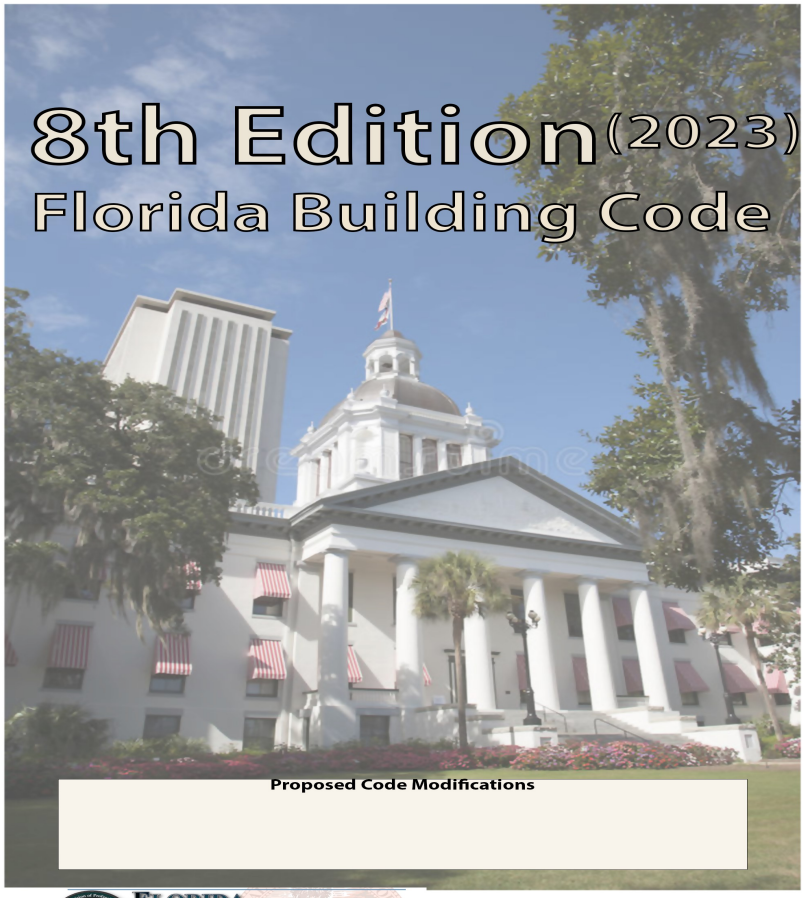


ICC 2021 Code Changes

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

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted – Consent: 9**

Total Mods for report: 40

Sub Code: Building

R9343/G3-18

1

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

Comments

General Comments **Yes**

Related Modifications

202

Summary of Modification

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

Rationale

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

Comment Period History

R9343-G1

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

Comment:

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

Approved as Submitted

2018 International Building Code

Add new definition as follows:

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

Code Change No: G3-18

Original Proposal

Section(s): 202

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

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

2018 International Building Code

Add new definition as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

G3-18 **AS**

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

Comments

General Comments **Yes**

Related Modifications

202

Summary of Modification

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

Rationale

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

Comment Period History

R9467-G1

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

Comment:

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

Comment Period History

R9467-G2

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

Comment:

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Code Change No: G9-19

Original Proposal

Section(s): 202

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

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

2018 International Building Code

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

G9-19 **AS**

R9490/S9-18

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

Comments

General Comments **Yes**

Related Modifications

1508.1

Summary of Modification

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

Rationale

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

Comment Period History

R9490-G1

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

Comment:

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Exceptions:

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

Code Change No: S9-18

Original Proposal

Section(s): 1508.1

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

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

2018 International Building Code

Revise as follows:

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

Exceptions:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S9-18 **AS**

R9508/S14-19

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

Comments

General Comments **Yes**

Related Modifications

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

Summary of Modification

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

Rationale

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

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

(Please see the uploaded mod S14-19 for the complete text)

Comment Period History

R9508-G1

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

Comment:

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

Comment Period History

R9508-G2

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

Comment:

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

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

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

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

Add new text as follows:

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

Add new standard(s) as follows:

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

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

Code Change No: S14-19

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

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

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

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

Add new text as follows:

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

Add new standard(s) as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S14-19 **AS**

R9511/S17-19

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

Comments

General Comments **Yes**

Related Modifications

1504.5.1 (New), Reference Standards SPRI

Summary of Modification

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

Rationale

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

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on theBCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

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

Comment Period History

R911-G1

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

Comment:

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

Approved as Modified by Public Comment 2

Original Proposal:

2018 International Building Code

Add new text as follows:

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

Add new standard(s) as follows:

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

Modified Proposal PC2:

2018 International Building Code

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

Code Change No: S17-19

Original Proposal

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

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

2018 International Building Code

Add new text as follows:

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

Add new standard(s) as follows:

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

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

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on theBCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

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

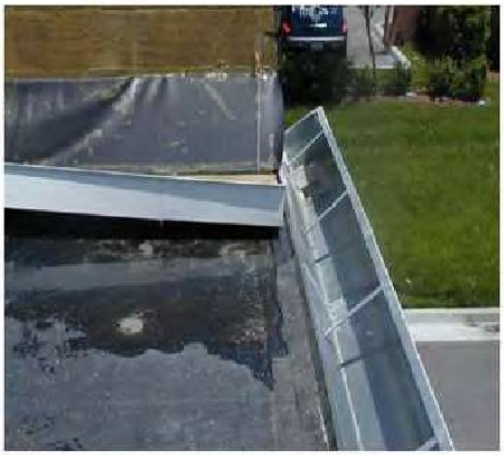
Studies of the aftermath of high-wind events revealed that many gutter systems did not resist the loads that occur during these high-wind events. When gutters are used to secure the roof membrane, a gutter failure can become a much bigger problem as it can cause a roof failure. Examples of these observations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

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

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

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

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



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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Disapproved**

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

Assembly Action: **None**

Public Comments

Public Comment 2:

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

Modify as follows:

2018 International Building Code

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

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

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

This public comment is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as w ell as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/codedevelopment-process/building-code-actioncommitteebcac.

