification of requirements and more consistent terminology have no cost impact.

Public Comment 3

Proponents: Borjen Yeh, APA - The Engineered Wood Association, APA - The Engineered Wood Association (borjen.yeh@apawood.org) requests As Submitted

Commenter's Reason: The change proposal that has been approved as modified includes a limitation of wood structural panel roof sheathing to plywood only for wood shingles (Section R905.7.1.1) and wood shakes (Section R905.8.1.1). This limitation is inconsistent with the definition of wood structural panels in the IRC, as specified in the approved parent Section R905.7.1, which states “Wood shingles shall be fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing.” and parent Section R905.8.1, which states “Wood shakes shall be fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing.”

The modification was introduced at the last Committee Action Hearing by the Cedar Shake & Shingle Bureau (CSSB, https://www.cedarbureau.org/). In the “Installation FAQ” of the CSSB website (https://www.cedarbureau.org/literature-education/installation-faq/) under “Oriented Strand Board,” it is not the CSSB recommendation to exclude the installation of cedar shakes and shingles over oriented strand board as a wood structural panel by definition.

The original change proposal without the modification correctly made proper changes. Therefore, it is requested that RB254-22 be

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approved as submitted (without the modification) to correct the unnecessary confusion induced by the modification.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This public comment clarifies the intent of the code and removes the unnecessary restriction of wood structural panel sheathing types.

Final Hearing Results

RB254-22 AS

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

58

R11118 | **/S22-22 Part II**

Date Submitted	03/14/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section R905.1.1 and Table R905.1.1(1).

Rationale

See attached

R11118Text Modification

See attached

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S22-22 Part II

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1), ASTM Chapter 44 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757 and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257

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R11118Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Metal panels	R905.10	Manufacturer's instructions ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D4869 Type III or Type IV ASTM D8257

For SI: 1 mile per hour = 0.447 m/s.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: This code change proposal adds a new product standard for synthetic roof underlayment, ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing," to Section R905.1.1-Underlayment and Table R905.1.1(1)-Underlayment Types.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds an additional option for roof underlayment. Synthetic underlayment products are priced competitively to the underlayment products already included in the Code

Public Hearing Results

Committee Action **As Modified**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Modification: TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257	ASTM D226 Type II ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257

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Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D8257~~
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions ~~ASTM D8257~~	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D8257~~
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D4869 Type III or Type IV ASTM D8257

Committee Reason: Due to compliance issues, the committee decided that the modification corrects the proposal by deleting ASTM D8257 from wood shingles and wood shakes in Table R905.1.1(1). In addition, the committee determined that the proposal, as modified, added a new ASTM standard in Table R905.1.1(1) for mechanically attached polymeric roof underlayment used in steep slope roofing to be used and eliminate confusion. Finally, the committee asked the proponent to clarify the use of "and " "or" to avoid any confusion (Vote: 9-0).

Final Hearing Results

S22-22 Part II AM

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

59

R11122		/S24-22 Part II			
Date Submitted	03/14/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -B

Summary of Modification

Multiple modifications to Section 905.1.1 "Underlayment" and Modifications to Table R905.1.1(1) through R905.1.1(3)

Rationale

See attached

R11122Text Modification

See attached

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Mod11122_TextOfModification.pdf

R11122Text Modification

S24-22 Part II

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3), ASTM Chapter 44 (New)

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* in accordance with this section is required for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757, and D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be ~~attached~~ fastened in accordance with Table R905.1.1(3).

~~**Exceptions:**~~

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

~~2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering~~

Exception: Structural metal panels that do not require a substrate or underlayment.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D8257 ASTM D1970

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R11122Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D4869 Type III or ~~Type~~ IV ASTM D8257 ASTM D1970

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches.~~ Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~a~~Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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R11122Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Clay and concrete tile	R905.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19 inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36 inch wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

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R11122Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Photovoltaic shingles	R905.16	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. Additionally, a single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two ~~two~~ layers of mechanically fastened underlayment applied in the following manner: ~~apply~~ Apply a ~~19-inch~~ strip of underlayment ~~felt~~ that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply ~~36-inch-wide~~ full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches ~~19 inches~~. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

TABLE R905.1.1(3) UNDERLAYMENT ~~APPLICATION~~ ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	~~The~~ Mechnically fastened underlayment shall be~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
Photovoltaic shingles	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	~~The~~ Mechnically fastened underlayment shall be ~~attached~~ fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

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

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

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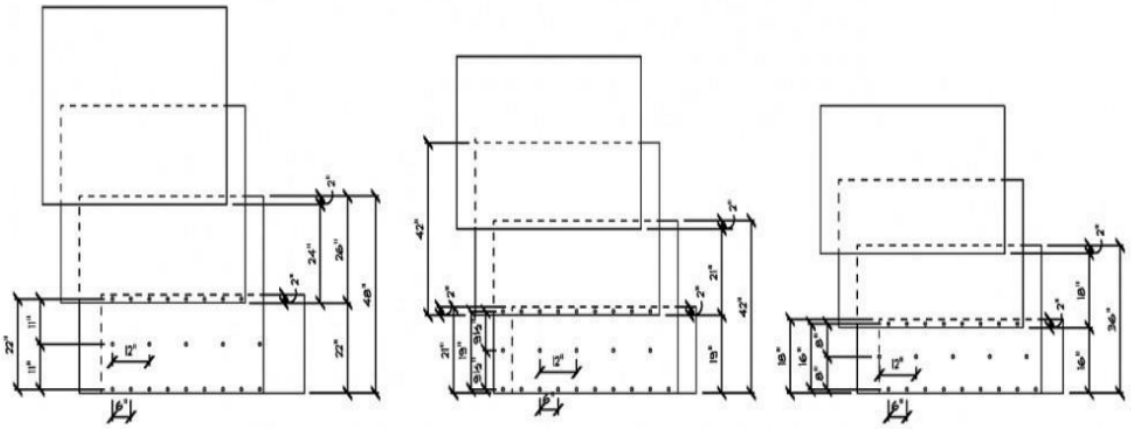
D8257/D8257M-20 Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

Reason: The first language modification in this proposal is to stipulate that underlayment is required. I receive feedback regularly from contractors that while the existing language implies that underlayment is required, that requirement is not clearly stated. Additionally, this proposal adds the first ever consensus-based Standard that is applicable to synthetic/polymeric underlayments. The roofing industry has been in need of such a Standard for many years so that this category of products can be adequately evaluated for performance. This proposal also modifies the language that is applicable to installation of a 2-layer underlayment system (See below Fig. clarifying the Underlayment Lapping and Fastening) in such a way that it reduces waste (the current language results in a strip of underlayment that is too narrow to be used in most cases), and so that the lapping and fastening requirements are applicable to any width of underlayment. Finally, this proposal also adds an exception in the charging paragraph for consistency with current IBC language, and also includes some cleanup items for clarity and consistency.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal adds a new ASTM Standard for qualifying synthetic underlayments which have been in use for many years and clarifies and reorganizes existing requirements.

Public Hearing Results

Committee Action **Disapproved**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The committee decided that the proposed text is confusing, especially in the column for areas where wind design is not required in accordance with figure R301.2.1.1, which could be misunderstood as requiring another layer. Therefore, the committee asked the proponent to clarify the language in the public comment phase (Vote: 8-1).