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

Final Action

S17-19 **AMPC2**

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

Comments

General Comments **No**

Related Modifications

1507.3.6

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

1507.3.6 Fasteners. Tile fasteners shall be corrosion resistant and not less than 11-gage, [0.120 inch (3 mm)], $^{5}/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck not less than $^{3}/_{4}$ inch (19.1 mm) or through the thickness of the deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

Code Change No: S28-19

Original Proposal

Section(s): 1507.3.6

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

2018 International Building Code

Revise as follows:

1507.3.6 Fasteners. Tile fasteners shall be corrosion resistant and not less than 11-gage, [0.120 inch (3 mm)], $^{5}/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck not less than $^{3}/_{4}$ inch (19.1 mm) or through the thickness of the deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S28-19	**AS**

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

Comments

General Comments **Yes**

Related Modifications

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

Summary of Modification

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

Rationale

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

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

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

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

Comment Period History

R9518-G1

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

Comment:

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

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

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

Add new text as follows:

-

TABLE 1507.12.2
SINGLE-PLY ROOFING MATERIAL STANDARDS

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

Revise as follows:

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

Delete without substitution

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

-

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

-

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

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

Modified Proposal:

Modify proposal as follows:

TABLE 1507.12.2

SINGLE-PLY ROOFING MATERIAL STANDARDS

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

Code Change No: S31-19

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

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

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

Add new text as follows:

TABLE 1507.12.2
SINGLE-PLY ROOFING MATERIAL STANDARDS

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

Revise as follows:

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

Delete without substitution

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

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

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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1507.12.2
SINGLE-PLY ROOFING MATERIAL STANDARDS

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

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

Assembly Action: **None**

Final Action

S31-19 **AM**

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

Comments

General Comments **Yes**

Related Modifications

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

Summary of Modification

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

Rationale

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

Comment Period History

R9524-G1

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

Comment:

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

Approved as Modified

Original Proposal:

2018 International Building Code

Add new text as follows:

SECTION 1509
ROOF COATINGS

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

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

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227

Modified Proposal:

Modify proposal as follows:

TABLE 1509.2

ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

Code Change No: S35-19

Original Proposal

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

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

2018 International Building Code

Add new text as follows:

SECTION 1509
ROOF COATINGS

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

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

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 1509.2
ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694

Moisture-cured polyurethane coating	ASTM D6947

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

Assembly Action: **None**

Final Action

S35-19 **AM**

Sub Code: Residential

R8950/RB283-19

9

Date Submitted	2/12/2021	**Section**	906	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Approved as Submitted – Consent				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **Yes**

Related Modifications

R906.1, NFPA Chapter 44 (New)

Summary of Modification

During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276.

Rationale

During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276. This proposal will make the code consistent with IBC Section 1508.1. FM 4450 is no longer applicable for this use. NFPA 276 is referenced in the IBC.

Comment Period History

R950-G1

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

Comment:

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

ORIGINAL

AS - APPROVED AS SUBMITTED

Revise as follows:

R906.1 General.~~The use of~~ Where above-deck thermal insulation is installed, such insulation shall be ~~permitted provided that such insulation is~~ covered with an *approved* roof covering and ~~complies with FM 4450~~ shall comply with NFPA 276 or UL 1256.

Add new standard(s) as follows:

NFPA

276-15: Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components

Code Change No: RB283-19

Original Proposal

Section(s): R906.1, NFPA Chapter 44 (New)

Proponent: Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council (mfischer@kellencompany.com)

2018 International Residential Code

Revise as follows:

R906.1 General. ~~The use of~~ Where above-deck thermal insulation is installed, such insulation shall be ~~permitted provided that such insulation is~~ covered with an *approved* roof covering and ~~complies with FM 4450~~ shall comply with NFPA 276 or UL 1256.

Add new standard(s) as follows:

NFPA

276-15: Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-deck Roofing Components

Reason: During the development of the 2012 IBC, FM 4450 was removed from the IBC requirements for roof insulation and replaced with NFPA 276. This proposal will make the code consistent with IBC Section 1508.1. FM 4450 is no longer applicable for this use. NFPA 276 is referenced in the IBC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial in nature to align with IBC requirements.

Staff Analysis: The referenced standard, NFPA 276-15, is currently referenced in other 2018 I-codes.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The replacement of FM4450 with NFPA 276 for roof insulation is appropriate and will be consistent with the IBC. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB283-19 **AS**

TAC: Roofing

Total Mods for **Roofing** in **Denied – Consent: 28**

Total Mods for report: 40

Sub Code: Building

R9466/G8-19

10

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

Comments

General Comments **Yes**

Related Modifications

[BS] 202

Summary of Modification

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

Rationale

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

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

(Please see uploaded mod G8-19 for the complete text)

Comment Period History

R9466-G1

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

Comment:

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

Modified Proposal:

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

Code Change No: G8-19

Original Proposal

Section(s): [BS] 202

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

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

2018 International Building Code

Revise as follows:

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

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

Assembly Action: **None**

Final Action

G8-19 **AM**

R9167/CCC-IBC5-19

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

Comments

General Comments **No**

Related Modifications

IBC®: 1504.1, 1504.1.1, TABLE 1504.1.1

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

Summary of Modification

Reordering of the section numbering

Rationale

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

Please see attachment

CCC-IBC5-19

IBC®: 1504.1, 1504.1.1, TABLE 1504.1.1

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

2018 International Building Code

Revise as follows:

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

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

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

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

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

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

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

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

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

Proposal # 5631

R9168/CCC-IBC2-19

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

Comments

General Comments **No**

Related Modifications

This section is marked reserved under the 2020 FBC-B

Summary of Modification

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

Rationale

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

Please see attachment

CCC-IBC2-19

IBC®: 1504.8

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

2018 International Building Code

Revise as follows:

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

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

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

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

Proposal # 5462

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

Comments

General Comments **Yes**

Related Modifications

1505.9

FBC-B/Section 1505.8

Summary of Modification

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

Rationale

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

Comment Period History

R9322-G1

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

Comment:

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Code Change No: FS152-18

Original Proposal

Section(s): 1505.9

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

2018 International Building Code

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

FS152-18 **AS**

R9487/S1-18

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

Comments

General Comments **No**

Related Modifications

[P]1502.1, [P]1502.2

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

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

Code Change No: S1-18

Original Proposal

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

Proponent: Mark Graham (mgraham@nrca.net)

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

2018 International Building Code

Revise as follows:

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S1-18 **AS**

R9488/S3-18

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

Comments

General Comments **No**

Related Modifications

[BF] 1505.8, [BF] 1505.9

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

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

Code Change No: S3-18

Original Proposal

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

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

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

2018 International Building Code

Revise as follows:

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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S3-18 **AS**

R9493/S13-18

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

Comments

General Comments **No**

Related Modifications

1510.7, 1510.7.1, 1510.7.2, 1512, 1512.1

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

Summary of Modification

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

Rationale

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

Section 1510.7 is redundant with IBC Section 3111.3:

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

Approved as Submitted

2018 International Building Code

Delete without substitution:

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

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

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

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

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

Code Change No: S13-18

Original Proposal

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

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

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

2018 International Building Code

Delete without substitution:

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

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

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

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

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

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

Section 1510.7 is redundant with IBC Section 3111.3:

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

Section 1510.7.2 is redundant with IBC Section 3111.3.1:

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

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

IBC Section 1512 is redundant with IBC Section 3111.3:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S13-18 **AS**

R9504/S5-19

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

Comments

General Comments **No**

Related Modifications

1511.3 (IEBC 705.3)

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

Summary of Modification

Modifies text of Section 1511.3 "Roof replacement".

Rationale

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

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

IBC Section 1511.1 reads:

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

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

Modified Proposal:

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

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

Code Change No: S5-19

Original Proposal

Section(s): 1511.3 (IEBC 705.3)

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

2018 International Building Code

Revise as follows:

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

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

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

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

IBC Section 1511.1 reads:

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

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

Assembly Action: **None**

Final Action

S5-19 **AM**

R9505/S10-19

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

Comments

General Comments **No**

Related Modifications

1511.5 (IEBC 705.5)

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Code Change No: S10-19

Original Proposal

Section(s): 1511.5 (IEBC 705.5)

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

2018 International Building Code

Revise as follows:

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S10-19 **AS**

R9506/S12-19

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

Comments

General Comments **Yes**

Related Modifications

1503.3, 1503.3.1 (New), 1503.3.2 (New)

Summary of Modification

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

Rationale

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

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

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

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

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

Comment Period History

R9506-G1

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

Comment:

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

Add new text as follows:

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

Revise as follows:

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

Modified Proposal:

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

Code Change No: S12-19

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

Add new text as follows:

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

Revise as follows:

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

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

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

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

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

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

Assembly Action: **None**

Final Action

S12-19 **AM**

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

Comments

General Comments **No**

Related Modifications

1503.3, 1503.3.1 (New), 1503.3.2 (New)

Summary of Modification

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

Rationale

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

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

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

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

Add new text as follows:

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

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

Modified Proposal:

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

Code Change No: S13-19

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

Add new text as follows:

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

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

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

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

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

Examples of covered parapets as required by 1503.3.2.

Examples of coped parapets as required by 1503.3.1.

Fascia on 6" wide by 4" high "Parapet"

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

Hyvee Iowa Fascia on 18" parapet condition

Rowan project – Fascia on 24" parapet

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

Assembly Action: **None**

Final Action

S13-19 **AM**

R9509/S15-19

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

Comments

General Comments **No**

Related Modifications

1504.4, 1504.8

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

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

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

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

Code Change No: S15-19

Original Proposal

Section(s): 1504.4, 1504.8

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

2018 International Building Code

Revise as follows:

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

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

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

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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: None

Final Action

S15-19 **AS**

R9510/S16-19

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

Comments

General Comments **No**

Related Modifications

1504.5

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

Summary of Modification

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

Rationale

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

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

Modified Proposal:

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

Code Change No: S16-19

Original Proposal

Section(s): 1504.5

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

2018 International Building Code

Revise as follows:

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

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

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. Since 2017 the BCAC has held 6 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: https://www.iccsafe.org/codes-tech-support/codes/code-development-process/building-code-action-committee-bcac/.

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

Assembly Action: **None**

Final Action

S16-19 **AM**

R9512/S18-19

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

Comments

General Comments **No**

Related Modifications

1504.7

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Code Change No: S18-19

Original Proposal

Section(s): 1504.7

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

2018 International Building Code

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S18-19	**AS**

R9513/S21-19

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

Comments

General Comments **No**

Related Modifications

1504.8, TABLE 1504.8, S19-16

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

Summary of Modification

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

Rationale

: In summary, this proposal has the following features:

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

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

Delete and substitute as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Modifies Proposal:

Modify proposal as follows:

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

TABLE 1504.8

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

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

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

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

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

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

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

Code Change No: S21-19

Original Proposal

Section(s): 1504.8, TABLE 1504.8

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

2018 International Building Code

Revise as follows:

Delete and substitute as follows:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Bibliography:

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

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

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

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

Engineering, AAWE.

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

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

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

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

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

Assembly Action: **None**

Final Action

S21-19 **AM**

R9514/S22-19

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

Comments

General Comments **Yes**

Related Modifications

1506, 1506.1

Summary of Modification

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

Rationale

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

Comment Period History

R9514-G1

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

Comment:

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

Approved as Modified

Original Proposal:

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

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

Modified Proposal:

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

Code Change No: S22-19

Original Proposal

Section(s): SECTION 1506, 1506.1

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

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

Assembly Action: **None**

Final Action

S22-19 **AM**

R9515/S24-19

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

Comments

General Comments **No**

Related Modifications

1507.1.1

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Exceptions:

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

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

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

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

Code Change No: S24-19

Original Proposal

Section(s): 1507.1.1

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

2018 International Building Code

Revise as follows:

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

Exceptions:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S24-19 **AS**

R9516/S25-19

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

Comments

General Comments **No**

Related Modifications

1507.3.1

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

Summary of Modification

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

Rationale

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

Approved as Modified

Original Proposal:

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

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

Modified Proposal:

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

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

Code Change No: S25-19

Original Proposal

Section(s): 1507.3.1

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

2018 International Building Code

SECTION 1506
MATERIALS

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

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

Assembly Action: **None**

Final Action

S25-19 **AM**

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

Comments

General Comments **No**

Related Modifications

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

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

Summary of Modification

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

Rationale

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

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

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

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

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

Delete without substitution:

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

Add new standard(s) as follows:

UL

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

Modified Proposal:

Modify proposal as follows:

TABLE 1504.1.1

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

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

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

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

Code Change No: S33-19 Part I

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

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

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

Delete without substitution:

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

Add new standard(s) as follows:

UL

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

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

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

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

Assembly Action: **None**

Final Action

S33-19 Part I **AM**

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

Comments

General Comments **No**

Related Modifications

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

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

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

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

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

3111.3.1 Equipment. Photovoltaic panels and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

Add new standard(s) as follows:

UL

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

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

Code Change No: S34-19 Part I

Original Proposal

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

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

2018 International Building Code

Revise as follows:

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

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

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

3111.3.1 Equipment. Photovoltaic panels and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

Add new standard(s) as follows:

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S34-19 Part I **AS**

Sub Code: Residential

R8488/RB21-19

Date Submitted	2/4/2021	**Section**	202	**Proponent**	Mo Madani
Chapter	2	**Affects HVHZ**	Yes	**Attachments**	Yes
TAC Recommendation	Denied – Consent			**Staff Classification**	Correlates Directly
Commission Action	Pending Review				

Comments

General Comments **Yes**

Related Modifications

Summary of Modification

This proposal simply revises the definition of roof assembly.

Rationale

This proposal simply revises the definition of roof assembly. The recent action on WUI proposal WUIC 1 added into the IWUIC a definition based on the IBC definition of roof assembly and it is being proposed here as a revision, for consistency among ICC definitions. Furthermore this definition is more accurate since not all roof assemblies will include an underlayment and the sentence already states that it does include a roof deck and, therefore, stating that it "can include a roof deck" is not correct. The proposed definition reads as follows:

[RB] ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof deck, underlayment and roof covering, and can also include a can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Comment Period History

R8488-G1

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

Comment:

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

Comment Period History

R8488-G2

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

Comment:

The Florida Home Builders Association (FHBA) requests denial of this code change due to the inclusion of the reference to Chapter 11 Section N1101.6.

AS - APPROVED AS SUBMITTED

Revise as follows:

[RB] ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly ~~includes the roof deck, underlayment and *roof covering*, and can also include a~~ can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Code Change No: RB21-19

Original Proposal

Section(s): [RB] 202

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2018 International Residential Code

Revise as follows:

[RB] ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly ~~includes the roof deck, underlayment and *roof covering*, and can also include a~~ can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

Reason: This proposal simply revises the definition of roof assembly. The recent action on WUI proposal WUIC 1 added into the IWUIC a definition based on the IBC definition of roof assembly and it is being proposed here as a revision, for consistency among ICC definitions. Furthermore this definition is more accurate since not all roof assemblies will include an underlayment and the sentence already states that it does include a roof deck and, therefore, stating that it "can include a roof deck" is not correct.

The proposed definition reads as follows:

> **[RB] ROOF ASSEMBLY.** A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof deck, underlayment and roof covering, and can also include a can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal based on the proponents published reason statement. These changes are consistent with other codes. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB21-19 **AS**

Date Submitted	3/3/2021	**Section**	324.3.1	**Proponent**	Mo Madani
Chapter	3	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

IRC: R324.3.1, R905.16.4, R905.17.5, Reference Standards UL

Sections R05.16.4 and R905.17.5 do not exist in the 2020 FBC-R.

Summary of Modification

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

Rationale

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

Approved as Submitted

2018 International Residential Code

Revise as follows:

R324.3.1 Equipment listings. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

Add new standard(s) as follows:

UL

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

Code Change No: S34-19 Part II

Original Proposal

Section(s): IRC®: R324.3.1, R905.16.4, R905.17.5, UL Chapter 44

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

2018 International Residential Code

Revise as follows:

R324.3.1 Equipment listings. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2.

Add new standard(s) as follows:

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This harmonizes the referenced standards and provides options. (Vote: 10-0)

Assembly Action: **None**

Final Action

S34-19 Part II **AS**

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

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

Summary of Modification

The proposal makes two editorial changes.

Rationale

The proposal makes two editorial changes. The alternate for ASTM D 1970 is redundant as that standard is listed in Section R905.1.1. Table R905.1.1 (1) includes ASTM D226 Type II for high wind areas; that material is also appropriate for lower wind zone areas.

ORIGINAL

AS - APPROVED AS SUBMITTED

AM - APPROVED AS MODIFIED USING PUBLIC COMMENT 1

Revise as follows:

R905.1.1 Underlayment. ***Underlayment*** **for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and** ***photovoltaic shingles*** **shall conform to the applicable standards listed in this chapter.** ***Underlayment*** **materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1).** ***Underlayment*** **shall be applied in accordance with Table R905.1.1(2).** ***Underlayment*** **shall be attached in accordance with Table R905.1.1(3).**

Exceptions:

1. ~~As an alternative, self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970 installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.~~
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* for the applicable roof covering for maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:

   3.1. Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).

   3.2. The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.

   3.3. *Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).

   3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19 mm) into the roof sheathing.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 140 MPH	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult = 140 MPH
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D6757
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ASTM D6757

For SI: 1 mile per hour = 0.447 m/s.

MODIFICATION
PUBLIC COMMENT 1

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

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

2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a label indicating compliance to complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering for maximum ultimate design wind speeds, Vult, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2(4)B. Underlayment shall be attached in accordance with Table R905.1.1(3).

3. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:

   3.1. Apply a 19-inch-wide (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).

   3.2. The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.

3.3. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).

3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19 mm) into the roof sheathing.

Code Change No: RB274-19

Original Proposal

Section(s): R905.1.1, TABLE R905.1.1(1)

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

2018 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. ~~As an alternative, self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970 installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.~~
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* for the applicable roof covering for maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:
   3.1. Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).
   3.2. The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.
   3.3. *Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).
   3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch (19 mm) into the roof sheathing.

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 140 MPH	MAXIMUM ULTIMATE DESIGN WND SPEED, Vult ≥ 140 MPH
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ASTM D6757
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral- surfaced roll roofing
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ASTM D6757

For SI: 1 mile per hour = 0.447 m/s.