Public Comments

Public Comment 1

Proponents: Gregory Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com) requests As Modified by Public Comment

Modify as follows:

R11122Text Modification

2021 International Residential Code

R905.1.1 Underlayment. *Underlayment* in accordance with this section is required for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes,*metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter.*Underlayment* materials required to comply with ASTM D226, D1970, D4869, D6757, ~~and~~ or D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2).*Underlayment* shall be fastened in accordance with Table R905.1.1(3).

Exception: Structural metal panels that do not require a substrate or underlayment.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D8257 ASTM D1970
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D8257 ASTM D1970	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257 ASTM D1970
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257 ASTM D1970	ASTM D4869 Type III or IV ASTM D8257 ASTM D1970

For SI: 1 mile per hour = 0.447 m/s.

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R111122Text Modification

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

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Mod_11122_Text_S24-22 Part II.pdf

R11122Text Modification

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Photovoltaic shingles	R905.16	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. ~~Additionally, a~~ A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches . Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4 inch wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4 inch wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.

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

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
Photovoltaic shingles	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

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

Commenter's Reason: This modification satisfies concerns from several industry stakeholders and harmonizes the contents of Section R905.1 with the language that was approved as modified in Proposal S24-22 Part I for the IBC.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal and comment merely provide clarification of the underlayment requirements and adds a new ASTM Standard that applies exclusively to synthetic underlayments.

Final Hearing Results

S24-22 Part II AMPC1

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Mod_11122_Text_S24-22 Part II.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

60

R11130		/S35-22 Part II			
Date Submitted	03/15/2024	**Section**	905.16.4	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

FBC-B/Section R905.16.5. Original text of mod is not consistent with that of the 2023 FBC -R.

Summary of Modification

The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.

Rationale

See attached

R11130Text Modification

See attached

Page: 1

Mod11130_TextOfModification.pdf

R11130Text Modification

S35-22 Part II

Original Proposal

IRC: R905.16.4, R905.17.5

Proponents: Larry Sherwood, INTERSTATE RENEWABLE ENERGY COUNCIL, Sustainable Energy Action Committee (larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept. OFM, California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, California Solar & Storage Association, California Solar & Storage Association (ben@calssa.org); Philip Oakes, NASFM, National Association of State Fire Marshals; Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2021 International Residential Code

Revise as follows:

R905.16.4 Material standards. *Photovoltaic shingles* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL 7103 ~~or with both UL 61730-1 and UL 61730-2~~.

Reason: The standard for all forms of BIPV roof coverings and roof assemblies is UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance. UL 61730-1 and UL 61730-2, which primarily cover the related electrical requirements, are part of the requirements within UL 7103.
This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal properly references the standard for BIPV roofing systems.

Public Hearing Results

Committee Action **As Submitted**

THIS CODE CHANGE WAS HEARD BY THE IRC-B COMMITTEE.

Committee Reason: The committee approved this proposal based on the fact that this proposal deletes UL 61730-1 and UL 61730-2, which primarily cover photovoltaic (PV) module safety qualification requirements for construction and requirements for testing. The deletion is based on the fact that UL 61730-1, and UL 61730-2 are part of the requirements within UL 7103, which covers all aspects of these products – fire classification, material performance, and wind resistance (Vote:10-0).

Final Hearing Results

S35-22 Part II AS

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Mod_11130_Text_S35-22 Part II.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

61

R11565		/RB251-22			
Date Submitted	04/01/2024	**Section**	902.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

The original text of mod is not consistent with that of the 2023 FBC -R.

Summary of Modification

Changing "roofing" to "roof assemblies" in Section R902.1 is important to recognize that roof assemblies are classified, not "roofing." The additional changes create a logical progression of thought that establishes when fire classification is required...

Rationale

See attached

R11565Text Modification

See attached

Page: 1

Mod11565_TextOfModification.pdf

R11565Text Modification

RB251-22

Original Proposal

IRC: R902.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R902.1 Roof covering materials. Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C*roof assemblies*~~roofing~~ shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B, or C *roof assemblies* are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the *roof assembly* shall be *listed* and identified as to Class by an *approved* testing agency. ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete*roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason: Changing "roofing" to "roof assemblies" in Section R902.1 is important to recognize that roof assemblies are classified, not "roofing." The additional changes create a logical progression of thought that establishes when fire classification is required, what tests are to be done when fire classification is necessary, and provisions for listing when that additional step is appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal corrects language and restates and reorders existing provisions to reduce opportunities for confusion. Since there are no technical changes introduced, no change in cost of construction is anticipated if the proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal corrects that the roof assembly should be listed and identified as to Class by an approved testing agency. The committee also agreed with replacing of "roofing" with "roof assemblies" in the roof covering materials section's charging statement to emphasize that roof assemblies need to be classified (Vote: 6-4).

Final Hearing Results

RB251-22 AS

Page: 1

Mod_11565_Text_RB251-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

62

R11566		/RB252-22			
Date Submitted	04/01/2024	**Section**	902.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC -R.

Summary of Modification

This proposal clarifies the section and makes the terminology consistent with chapter 2 definitions, with the subsections (all of which describe roof assemblies) and with sections 904 and 905.

Rationale

See attached

R11566Text Modification

See attached

Mod11566_TextOfModification.pdf

Page: 1

R11566Text Modification

RB252-22

Original Proposal

IRC: R902.1

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2021 International Residential Code

Revise as follows:

R902.1 Roof ~~covering materials~~ assemblies. Roofs shall be covered with materials as set forth in Section ~~Sections~~ R904 ~~and~~ or with roof coverings as set forth in Section R905. Class A, B or C ~~roofing~~ roof assemblies shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*. Where Class A, B or C roof assemblies are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the roof assembly shall be listed ~~Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete*roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

Reason: This proposal clarifies the section and makes the terminology consistent with chapter 2 definitions, with the subsections (all of which describe roof assemblies) and with sections 904 and 905.

Chapter 2 defines "roof assembly" as "A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6."
Chapter 2 does not define "roofing" or "roof covering material" but it defines "roof covering" as "The covering applied to the roof deck for weather resistance, fire classification or appearance."

The section contains the words "roof covering materials" and "roofing" as well as "roof assembly" (or actually its plural, roof assemblies).

The fire test in ASTM E108 or UL 790 must be conducted on the "roof assembly", meaning that it must be conducted on the entir***reoof covering system*** and not on the individual roofing material or roof covering (the chapter on definitions clarifies that "roof covering system" is the same as "roof assembly").

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply corrects the terminology for consistency.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal clarifies the section and makes the terminology consistent with Chapter 2 definitions for roof assemblies. The proposal does include roof coverings in the roof assembly definitions (Vote: 8-2)..

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Mod_11566_Text_RB252-22.pdf

R11566Text Modification

Final Hearing Results

RB252-22 AS

Page: 2

Mod_11566_Text_RB252-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

63

R11568		/RB258-22			
Date Submitted	04/01/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This proposal corrects an error in the 2021 IRC that technically was corrected during the 2019 cycle but was correlated incorrectly by staff.

Rationale

See attached

R11568Text Modification

See attached

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Mod11568_TextOfModification.pdf

R11568Text Modification

RB258-22

Original Proposal

IRC: R905.1.1

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a*label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a*label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering and design wind speed ~~areas where wind design is not required in accordance with Figure R301.2.1.1~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2.1.1. Underlayment shall be attached in accordance with Table R905.1.1(3) for the applicable roof covering and design wind speed.