Reason: The proposal makes two editorial changes. The alternate for ASTM D 1970 is redundant as that standard is listed in Section R905.1.1. Table R905.1.1 (1) includes ASTM D226 Type II for high wind areas; that material is also appropriate for lower wind zone areas.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: The committee approved this proposal based on the proponent's reason. The alternate for ASTM D1970 is redundant since it is listed in Section R905.1.1. Table R905.1.1(1) includes ASTM D226 Type II for high wind areas and is also appropriate for low wind zones. (Vote: 11-0)

Assembly Action: **None**

Public Comments

Public Comment 1:

T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Public Comment

Further modify as follows:

2018 International Residential Code

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance to ASTM D1970, and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a label indicating compliance to complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering for maximum ultimate design wind speeds, Vult, less than 140 miles per hour shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2(4)B. Underlayment shall be attached in accordance with Table R905.1.1(3).
3. As an alternative, two layers of underlayment complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:
   - 3.1. Apply a 19-inch-wide (483 mm) strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).
   - 3.2. The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.
   - 3.3. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).
   - 3.4. The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch (19 mm) into the roof sheathing.

Commenter's Reason: This public comment corrects 2 errors. While underlayment complying with ASTM D1970 is mentioned in Section R905.1.1, it is not specifically mentioned in Tables R905.1.1(1), R905.1.1(2), or R905.1.1(3). The exception is needed to maintain some of the specific criteria for the use of this underlayment such as roof ventilation and climate exposure.

The second part corrects an error related to the use 4 inch wind strips complying with ASTM D1970 over the joints in the roof deck. In areas where wind design is required in accordance with Figure R301.2(5)B, the intent was for the underlayment to be ASTM D226 Type II or ASTM D4868 Types III or IV with the enhanced fastening. This public comment makes that correction and also adds an additional modification to correlate with RB275 which was Approved as Submitted by the IRC B Committee.

This public comment also clarifies labeling language for ASTM D1970 underlayment products that is consistent with other underlayment products referenced in this section.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment will slightly increase the cost of construction. In areas where wind design is required, a heavier felt underlayment (30#) and enhanced fastening is required over the taped joints in the roof deck.

Final Action

RB274-19 **AMPC1**

R8946/RB275-19

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

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

Summary of Modification

This code change simply requires an extra layer of 30# roofing felt

Rationale

This code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2018 IRC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where wind design is required in accordance with Figure R301.2(4)B. The wind design required trigger is consistent with other limitations in the IRC and would also capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for the northeastern U.S. and Alaska, where the wind design required region is based on the 140 mph wind speed contour, the trigger remains the same. This proposal would also remove the enhanced underlayment requirements from the Special Wind Regions.

ORIGINAL

AS - APPROVED AS SUBMITTED

Revise as follows:

R905.1.1 Underlayment. ***Underlayment*** **for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and** ***photovoltaic shingles*** **shall conform to the applicable standards listed in this chapter.** ***Underlayment*** **materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1).** ***Underlayment*** **shall be applied in accordance with Table R905.1.1(2).** ***Underlayment*** **shall be attached in accordance with Table R905.1.1(3).**

Exceptions:

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

2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* for the applicable roof covering for ~~maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour~~ areas where wind design is not required in accordance with Figure R301.2(4)B shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.

3. ~~As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:~~

   3.1. ~~Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).~~

   3.2. ~~The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.~~

   3.3. ~~*Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32 gage sheet metal. Power driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).~~

   3.4. ~~The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140~~
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IVASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D6757~~
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing~~
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ~~ASTM D6757~~

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2)

UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12),underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
		eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied In the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches ,Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	~~For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 unitshorizontal (4:12), u~~Underlayment shall be twolayers applied in the following
Mineral-surfaced roll roofing	R905.5		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Slate and slate-type shingles	R905.6		manner: apply a19-inch strip of underlayment felt parallel to andstarting at the eaves. Starting at the eave, apply36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4inches and shall be offset by 6 feet.~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall beone layer applied in the following manner: underlaymentshall be applied shingle fashion, parallelto and starting from the eave and lapped 4 inches.End laps shall be 4 inches and shall be offset by 6 feet.~~
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		
Photovoltaic shingles	R905.16	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

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

TABLE R905.1.1(3)

UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic caps ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Clay and concrete tile	R905.3		
Photovoltaic	R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic caps ~~nails or cap staples with a nominal cap diameter of not lessthan 1 inch~~. Metal caps shall have a thickness of not less than32-gage sheet metal. Power-driven metal caps shall have aminimum thickness of 0.010 inch. Minimum thickness of theoutside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} = 140 MPH~~
			penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.

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

Code Change No: RB275-19

Original Proposal

Section(s): R905.1.1, TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3)

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

2018 International Residential Code

Revise as follows:

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, metal roof panels and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970 installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* for the applicable roof covering for ~~maximum ultimate design wind speeds, V_{ult}, less than 140 miles per hour~~ areas where wind design is not required in accordance with Figure R301.2(4)B shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.
3. ~~As an alternative, two layers of *underlayment* complying with ASTM D226 Type II or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1–3.4:~~
   - 3.1. ~~Apply a 19-inch-wide (483 mm) strip of *underlayment* parallel with the eave. Starting at the eave, apply 36-inch-wide (914 mm) strips of *underlayment* felt, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).~~
   - 3.2. ~~The *underlayment* shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps.~~
   - 3.3. ~~*Underlayment* shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32 gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm).~~
   - 3.4. ~~The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~

TABLE R905.1.1(1)
UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140~~
Asphalt shingles	R905.2	ASTM D226 Type I ASTM D4869 Type I, II, III or IVASTM D6757	ASTM D226 Type II ASTM D4869 Type III or Type IV ~~ASTM D6757~~
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing	ASTM D226 Type II ~~ASTM D2626 Type IASTM D6380 Class M mineral-surfaced roll roofing~~
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or Type IV
Metal panels	R905.10	Manufacturer's instructions	ASTM D226 Type II ASTM D4869 Type III or Type IV
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757	ASTM D4869 Type III or Type IV ~~ASTM D6757~~

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2)
UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
Asphalt shingles	R905.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12),underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
		inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied In the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches ,Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	~~For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 unitshorizontal (4:12), u~~Underlayment shall be twolayers applied in the following manner: apply a19-inch strip of underlayment felt parallel to andstarting at the eaves. Starting at the eave, apply36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. End laps shall be 4inches and shall be offset by 6 feet.~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall beone layer applied in the following manner: underlaymentshall be applied shingle~~
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
			~~fashion, parallelto and starting from the eave and lapped 4 inches.End laps shall be 4 inches and shall be offset by 6 feet.~~
Photovoltaic shingles	R905.16	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	~~Same as Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph, except all laps shall be not less than 4 inches.~~ Underlayment shall be two layers applied in the followingmanner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch- wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

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

TABLE R905.1.1(3)
UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic caps ~~nails or cap staples with a nominal cap diameter of not less than 1 inch~~. Metal caps shall have a thickness of not less than 32-gage sheet
Clay and concrete tile	R905.3		
Photovoltaic	R905.16		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} < 140 MPH~~	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2(4)B ~~MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} ≥ 140 MPH~~
			metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
Metal roof shingles	R905.4	Manufacturer's installation instructions.	The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps witha 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1 inch diameter metal or plastic caps ~~nails or cap staples with a nominal cap diameter of not lessthan 1 inch~~. Metal caps shall have a thickness of not less than32-gage sheet metal. Power-driven metal caps shall have aminimum thickness of 0.010 inch. Minimum thickness of theoutside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch ~~for ring shank cap nailsand 0.091 inch for smooth shank cap nails. Staples shall benot less than 21 gage.~~ The ~~C~~cap nail shank ~~and cap staple legs~~ shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

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

Reason: This code change simply requires an extra layer of 30# roofing felt (ASTM D 226 Type II, or ASTM D 4869 Types III or IV) for areas vulnerable to roof covering loss and subsequent water intrusion in the hurricane-prone regions. The fastening of the underlayment remains the same as required in the 2018 IRC except the use of staples as a fastening method has been removed. The effectiveness of staples in keeping the underlayment in place when subjected to hurricane-level wind loads has not been tested. Additionally, the trigger for the enhanced underlayment has been changed to where wind design is required in accordance with Figure R301.2(4)B. The wind design required trigger is consistent with other limitations in the IRC and would also capture areas impacted by Hurricane Michael where design wind speeds currently range from 130 mph to 140 mph. However, for the northeastern U.S. and Alaska, where the wind design required region is based on the 140 mph wind speed contour, the trigger remains the same. This proposal would also remove the enhanced underlayment requirements from the Special Wind Regions.

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

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

available for use. An insurance closed claims study for residential properties conducted following Hurricane Charley in 2004 indicated interior losses and additional living expenses were 27% of the total loss costs.

Recent hurricanes have not been an exception. The following photographs show buildings damaged due to Hurricane Michael which impacted Mexico Beach and the Panama City area of Florida (other areas as well). While structurally, the buildings performed well, each had extensive interior damage likely due to wind driven rain and roof covering loss. Also, parts of North Carolina that were hit by Hurricane Florence in 2018 are in areas where the design wind speed is around 145 mph. However, these areas suffered substantial residential roof damage at winds which measured only at around 100 mph.

Tests performed by IBHS at the Research Center have consistently shown that the secondary roof underlayment strategies recommended by the IBHS Fortified Home™ - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. Two of these strategies are already recognized by the code in Exceptions 1 and 2 to Section R905.1.1. A 2011 hurricane demonstration clearly showed the benefit of sealing the seams of the roof deck sheathing which is one of the strategies recognized in Exception 2 to Section R905.1.1.

A summary of the results of the demonstration can be viewed at the following link: http://ibhstest.wpengine.com/ibhs-news-releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following link: https://disastersafety.org/thunderstorms/wind-driven-rain-demo/.

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

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

Cost Impact: The code change proposal will increase the cost of construction
If one of the methods in Exceptions 1 or 2 of Section R905.1.1 are used, this proposal will not increase the cost of construction.

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved for several reasons. This proposal will reduce water infiltration. The double under layment is moving towards a sealed roof deck. The provisions are only applicable in greater than 130 mph zones, so this will benefit high wind regions and reduce storm damage. (Vote: 10-1)

Assembly Action: **None**

Final Action

RB275-19 **AS**

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **Yes**

Related Modifications

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

Summary of Modification

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

Rationale

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

Comment Period History

R8947-G1

Proponent Alan Gremillion **Submitted** 7/1/2021 **Attachments** No

Comment:

If an additional layer of 30# felt is installed, then this would increase construction costs = $300 for a 2,000 home.

ORIGINAL

AM - APPROVED AS MODIFIED

Revise as follows:

R905.3.1 Deck requirements.Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

MODIFICATION

PUBLIC COMMENT 1

R905.3.1 Deck requirements.Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in Seismic Design Categories A, B and C.

Code Change No: RB277-19

Original Proposal

Section(s): R905.3.1

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

2018 International Residential Code

Revise as follows:

R905.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~sheathing or spaced~~ structural sheathing boards.

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

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal limits the "spaces sheathing", therefore it does not increase any cost.

Report of Committee Action Hearings

Committee Action: **Disapproved**

Committee Reason: It is not appropriate that these sheathing types should not be allowed anywhere but in high seismic zones. (Vote: 6-5)

Assembly Action: **None**

Public Comments

Public Comment 1:

Shahen Akelyan, representing ICC LA Basin Chapter (shahen.akelyan@lacity.org) requests As Modified by Public Comment

Modify as follows:

2018 International Residential Code

R905.3.1 Deck requirements. Concrete and clay tile shall be installed only over solid ~~structural~~ sheathing ~~boards~~.

Exception: Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in Seismic Design Categories A, B and C.

Commenter's Reason: The proposed modification to the original proposal clarifies the structural board/sheathing and adds an exception to the projects in Seismic Design Categories A, B, and C. The intent of the proposal was to have a limitation in High Seismic Area.

During the Committee Action Hearings in Albuquerque, New Mexico, we attempted to propose a floor modification that would have proposed the subject change and exception. Unfortunately, it was ruled out of order. However, with the original language, the proposal was disapproved with only 6-5 vote. The committee commented positively about the proposal and suggested to submit a public comment to bring in the floor modification.

The similar proposal and floor modification was submitted to the IBC under S25-19, and it was approved, as modified, by the committee. This proposal will be constant with the approved proposal in IBC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction The proposal limits the "spaced sheathing", therefore it does not increase any cost.