Reason: This proposal corrects an error in the 2021 IRC that technically was corrected during the 2019 cycle but was correlated incorrectly by staff. The public comment to RB274 did two things. It added the exception back to this section for a fully adhered underlayment that was mistakenly deleted by the original proponent. It also corrected an error in Exception 2 related to underlayment types permitted over the 4-inch-wide strips of self-adhering polymer modified bitumen membrane. However, when RB274-19 was correlated with RB275-19, the correction approved in the public comment to RB274-19 was not implemented in the printed version of the 2021 IRC. Staff was notified and a request was made to include it as an errata. However, at this point, we have not received clear confirmation from staff either way about the status of this item. This code change clarifies the underlayment types permitted, underlayment application and underlayment fastening for Exception 2 as staff apparently is not considering this an errata.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification of a code change that was previously approved in the 2019 code cycle.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal fixes the incorrect reference to design wind speed. In addition, the

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Mod_11568_Text_RB258-22.pdf

R11568Text Modification

proposal clarifies the underlayment types permitted, underlayment application, and underlayment fastening for Exception 2 (Vote: 9-0).

Final Hearing Results

RB258-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

64

R11569		/RB259-22			
Date Submitted	04/01/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

Underlayment options for photovoltaic shingles in Table R905.1.1(1) are updated to include ASTM D226 saturated felts. This aligns options in the International Residential Code with the ones already present in the International Building Code in Table 1507.1.1(1)

Rationale

See attached

R11569Text Modification

See attached

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Mod11569_TextOfModification.pdf

R11569Text Modification

RB259-22

Original Proposal

IRC: TABLE R905.1.1(1)

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason: Underlayment options for photovoltaic shingles in Table R905.1.1(1) are updated to include ASTM D226 saturated felts. This aligns options in the International Residential Code with the ones already present in the International Building Code in Table 1507.1.1(1). In areas where wind design is required, ASTM D226 Type II is added as an alternative to ASTM D4869, Types III and IV, This is technically justified because the minimum net masses of saturated felt, saturant, and desaturated felt are equivalent for both ASTM D226 Type II and ASTM D4869 Type IV. Equivalent composition can be expected to yield equivalent results. In areas where wind design is not required, ASTM D226 Types I and II are proposed for addition. Felts meeting D226, Type I exceed the minimum saturated felt, saturant, and desaturated felt net masses of D4869 Type I, making both D226 Types I and II suitable for recognition as an alternative to ASTM D4869 Types I, II, III, and IV.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of underlayment options is not expected to affect the cost of construction.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11569_Text_RB259-22.pdf

R11569Text Modification

Committee Reason: The committee concluded that the proposal provides an additional underlayment options for photovoltaic shingles adding a reference to ASTM D226 Asphalt-Saturated Organic Felt in as an approved underlayment (Vote: 9-0).

Final Hearing Results

RB259-22 AS

Page: 2

Mod_11569_Text_RB259-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

65

R11570		/RB260-22			
Date Submitted	04/01/2024	**Section**	905.1.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This code change proposal is a clarification and clean-up of Section R905.1.1 and Table R905.1.1(1).

Rationale

See attached

R11570Text Modification

See attached

Page: 1

Mod11570_TextOfModification.pdf

R11570Text Modification

RB260-22

Original Proposal

IRC: R905.1.1, TABLE R905.1.1(1)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile,*metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869, ~~and~~ D6757 ASTM D2626 Type I and ASTM D6380 Class M shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2).*Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a*label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes on solid sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels on solid sheathing	R905.10	Manufacturer's instructions ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

For SI: 1 mile per hour = 0.447 m/s.

Reason: This code change proposal is a clarification and clean-up of Section R905.1.1 and Table R905.1.1(1). Specifically:

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Mod_11570_Text_RB260-22.pdf

R11570Text Modification

- In Section 1507.1.1, ASTM D2626, Type I and ASTM D6380, Class M are added since these already occur in the table.
- In the table in the row for clay and concrete tile roof coverings, "mineral surface roof roofing" is deleted from the description of ASTM D6380, Class M as it is unnecessary. The Class M designation already identifies the product as being mineral granule-surfacing.
- In the table in the row for metal roof panel roof coverings, underlayment is only used over solid or closely fitted decks. Where a structural metal panel roof covering is applied over open framing without a roof deck, an underlayment is not applied. Also, "Manufacturer's instructions" is stuck from the cell for maximum basic wind design wind speed, V < 140 mph. This is replaced with ASTM designation underlayment standards similar to what is already appearing in the rows for Metal Roof Shingle through Wood Shakes.
- In the table for the row for wood shake roof coverings, underlayment is only used over solid roof deck sheathing. Where a wood shake roof covering is applied over spaced sheathing, an underlayment is not applied to allow for downward venting/drying of the wood shakes. An interlayment is unused between courses of wood shakes per Section R905.8.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply a clarification and clean-up of the table.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R905.1.1 Underlayment. Underlayment for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and photovoltaic shingles shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 ASTM D2626 ~~Type I and~~ or ASTM D6380 Class M shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). Underlayment shall be applied in accordance with Table R905.1.1(2). Underlayment shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a label indicating compliance with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering

TABLE R905.1.1(1) UNDERLAYMENT TYPES

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 ~~Type I~~ ASTM D6380 Class M	ASTM D226 Type II
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV

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R11570Text Modification

Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes on solid sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels on solid sheathing	R905.10	ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV

Committee Reason: The committee decided that the modification correctly deletes Type I when referencing ASTM D2626 Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing. In addition, the committee determined that the proposal, as modified, clarifies underlayment requirements and adds ASTM D2626 to Metal panels on solid sheathing (Vote: 10-0).

Final Hearing Results	
RB260-22	AM

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

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R11572		/RB262-22			
Date Submitted	04/01/2024	**Section**	905.1.2	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC -R.

Summary of Modification

This proposal strikes the special language for roofs above 8:12 slope to ensure the minimum requirement causes installation of the ice dam protective membrane over an appropriate portion of the roof that includes extension within the exterior wall line.

Rationale

See attached

R11572Text Modification

See attached

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Mod11572_TextOfModification.pdf

R11572Text Modification

RB262-22

Original Proposal

IRC: R905.1.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building. ~~On roofs with slope equal to or greater than 8 units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.~~

Exception: Detached *accessory structures* not containing conditioned floor area.

Reason: Ice dams form at or downslope of the transition between above freezing and below freezing sections of the roof deck. Warm air rising from the interior of the building into the attic space may raise the roof deck temperature and cause snow or ice on the roof to melt, run downslope, and possibly refreeze if the roof deck temperature downslope is low enough. Building characteristics, including roof slope, determine where that transition occurs and affect whether and where an ice dam forms.
The special guideline for roofs at or above 8:12 slope overlooks many building construction variations. This proposal strikes the special language for roofs above 8:12 slope to ensure the minimum requirement causes installation of the ice dam protective membrane over an appropriate portion of the roof that includes extension within the exterior wall line. The existing language could create situations where the ice dam membrane terminates well before the location on the roof deck where there is a transition from above freezing to below freezing conditions, which could allow ice dam formation at an area not covered by an ice barrier and lead to water infiltration into the building.

Additionally, the existing language can be interpreted in multiple fashions due to use of the word "also" in the last sentence of Section R905.1.2, suggesting there may be a requirement for two layers of ice barrier for roofs 8:12 and higher in slope.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
If people interpret the existing provisions to require two layers of ice barrier for slopes 8:12 and above, one that runs at least 36" parallel to slope and one that runs at least 24" inside the exterior wall line, this proposal could result in a decrease in cost of construction by permitting one layer that runs at least 24" inside the exterior wall line. If people interpret the existing provisions to require only a single layer running at least 36" parallel to the slope, this proposal could result in an increase in cost of construction for situations in which more than a single 36" width of ice barrier will be required to reach 24" inside the exterior wall line. On balance for all projects, the proposal is expected to be approximately cost neutral.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building.

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Mod_11572_Text_RB262-22.pdf

R11572Text Modification

On roofs with slope equal or greater than 8 units vertical in 12 units horizontal, (67 percent slope), the ice barrier membrane shall ~~also~~ be applied not less than 36" (914mm) measured along the roof slope from the eave edge of the building.

Committee Reason: The committee concluded that the modification restores the language deleted by this proposal and only deletes "also" to avoid confusion. Therefore, the committee approved this proposal as modified due to the fact that it clarifies the requirements that the ice barrier membrane shall be applied not less than 36" (914mm) measured along the roof slope from the eave edge of the building (Vote: 10-0).

Final Hearing Results

RB262-22 AM

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

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R11573		/RB264-22			
Date Submitted	04/01/2024	**Section**	905.2.8.2	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R. This code change is already part of the 2023 FBC - R.

Summary of Modification

This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Rationale

See attached

R11573Text Modification

See attached

Mod11573_TextOfModification.pdf

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R11573Text Modification

RB264-22

Original Proposal

IRC: R905.2.8.2

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.2 Valleys. Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table R905.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing, complying with ASTM D3909 or ASTM D6380 Class M, shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380 and not less than 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 shall be permitted. Self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970and not less than 36 inches (914 mm) wideshall be permitted in lieu of the lining material.

Reason: Although implied, the minimum width of ASTM D1970 valley lining is not provided in the existing language of the IRC. This proposal establishes that ASTM D1970 underlayment used as closed valley lining must be at least 36" wide.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal defines an implied requirement to remove ambiguity. No change in cost of construction is expected if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposal incorporates the minimum width of at least 36" based on ASTM D1970 (Vote: 10-0).

Final Hearing Results

RB264-22 AS

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Mod_11573_Text_RB264-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

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R11574		/RB266-22			
Date Submitted	04/01/2024	**Section**	905.3.6	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

New sections are proposed for many roof coverings that specifically addresses the wind limitations in the IRC for roof covering attachment and specifies the performance requirements for roof coverings in wind design required regions.

Rationale

See attached

R11574Text Modification

See attached

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Mod11574_TextOfModification.pdf

R11574Text Modification

RB266-22

Original Proposal

IRC: R905.3.6 (New), R905.5.6 (New), R905.6.5 (New), R905.6.5, TABLE R905.6.5, R905.7.5 (New), R905.7.5, TABLE R905.7.5(1), TABLE R905.7.5(2), R905.8.6 (New), R905.8.6, TABLE R905.8.6, R905.9.4 (New), R905.10.5 (New), R905.11.4 (New), R905.12.4 (New), R905.13.4 (New), R905.14.4 (New), R905.15.4 (New), R905.17.7 (New), ASTM Chapter 44 (New)

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

2021 International Residential Code

Add new text as follows:

R905.3.6 Wind resistance of concrete and clay tile. In regions where wind design is required in accordance with Figure R301.2.1.1, wind loads on concrete and clay tile shall be determined in accordance with Section 1504.3 of the International Building Code. In regions where wind design is not required in accordance with Figure R301.2.1.1, concrete and clay tiles shall be attached in accordance with this Sections R905.3.7 and R905.3.8.

R905.5.6 Wind resistance of mineral-surfaced roll roofing. Mineral-surfaced roll roofing shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.6.5 Wind resistance of slate shingles. Slate shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, slate shingles shall be attached in accordance with Section R905.6.6.

Revise as follows:

R905.6.6 ~~R905.6.5~~ Application. Minimum headlap for slate shingles shall be in accordance with TableR905.6.6 ~~R905.6.5~~ . Slate shingles shall be secured to the roof with two fasteners per slate. Slate shingles shall be installed in accordance with this chapter and the manufacturer's instructions.

TABLE R905.6.6 ~~R905.6.5~~ SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 ≤ slope < 8:12	4
8:12 ≤ slope < 20:12	3
Slope ≥ 20:12	2

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.7.5 Wind resistance of wood shingles. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shingles are permitted to be attached in accordance with Section R905.7.6.

Revise as follows:

R905.7.6 ~~R905.7.5~~ Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1\frac{1}{2}$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $\frac{1}{4}$ inch to $\frac{3}{8}$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.6(1) ~~R905.7.5(1)~~. Fasteners for untreated (naturally durable) wood

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R11574Text Modification

shingles shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.7.6(1) ~~R905.7.5(1)~~ WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	$3^3/_4$	5
		No. 2	$3^1/_2$	4
		No. 3	3	$3^1/_2$
	18	No. 1	$4^1/_4$	$5^1/_2$
		No. 2	4	$4^1/_2$
		No. 3	$3^1/_2$	4
	24	No. 1	$5^3/_4$	$7^1/_2$
		No. 2	$5^1/_2$	$6^1/_2$
		No. 3	5	$5^1/_2$

For SI: 1 inch = 25.4 mm.

TABLE R905.7.6(2) ~~R905.7.5(2)~~ NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLES

PRODUCT TYPE	NAIL TYPE, MINIMUM LENGTH AND SHANK DIAMETER (inches)
Shakes	
18" straight-split	5d box $1^3/_4$" × 0.080
18" and 24" handsplit and resawn	6d box 2" × 0.099
24" taper-split	5d box $1^3/_4$" × 0.080
18" and 24" tapersawn	6d box 2" × 0.099
Shingles	
16" and 18"	3d box $1^1/_4$" × 0.076
24"	4d box $1^1/_2$" × 0.076

For SI: 1 inch = 25.4 mm.

Add new text as follows:

R905.8.6 Wind resistance of wood shakes. In regions where wind design is required in accordance with Figure R301.2.1.1, Wood shakes shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, wood shakes are permitted to be attached in accordance with Section R905.8.7.

Revise as follows:

R905.8.7 ~~R905.8.6~~ Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.7 ~~R905.8.6~~. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.6(2) ~~R905.7.5(2)~~. Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm)

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R11574Text Modification

thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

TABLE R905.8.7 ~~R905.8.6~~ WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches) 4:12 pitch or steeper
Shakes of naturally durable wood	18	No. 1	$7^1/_2$
	24	No. 1	10[a]
Preservative-treated tapersawn shakes of Southern Yellow Pine	18	No. 1	$7^1/_2$
	24	No. 1	10
	18	No. 2	$5^1/_2$
	24	No. 2	$7^1/_2$
Taper-sawn shakes of naturally durable wood	18	No. 1	$7^1/_2$
	24	No. 1	10
	18	No. 2	$5^1/_2$
	24	No. 2	$7^1/_2$

For SI: 1 inch = 25.4 mm.

a. For 24-inch by $^3/_8$-inch handsplit shakes, the maximum exposure is $7^1/_2$ inches.

Add new text as follows:

R905.9.4 Wind resistance of built-up roofs. Built-up roof coverings shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.10.5 Wind resistance of metal roof panels. Metal roof panels shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). Metal roof panels applied to a solid or closely fitted deck shall be tested for wind resistance in accordance with FM 4474, UL 580, or UL 1897. Structural standing seam metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592 or FM 4474. Structural through-fastened metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592, FM 4474 or UL 580.