Final Action

RB277-19 **AMPC1**

R8948/RB278-19

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

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

Summary of Modification

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

Rationale

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

ORIGINAL

AS - APPROVED AS SUBMITTED

Revise as follows:

R905.3.6 Fasteners. Nails shall be corrosion resistant and not less than 11-gage, [0.120 inch (3 mm)] $^{5}/_{16}$-inch (11 mm) head, and of sufficient length to penetrate the deck not less than $^{3}/_{4}$ inch (19 mm) or through the thickness of the deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2 mm). Perimeter fastening areas include three tile courses but

Date Submitted	2/12/2021	**Section**	905	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Correlates Directly

Comments

General Comments **No**

Related Modifications

R301.2.1, R905.4.4.1(New), TABLE R905.4.4.1 (New), FM Chapter 44 (New), UL Chapter 44 (New)

This code change is already part of the 2020 FBC-R.

Summary of Modification

This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

Rationale

This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

ORIGINAL

AM - APPROVED AS MODIFIED

Add new text as follows:

R905.4.4.1 Wind Resistance of metal roof shingles.Metal roof shingles applied to a solid or closely fitted deck shall be tested in accordance with ASTM D3161, FM 4474, UL 580, or UL 1897. Metal roof shingles tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a label to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1

TABLE R905.4.4.1
CLASSIFICATION OF ASPHALT STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,VASDFROM TABLE R301.2.1.3 (mph)	ASTM D7158[a] SHINGLE CLASSIFICATION	ASTM D3161 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

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

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

Revise as follows:

R301.2.1 Wind design criteria.Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design wind speed in Table R301.2(1) as determined from Figure R301.2(5)A. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. Metal roof shingles shall be designed for wind speeds in accordance with Section R905.4.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

Add new text as follows:

FM
4474—2011: American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

UL
580—2006: Test for Uplift Resistance of Roof Assemblies—with Revisions through October 2013

MODIFICATION
COMMITTEE MODIFICATION

Committee Modification:

TABLE R905.4.4.1

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

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	~~ASTM D7158[a] SHINGLE CLASSIFICATION~~	ASTM D3161 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

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

Code Change No: RB279-19

Original Proposal

Section(s): R301.2.1, R905.4.4.1(New), TABLE R905.4.4.1 (New), FM Chapter 44 (New), UL Chapter 44 (New)

Proponents: Andy Williams, Metal Construction Association, representing Metal Construction Association (afwilliams@Connect2amc.com)

2018 International Residential Code

Add new text as follows:

R905.4.4.1 Wind Resistance of metal roof shingles. Metal roof shingles applied to a solid or closely fitted deck shall be tested in accordance with ASTM D3161, FM 4474, UL 580, or UL 1897. Metal roof shingles tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a label to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1

TABLE R905.4.4.1
CLASSIFICATION OF ASPHALT STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,VASDFROM TABLE R301.2.1.3 (mph)	ASTM D7158[a] SHINGLE CLASSIFICATION	ASTM D3161 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

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

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

Revise as follows:

R301.2.1 Wind design criteria. Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design wind speed in Table R301.2(1) as determined from Figure R301.2(5)A. The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. Metal roof shingles shall be designed for wind speeds in accordance with Section

R905.4.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

Add new text as follows:

FM
4474—2011: American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

UL
580—2006: Test for Uplift Resistance of Roof Assemblies—with Revisions through October 2013

Reason: This proposal recognizes wind resistance of "metal roof shingles" as a separate item in Section R905.4.4.1. This product is not the same in all respects as asphalt shingles (Section R905.2.4.1) which is the reason for addition of this section.

Table R905.2.4.1 is appropriate to metal roof shingles. The title is changed to reflect modifications that were made to ASTM D3161 dating back to 2013.

The major issue is that the wind uplift testing is currently addressed by multiple standards that determine compliance through uplift ratings. Metal shingle performance is not correctly represented by these current tests due to the air permeability inherent in the design of the shingle units, so a fan-induced method was developed through ASTM, with UL as a major proponent, as an alternative to the required uplift resistance testing. Manufacturers use one or more of the standards listed to determine this performance and feel they should choose the correct and most representative method to show compliance.

ASTM D3161 (Fan Induced) was originally created for asphalt shingles however the standard was expanded in 2013 to evaluate wind resistance of discontinuous, air permeable, steep slope roofing products with or without contribution from adhesives or mechanical interlocking to hold down the leading tab edge and is not limited to asphalt shingles. This clearly includes metal shingles (specifically identified in Scope Section 1.3).

ASTM D3161 removes difficulties for metal shingle manufacturers currently required to run UL 1897 or UL 580 in a non-air-permeable manner that does not fairly represent the product. UL has provided metal shingle wind classifications for many years and currently has D3161-related listings in the Online Classification Directory. UL was also a proponent of the D3161 scope change showing acceptance of D3161 as a means to demonstrate metal shingle wind resistance. The scope is clear. "This test method was formerly titled "Wind Resistance of Asphalt Shingles (Fan-Induced Method)" but was revised to acknowledge that the method is applicable to many other steep slope roofing products and has been used to evaluate the wind resistance of those products for many years by several testing and certification laboratories."

The modification to Section R301.2.1 is placed to point the reader to Section R905.4.4.1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal introduces alternate wind resistance testing that is more appropriate to metal shingles.

Staff Analysis: The referenced standard, FM 4474-2011 and UL 580-2006/13, is currently referenced in other 2018 I-codes.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Committee Modification:

TABLE R905.4.4.1
CLASSIFICATION OF STEEP SLOPE METAL ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 ~~OR D7158~~

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	~~ASTM D7158[a] SHINGLE CLASSIFICATION~~	ASTM D3161 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

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

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

Committee Reason: The modification removed the third column in the table to make the proposal specific to metal roofs. The committee removed the footnote for coordination with the approval of the modification. The modified proposal was approved because it provides criteria for metal roofs. This will be consistent with the proposal for asphalt shingles. (Vote: 11-0)

Assembly Action: **None**

Final Action

RB279-19 **AM**

Date Submitted	3/3/2021	**Section**	902.3	**Proponent**	Mo Madani
Chapter	9	**Affects HVHZ**	No	**Attachments**	Yes
TAC Recommendation	Denied – Consent				
Commission Action	Pending Review			**Staff Classification**	Overlap

Comments

General Comments **No**

Related Modifications

R902.3, R905.16.6, R905.16.4, TABLE R905.16.6 (New), R905.17.5, R905.17.7, UL Chapter 44 (New)

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

Summary of Modification

BIPV products are designed to directly replace roof covering, therefore a BIPV system must be evaluated not only as a PV module but also as a roof covering with additional Code required to verify performance.