Exceptions:

1. Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2210.1 of the International Building Code.
2. Metal roofs constructed of aluminum shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2002.1 of the International Building Code.

R905.11.4 Wind resistance of modified bitumen roofing. Modified bitumen roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.12.4 Wind resistance of thermoset single-ply roofing. Thermoset single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.13.4 Wind resistance of thermoplastic single-ply roofing. Thermoplastic single-ply roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.14.4 Wind resistance of sprayed polyurethane foam roofing. Sprayed polyurethane foam roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

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Mod_11574_Text_RB266-22.pdf

R11574Text Modification

R905.15.4 Wind resistance of liquid-applied roofing. Liquid-applied roofing shall be tested in accordance with FM 4474, UL1897 or UL 580 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.17.7 Wind resistance of BIPV roof panels. BIPV roof panels shall be tested in accordance with UL 1897 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1592-2005(2017)	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

Reason: This proposal is one of two proposals intended to clarify the wind limitations in the IRC. Section R301.2.1.1 intends to limit the applicability of the IRC to areas where wind design is not required in accordance with Figure R301.2.1.1. However, Chapter 9 contains high wind requirements for asphalt, metal, and photovoltaic shingles and for underlayment in wind design required regions, but for no other roof coverings. While Section R905.1 states that unless otherwise specified, roof coverings have to resist the component and cladding loads specified in Table R302(2), that requirement is not necessarily correct for all roof coverings. Prescriptive attachment methods are provided for concrete and clay tile but the code does not specify any wind limitations on the use of this prescriptive method.
Therefore, new sections are proposed for many roof coverings that specifically addresses the wind limitations in the IRC for roof covering attachment and specifies the performance requirements for roof coverings in wind design required regions. Where prescriptive attachment methods are provided, the proposal limits their use to areas where wind design is not required. The performance requirements specified are consistent with Section 1504 in the IBC. This proposal is not intended to change any technical requirements in the IRC related to wind design. It is intended to simply clarify the wind requirements for roof coverings in the IRC.

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

Public Hearing Results

Committee Action **As Modified**

Committee Modification: ~~**R905.6.5 Wind resistance of slate shingles.**Slate shingles shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). In regions where wind design is not required in accordance with Figure R301.2.1.1, slate shingles shall be attached in accordance with Section R905.6.6.~~

TABLE R905.6.6 5 SLATE SHINGLE HEADLAP

Portions of table not shown remain unchanged.

R905.17.7 Wind resistance of BIPV roof panels.BIPV roof panels shall be tested in accordance with~~UL 1897~~ UL 7103 and installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

Committee Reason: The committee decided that the modification corrects the UL standard from UL 1897 to UL 7103. The modification also deletes the unnecessary requirements for wind resistance of slate shingles since it has been addressed in a previous code change. The committee determined that the proposal as modified provides good previsions for wind resistance. In addition, the proposal adds a standard for a test method for structural performance of sheet metal roof and siding systems by uniform static air pressure difference (Vote: 10-0).

Page: 4

Mod_11574_Text_RB266-22.pdf

R11574Text Modification

Final Hearing Results

RB266-22 AM

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

69

R11575		/RB267-22			
Date Submitted	04/01/2024	**Section**	905.3.7	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This proposals suggests that the slope conditions for this row be placed under the column titled “roof slope” and the number of fasteners required should be under the column titled “number of fasteners”.

Rationale

See attached

R11575Text Modification

See attached

Page: 1

Mod11575_TextOfModification.pdf

R11575Text Modification

RB267-22

Original Proposal

IRC: TABLE R905.3.7

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

2021 International Residential Code

Revise as follows:

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

SHEATHING	ROOF SLOPE	NUMBER OF FASTENERS
Solid without battens	All	One per tile
Spaced or solid with battens<u>and slope < 5:12</u>	<u>Fasteners not required</u> <u>slope < 5:12</u>	<u>Fasteners not required</u>
Spaced sheathing without battens	5:12 ≤ slope < 12:12	One per tile/every other row
	12:12 ≤ slope < 24:12	One per tile

Reason: At first glance, the data in the row "spaced or solid with battens and slope <5:12" appears to be shifted to the left and not in the correct columns. In researching, this table has been in this form since the 2000 IRC. This proposals suggests that the slope conditions for this row be placed under the column titled "roof slope" and the number of fasteners required should be under the column titled "number of fasteners".
In reviewing the Concrete and Clay Roof Tile Installation Manual (2015-latest edition) by the Tile Roofing Institute and Western States Roofing Contractors Association, Table IB, it would appear that this shift of data in the IRC table is supported. This can be viewed online at this link: https://tileroofing.org/wp-content/uploads/TRI-Installation-Guide-2015-1.pdf

The clay and concrete tile industry is welcome to further refine this proposal with floor modifications and/or public comments. The goal of this proposal is simply to make the presentation of the data in the cells align sensibly with the column titles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial and does not change the application of the IRC provisions.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal based on the fact that the proposal corrects the text in Table R905.3.7 regarding the slope conditions and the number of fasteners (Vote: 10-0)

Final Hearing Results

RB267-22 AS

Page: 1

Mod_11575_Text_RB267-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

70

R11576 | **/RB268-22**

Date Submitted	04/01/2024	**Section**	905.6.5	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings.

Rationale

See attached

R11576Text Modification

See attached

Page: 1

Mod11576_TextOfModification.pdf

R11576Text Modification

RB268-22

Original Proposal

IRC: R905.6.5 (New), TABLE R905.6.5 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

R905.6.5 Wind resistance of slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate shingle packaging shall bear a label indicating compliance with ASTM D3161 and the required classification in Table R905.6.5.

TABLE R905.6.5 CLASSIFICATION OF SLATE SHINGLES TESTED IN ACCORDACNE WITH ASTM D3161

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult}, FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{asd}, FROM TABLE R301.2.1.3 (mph)	ASTM D3161 CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

For SI: 1 mph=0.447 m/s

Reason: This code change proposal is intended to provide building officials and users of the code guidance regarding the wind resistance of slate roof covings. Wind resistance of slate roof coverings is not currently addressed in the IRC. This code change adds wind resistance testing in accordance with ASTM D3161 and its classification designations similar to what is already provided for in the IBC for asphalt shingles and metal roof shingles. A new table is added, Table R905.6.5 providing the required wind resistance classification based on the maximum ultimate design wind speed, V_{ult}, or maximum basic wind speed, V_{asd}. Slate package labeling is required to facilitate classification identification and enforcement. Such package labeling would be slate supplier specific, but most likely would be in the form of of a pallet tag.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While this code change proposal adds a requirement for wind resistance testing, it will not result in an increase in the cost of construction. Slate suppliers have indicating they already have ASTM D3161 testing in-place and classifications available.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal adds needed requirements for wind resistance of slate shingles. In addition, the proposal reference ASTM D3161 and its classification designations (Vote: 10-0).

Page: 1

Mod_11576_Text_RB268-22.pdf

R11576Text Modification

Final Hearing Results

RB268-22 AS

Page: 2

Mod_11576_Text_RB268-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

71

R11577		/RB269-22			
Date Submitted	04/01/2024	**Section**	905.7.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC -R.

Summary of Modification

When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment.

Rationale

See attached

R11577Text Modification

See attached

Page: 1

Mod11577_TextOfModification.pdf

R11577Text Modification

RB269-22

Original Proposal

IRC: R905.7.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.7.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shingles shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.

Reason: When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposed text ensures the configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation. The committee recommended for the proponent to look into clarifying "shall not be backed with materials" during the public comment phase (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

Page: 1

Mod_11577_Text_RB269-22.pdf

R11577Text Modification

2021 International Residential Code

R905.7.1 Deck requirements. Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shingles are installed over spaced sheathing and the underside of the shingles are exposed to the attic space the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shingles shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (10-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results	
RB269-22	AMPC1

Page: 2

Mod_11577_Text_RB269-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

72

R11578	/RB270-22				
Date Submitted	04/01/2024	**Section**	905.7.5	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC - R.

Summary of Modification

Modifies text of Section R905.7.5 "Application". Changes reference standard to ASTM A641/A641M-2019.

Rationale

See attached

R11578Text Modification

See attached

Page: 1

Mod11578_TextOfModification.pdf

R11578Text Modification

RB270-22

Original Proposal

IRC: R905.7.5, ASTM Chapter 44

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.7.5 Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D or ASTM A641 Class 3S (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M ~~09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft².
Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Bibliography: ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples
ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce cost. The proposal aligns with current industry practices

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal incorporates updated requirements based on ASTM A641/A641M-2019

Page: 1

Mod_11578_Text_RB270-22.pdf

R11578Text Modification

specification for Zinc-coated (Galvanized) carbon steel wire. The committee's approval is consistent with the committee's previous actions (Vote: 10-0).

Final Hearing Results

RB270-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

73

R11579		/RB271-22			
Date Submitted	04/02/2024	**Section**	905.8.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC - R.

Summary of Modification

When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment.

Rationale

See attached

R11579Text Modification

See attached

Page: 1

Mod11579_TextOfModification.pdf

R11579Text Modification

RB271-22

Original Proposal

IRC: R905.8.1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

2021 International Residential Code

Revise as follows:

R905.8.1 Deck requirements. Wood shakes shall be ~~used only~~installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shakes shall not be backed with materials that prevent the free movement of air on the interior side of the spaced sheathing.

Reason: When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process.
Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shake to hold on to heat load for longer durations, which leads to shorter service life cycles.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee's approval is consistent with the committee's previous action on RB269-22. See RB269-22 committee's reason statement (Vote: 10-0).

Public Comments

Public Comment 1

Proponents: Chadwick Collins, Kellen Company, Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

Page: 1

Mod_11579_Text_RB271-22.pdf

R11579Text Modification

2021 International Residential Code

R905.8.1 Deck requirements. Wood shakes shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. When wood shakes are installed over spaced sheathing and the underside of the shakes are exposed to the attic space, the attic shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shakes shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sheathing.

Commenter's Reason: The original proposal was recommended for approval by the Committee as submitted (10-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

Cost Impact: The net effect of the Public Comment and code change proposal will not increase or decrease the cost of construction This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Final Hearing Results	
RB271-22	AMPC1

Page: 2

Mod_11579_Text_RB271-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

74

R11580		/RB272-22			
Date Submitted	04/02/2024	**Section**	905.8.6	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

This section is marked reserved in the 2023 FBC -R.

Summary of Modification

Modifies the text of Section R905.8.6 "Application". Updates reference standard to ASTM A641/A641M - 2019.

Rationale

See attached

R11580Text Modification

See attached

Page: 1

Mod11580_TextOfModification.pdf

R11580Text Modification

RB272-22

Original Proposal

IRC: R905.8.6, ASTM Chapter 44

Proponents: Rick Allen, ISANTA, ISANTA (rallen@isanta.org)

2021 International Residential Code

Revise as follows:

R905.8.6 Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D or ASTM A641 Class 3S (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths$^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than$^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A641/A641M~~–09a(2014)~~ 2019 Specification for Zinc-coated (Galvanized) Carbon Steel Wire

Reason: Galvanized nails are made from wire. The wire may be uncoated or galvanized. Nails that are made from uncoated wire are hot-dip galvanized after forming to specification A153 Class D which provides a minimum average coating weight of 1 oz./ft². Nails that are made from galvanized wire are made from wire coated to specification A641 Class 3S which provides a minimum average coating weight of 1 oz/ft².

Although commercially available and used for many years, Class 3S was added to Specification A641 in 2019

Specification A641 Class 3S was added to ASTM F1667 in 2020.

Referenced standard

ASTM F1667/F1667M-21a: Standard Specification for Driven Fasteners: Nails, Spikes and Staples

ASTM A153/A153M-16a: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A641/A641-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal will not add or reduce to cost. Proposal aligns with current industry practice.

Public Hearing Results

Committee Action **As Submitted**

Page: 1

Mod_11580_Text_RB272-22.pdf

R11580Text Modification

Committee Reason: The committee determined that the proposal incorporates updated requirements based on ASTM A641/A641M-2019 specification for Zinc-coated (Galvanized) carbon steel wire. The committee's approval is consistent with the committee's previous actions (Vote: 10-0).

Final Hearing Results

RB272-22 AS

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

75

R11581		/RB274-22			
Date Submitted	04/02/2024	**Section**	905.12	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

This code change proposal is intended to clarify the code's requirements regarding single-ply membrane roof coverings.

Rationale

See attached

R11581Text Modification

See attached

Page: 1

Mod11581_TextOfModification.pdf

R11581Text Modification

RB274-22

Original Proposal

IRC: R905.12, R905.12.1, R905.12.2, TABLE R905.12 (New), R905.12.3, R905.13, R905.13.1, R905.13.2, R905.13.3

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Revise as follows:

R905.12 ~~Thermoset single~~ Single-ply roofing. The installation of ~~thermoset single-ply roofing~~ *single-ply membrane roof coverings* shall comply with the provisions of this section.

R905.12.1 Slope. ~~Thermoset *single*~~*Single-ply membrane* ~~roofs~~ *roof coverings* shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage.

R905.12.2 Material standards. ~~Thermoset single~~*Single-ply membrane roof coverings* shall comply with ~~ASTM D4637 or ASTM D5019~~ the material standards in Table R905.12.

Add new text as follows:

TABLE R905.12 SINGLE-PLY ROOFING MATERIAL STANDARDS

MATERIAL	MATERIAL STANDARD
Chlorosulfanted polyethylene (CSPE) or polyisobutylene (PIB)	ASTM D5019
Ethylene propylene diene monomer (EPDM)	ASTM D4637
Ketone Ethylene Ester (KEE)	ASTM D6754
Polyvinyl chlorine (PVC) or (PVC/KEE)	ASTM D4434
Thermosplastic polyolefin (TPO)	ASTM D6878

Revise as follows:

R905.12.3 Application. ~~Thermoset single~~ *Single-ply membrane roof* ~~*roofs*~~*coverings* shall be installed in accordance with this chapter and the manufacturer's installation instructions.

~~**R905.13 Thermoplastic single-ply roofing.** The installation of thermoplastic single-ply roofing shall comply with the provisions of this section.~~

~~**R905.13.1 Slope.** Thermoplastic *single-ply membrane* roofs shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope).~~

~~**R905.13.2 Material standards.** Thermoplastic single-ply roof coverings shall comply with ASTM D4434, D6754 or D6878.~~

~~**R905.13.3 Application.** Thermoplastic single-ply roofs shall be installed in accordance with this chapter and the manufacturer's instructions.~~

Reason: This code change proposal is intended to clarify the code's requirements regarding single-ply membrane roof coverings. Currently, requirements for thermoset single-ply roofing are address in Section R905.12 and thermoplastic single-ply roofing are addressed in Section R905.13. Other than the material standards for specific membrane types, the requirements are identical in both sections.

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Mod_11581_Text_RB274-22.pdf

R11581Text Modification

This code change proposal combines the two sections into a new section, Section R905.12-Single-ply Roofing and combines the material standards in a new table, Table R905.12-Single-ply Roofing Material Standards.

This code change proposal makes no changes to the code's requirements for single-ply membrane roof coverings; it is simply a reformat of the code's already existing requirements.

This same consolidation and new table has already been incorporated into IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since this code change proposal makes no changes to the code's technical requirements, there is no cost impact.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposal reorganizes and clarifies requirements for single-ply membrane roof coverings. The committee also agreed with the combination of Section R905.12 for thermoset single roofing and Section R905.13 for thermoplastic single-ply roofing. In addition, The proposal also adds material standards in Table R905.12 (Vote: 9-0)

Final Hearing Results

RB274-22 AS

Page: 2

Mod_11581_Text_RB274-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

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R11582	/RB277-22				
Date Submitted	04/02/2024	**Section**	906.2	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments Yes

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R. This code change is already part of the 2023 FBC -R.

Summary of Modification

Table R906.2. Adds new reference standard C1902-20 "Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications".

Rationale

See attached

1st Comment Period History

R11582-G1

Proponent Drew Smith Submitted 6/25/2024 1:35:54 PM Attachments No

Comment:

Proposal should reduce the cost of construction.

R11582Text Modification

See attached

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Mod11582_TextOfModification.pdf

R11582Text Modification

RB277-22

Original Proposal

IRC: TABLE R906.2, ASTM Chapter 44 (New)

Proponents: Greg Keeler, Owens Corning, Owens Corning (greg.keeler@owenscorning.com)

2021 International Residential Code

Revise as follows:

TABLE R906.2 MATERIAL STANDARDS FOR ROOF INSULATION

Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VI
Expanded polystyrene	ASTM C578
Extruded polystyrene board	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
Mineral wool board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

C1902-20 Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications

Reason: Today, the scope of ASTM C552, “Standard Specification for Cellular Glass Thermal Insulation”, encompasses applications where the cellular glass is intended to be used on surfaces that operate between -450 F and 800 F. While useful in industrial and pipe applications, this temperature range is much broader than needed for typical building material applications and limits the flexibility in the manufacturing operation to modify the formulation or process to tailor the properties to the needs of the building materials market. Therefore, the new material specification of ASTM C1902, “Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications”, is being proposed that is better aligned to service the building materials market. This specification would be differentiated from the existing ASTM C552 specification in the following ways:

1. Narrow the scope of the service temperature range to that of typical building applications

a. From the industrial temperature of -450 F to 800 F to the building temperature range of -50 F to 200 F

2. Remove properties that are not pertinent to the building materials market

a. Hot-surface performance warpage – This test refers primarily to high-temperature insulations that are applicable to hot-side temperatures as high as 800°F to determine material warpage or cracking and is not relevant to buildings.

b. Stress corrosion - This test is for insulation in contact with austenitic stainless-steel piping to assess corrosion of a stressed component and is not relevant to buildings.

3. Add properties that are pertinent to the building materials market

a. Dimensional stability - This is a measurement of a material's change in dimensions in response to various environmental exposure conditions, which can be important to building systems.

Cost Impact: The code change proposal will decrease the cost of construction
The current code language requires products to be over-engineered for the building application and does not address dimensional stability, a key characteristic for building insulation. This proposed change addresses dimensional stability, over-engineering, and enables the product density to be reduced to enable lower cost and improved thermal resistance of the cellular glass. The improved thermal resistance

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Mod_11582_Text_RB277-22.pdf

R11582Text Modification

further enables reduced energy usage for the occupied building.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee approved this proposal considering the fact that the proposal adds needed ASTM C1902-20 for cellular glass insulation used in building and roof applications to Table R906.2 for cellular glass board (Vote: 10-0).

Final Hearing Results

RB277-22 AS

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TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

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R11583	/RB280-22				
Date Submitted	04/02/2024	**Section**	908.1	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

This code change proposal provides guidance to building officials and users of the code regarding the use of roof coatings.

Rationale

See attached

R11583Text Modification

See attached

Page: 1

Mod11583_TextOfModification.pdf

R11583Text Modification

RB280-22

Original Proposal

IRC: SECTION R908 (New), R908.1 (New), R908.2 (New), TABLE R908.2 (New)

Proponents: Mark Graham, National Roofing Contractors Assoc., National Roofing Contractors Assoc. (mgraham@nrca.net)

2021 International Residential Code

Add new text as follows:

SECTION R908
ROOF COATINGS

R908.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section R902, R904 and this section. *Roof coatings* shall be installed in accordance with the manufacturer's installation instructions.

R908.2 Material standards. *Roof coating* materials shall comply with one of the standards in Table R908.2.

TABLE R908.2 ROOF COATING MATERIAL STANDARDS

COATING MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

Reason: This code change proposal provides guidance to building officials and users of the code regarding the use of roof coatings. While the IRC already provides a definition for the term "roof coating" and a number of material standards for roof coating products are already referenced in the various roof covering sections of the code, the code currently provides little guidance regarding roof coating use.
This code change proposal adds a new section, Section R908-Roof Coatings, specific to roof coating used on roof coverings. The new section requires roof coating use to comply with the code's fire classification requirements, material requirements and the specific material standard for the roof coating product being used. Also, the installation is required to comply with the manufacturer's installation instructions.

The material standards for the roof coating products included in the table are already included elsewhere in Chapter 9.

This new code section is similar to Section 1509-Roof Coatings that first appears in IBC 2021.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal clarifies the code's requirements regarding the use of roof coatings.

Public Hearing Results

Committee Action **As Submitted**

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Mod_11583_Text_RB280-22.pdf

R11583Text Modification

Committee Reason: The committee approved this proposal considering the fact that the proposal provides guidance for roof coatings. Although the code already defines the term "roof coating" more guidance is needed for the code users. The committee action is consistent with the committee action on RB274-22 (Vote: 10-0).

Final Hearing Results	
RB280-22	AS

Page: 2

Mod_11583_Text_RB280-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

78

R11584	/RB281-22				
Date Submitted	04/02/2024	**Section**	908.3	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Pending Review			Staff Classification	Overlap
Commission Action	Pending Review				

Comments

General Comments Yes

Related Modifications

Original text of mod is not consistent with that of the 2023 FBC - R.

Summary of Modification

Code requires materials and methods for roof replacement to comply with Chapter 9, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes.

Rationale

See attached

1st Comment Period History

R11584-G1

Proponent Drew Smith Submitted 6/25/2024 1:41:50 PM Attachments No

Comment:

Could save approx $.55/sq.ft. to the cost of a roof where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated

R11584Text Modification

See attached

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Mod11584_TextOfModification.pdf

R11584Text Modification

RB281-22

Original Proposal

IRC: R908.3

Proponents: T. Eric Stafford, Insurance Institute for Business and Home Safety

2021 International Residential Code

Revise as follows:

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck*.

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

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905 where permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table R905.1.1(1), Table R905.1.1(2), and Table R905.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and self-adhered underlayment manufacturer.
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Reason: The use of a self-adhered polymer modified bitumen membrane complying with ASTM D1970 is one of several underlayment options permitted for roof coverings in the IRC. ASTM D1970 self-adhered membranes were first recognized in the 2000 IBC and IRC as an underlayment and as an option for an ice barrier. After 20 years of code implementation, it remains approved by shingle manufacturers, underlayment manufacturers and building codes, and has been consistently observed to perform very well as a method for preventing water intrusion in the event the roof covering is lost or damage.

While the code requires materials and methods for roof replacement to comply with Chapter 9, it doesn't provide any specific requirements for what to do where a roof is being replaced and there is an existing self-adhered underlayment other than ice barrier membranes. Section R908.3 requires roof replacement to include the removal of all roof covering layers down to the roof deck. An exception permits one additional layer of an ice barrier membrane where the existing roof has an ice barrier membrane.

As currently written, the code would imply that a self-adhered membrane would have to be removed during a roof replacement. However, depending on the decking material, many self-adhered membranes can be difficult to remove. Some may not be able to be removed without damaging or removing the roof deck. Damaging the deck and/or removing the roof decking can be expensive and unnecessary.

This proposal is a collaboration between the Insurance Institute for Business and Home Safety (IBHS), the Asphalt Roofing Manufacturers Association (ARMA), and the National Roofing Contractors Association (NRCA). It provides specific requirements on acceptable methods for dealing with existing self-adhered membranes during a roof replacement. The underlayment methods in the 2021 IRC include specific methods for preventing water intrusion in the event the roof covering is damaged or lost in high wind regions. The changes proposed herein seek to maintain that level of protection during roof replacement.

ARMA provides guidance on the removal of self-adhered membrane in their Technical Bulletin, Self-Adhering Underlayment Removal Prior

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Mod_11584_Text_RB281-22.pdf

R11584Text Modification

to Steep Slope Re-Roofing: *"Removal of self-adhering underlayment is always recommended in situations in which it can be removed without damaging the deck….If one layer of self-adhering underlayment is in place, and it is not possible to remove it without damaging the deck, installation of a second layer of underlayment over the existing membrane may be permissible: Check with the underlayment manufacturer's installation instructions and local building codes for details. Offset end and side laps in the new and existing underlayment to minimize thickness build-up and "feather in" the new underlayment by extending the new material a minimum of 8" up the slope onto the bare deck. This will reduce the likelihood of problems with drainage and aesthetics. If two or more layers of self-adhering underlayment are in place, all layers should be removed."*

In lieu of an additional layer of self-adhered underlayment, this proposal also permits felt underlayment to be installed in accordance with Tables R905.1.1(1), R905.1.1(2), and R905.1.1(3).

This proposal also provides industry recommended clarifications regarding the installation of an additional layer of an ice barrier membrane.

Cost Impact: The code change proposal will decrease the cost of construction
For existing roofs with one layer of self-adhered membrane underlayment, this proposal would reduce the cost of construction by permitting the existing layer to remain in place.

Public Hearing Results

Committee Action **As Modified**

Committee Modification: R908.3 Roof replacement. Roof replacement shall include the removal of existing layers of roof coverings down to the roof deck.
Exceptions:

1. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905 where permitted by the roof covering manufacturer and ~~self-adhered~~ new ice barrier underlayment manufacturer
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Table R905.1.1(1), Table R905.1.1(2),and Table R905.1.1(3).
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment provided the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and new self-adhered underlayment manufacturer.
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
   3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

Committee Reason: The committee determined that the modification clarifies by adding "new" to the self-adhered underlayment manufacturer. The modification also corrects the "self-adhered" to "new ice barrier". The committee concluded that the proposal, as modified, provides good material guidance and evaluation for roof replacement (Vote: 10-0).

Final Hearing Results

RB281-22 AM

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Mod_11584_Text_RB281-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

79

R11677 | **/RB265-22**

Date Submitted	05/15/2024	**Section**	905.2.8.4	**Proponent**	Mo Madani
Chapter	9	**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

Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word “printed” from the only instance in IRC Chapter 9 where it is used in conjunction with "instructions.

Rationale

See attached

1st Comment Period History

R11677-G1

Proponent Aaron Phillips Submitted 6/21/2024 10:53:41 AM Attachments No

Comment:

ARMA encourages approval of this Mod to permit more sustainable options for sharing instructions.

R11677Text Modification

See attached

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Mod11677_TextOfModification.pdf

R11677Text Modification

RB265-22

Original Proposal

IRC: R905.2.8.4

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org)

2021 International Residential Code

Revise as follows:

R905.2.8.4 Other flashing. Flashing against a vertical front wall, as well as soil stack, vent pipe and chimney flashing, shall be applied in accordance with the asphalt shingle manufacturer's ~~printed~~ instructions.

Reason: Manufacturer's instructions are increasingly made available in media other than printed versions. This proposal removes the word "printed" from the only instance in IRC Chapter 9 where it is used in conjunction with "instructions." Removal of the word "printed" will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal expands available options for delivering manufacturer's instructions, which allows manufacturers to select the option that best serves their customers. There is no basis to expect either a general increase or decrease in cost of construction if this proposal is approved.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee concluded that the proposal reasonably removes the word "printed" where it is used in conjunction with "instructions.". Moreover, this removal permits alternative methods for providing instructions, including digital formats (Vote: 10-0).

Final Hearing Results

RB265-22 AS

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Mod_11677_Text_RB265-22.pdf

TAC: Roofing

Total Mods for **Roofing** in **Pending Review : 80**

Total Mods for report: 80

Sub Code: Residential

80

R11588 | **/RB288-22**

Date Submitted	04/02/2024	**Section**	1003.18	**Proponent**	Mo Madani
Chapter	10	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Pending Review			Staff Classification	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments No

Related Modifications

Summary of Modification

Modifies text of Exception 2, Section R1003.18 "Chimney clearances".

Rationale

See attached

R11588Text Modification

See attached

Page: 1

Mod11588_TextOfModification.pdf

R11588Text Modification

RB288-22

Original Proposal

IRC: R1003.18

Proponents: James Buckley, Buckley Rumford Co., MACS, CFLI (buckley@rumford.com)

2021 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the building or within the exterior wall of the building shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the building, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. Masonry chimneys equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. Where masonry chimneys are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than ~~12 inches (305 mm)~~ 8 inches (203 mm) from the inside surface of the nearest flue lining.
3. Exposed combustible *trim* and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf - supporting the change from 12" to 8" in Exception 3 in 2013 (RB458 - 13) compared an 8" thick chimney in contact with a combustible frame wall to a code-compliant 4" masonry wall plus 2" of air space to the framing and found the 8" thick masonry wall in contact with combustible framing was safer. This is just a special case. Keeping combustibles at least 8"of solid masonry away from the inside surface of the nearest flue lining to make Exception 2 consistent with Exception 3.

Bibliography: The engineering study - https://www.rumford.com/code/EightInchThickTestReport.pdf

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a change in dimension only that will cost nothing.

Public Hearing Results

Committee Action **As Submitted**

Committee Reason: The committee determined that the proposed change is rational, it reduces burden, and consistent with the code requirements (Vote: 10-0).

Final Hearing Results

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Mod_11588_Text_RB288-22.pdf

R11588Text Modification

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