Rationale

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

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

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

R902.3 Building-integrated photovoltaic product. Building-integrated photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with ~~Section R902.1~~UL 7103. Class A, B or C *BIPV products* shall be installed where the edge of the roof is less than 3 feet (914 mm) from a lot line.

R905.16.6 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table ~~R905.2.4.1~~ R905.16.6 for the appropriate maximum basic wind speed. ~~*Photovoltaic shingle* packaging shall bear a label to indicate compliance with the procedures in ASTM D3161 and the required classification from Table R905.2.4.1.~~

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL ~~1703~~7103.

Add new text as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	UL 7103[a] SHINGLE CLASSIFICATION	UL 7103 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL ~~1703~~7103.

Delete without substitution:

~~**R905.17.7 Wind resistance. BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.**~~

Add new standard(s) as follows:

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

Modified Proposal:

Modify proposal as follows:

TABLE R905.16.6

Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3(mph)	~~UL 7103[a] SHINGLE CLASSIFICATION~~	UL 7103 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

~~a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Code Change No: S33-19 Part II

Original Proposal

Section(s): R902.3, R905.16.6, R905.16.4, TABLE R905.16.6 (New), R905.17.5, R905.17.7, UL Chapter 44 (New)

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

2018 International Building Code

Revise as follows:

R902.3 Building-integrated photovoltaic product. Building-integrated photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with ~~Section R902.1~~ UL 7103. Class A, B or C *BIPV products* shall be installed where the edge of the roof is less than 3 feet (914 mm) from a lot line.

R905.16.6 Wind resistance. *Photovoltaic shingles* shall ~~be tested in accordance with procedures and acceptance criteria in ASTM D3161. *Photovoltaic shingles* shall~~ comply with the classification requirements of Table ~~R905.2.4.1~~ R905.16.6 for the appropriate maximum basic wind speed. ~~*Photovoltaic shingle* packaging shall bear a label to indicate compliance with the procedures in ASTM D3161 and the required classification from Table R905.2.4.1.~~

R905.16.4 Material standards. *Photovoltaic shingles* shall be listed and labeled in accordance with UL ~~1703~~ 7103.

Add new text as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	UL 7103[a] SHINGLE CLASSIFICATION	UL 7103 SHINGLE CLASSIFICATION
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.

Revise as follows:

R905.17.5 Material standards. *BIPV roof panels* shall be *listed* and *labeled* in accordance with UL ~~1703~~ 7103.

Delete without substitution:

~~**R905.17.7 Wind resistance.** BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.~~

Add new standard(s) as follows:

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

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

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

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

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

Staff Analysis: A review of the standard proposed for inclusion in the code, UL7103-19, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE R905.16.6
Classification of Photovoltaic Shingles

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ult} FROM FIGURE R301.2(5)A (mph)	MAXIMUM BASIC WIND SPEED,V_{ASD} FROM TABLE R301.2.1.3(mph)	~~UL 7103[a] SHINGLE CLASSIFICATION~~	UL 7103 SHINGLE CLASSIFICATION
110	85	~~D, G or H~~	A, D or F
116	90	~~D, G or H~~	A, D or F
129	100	~~G or H~~	A, D or F
142	110	~~G or H~~	F
155	120	~~G or H~~	F
168	130	~~H~~	F
181	140	~~H~~	F
194	150	~~H~~	F

~~a. The standard calculations contained in UL7103 assume Exposure Category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

Committee Reason: The modification removes the third column of Table R905.16.6 since UL7103 is not applicable to photovoltaic shingles. The proposal references UL7103 which covers photovoltaic roof coverings. The reference is necessary in the codes to provide requirements for this industry. (Vote: 9-0)

Assembly Action: **None**

Final Action

S33-19 Part II **AM**

TAC: Roofing

Total Mods for **Roofing** in **Pulled of Consent by Staff: 2**

Total Mods for report: 40

Sub Code: Building

R9489/S4-18

38

Date Submitted	3/2/2021	**Section**	1505.9	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	Yes

TAC Recommendation Pulled of Consent by Staff
Commission Action Pending Review

Staff Classification Correlates Directly

Comments

General Comments **No**

Related Modifications

1505.9

Primary TAC - Roofing - D
Secondary TAC - Fire - AS

Summary of Modification

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

Rationale

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

Approved as Modified

Original Proposal:

2018 International Building Code

Revise as follows:

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

Modified Proposal:

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

Code Change No: S4-18

Original Proposal

Section(s): 1505.9

Proponents: Mark Graham (mgraham@nrca.net)

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

2018 International Building Code

Revise as follows:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Modified**

Modify proposal as follows:

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

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

Assembly Action: **None**

Final Action

S4-18 **AM**

R9492/S11-18

Date Submitted 3/2/2021	**Section** 1510.2.4	**Proponent** Mo Madani
Chapter 15	**Affects HVHZ** Yes	**Attachments** Yes

TAC Recommendation Pulled of Consent by Staff
Commission Action Pending Review
Staff Classification Correlates Directly

Comments
General Comments **Yes**

Related Modifications
FBC-B/1510.2.5

Primary TAC - Roofing - D
Secondary TAC - Fire - AS

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

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

Comment Period History

R9492-G1

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

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

Approved as Submitted

2018 International Building Code

Revise as follows:

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

Exceptions:

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

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

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

Code Change No: S11-18

Original Proposal

Section(s): 1510.2.4

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

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

2018 International Building Code

Revise as follows:

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

Exceptions:

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S11-18 **AS**

TAC: Roofing

Total Mods for **Roofing** in **: 1**

Total Mods for report: 40

Sub Code: Building

R9519/S32-19

40

Date Submitted	3/3/2021	**Section**	1507.15.2	**Proponent**	Mo Madani
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Pulled of Consent by Interested Entity
Commission Action Pending Review

Staff Classification Correlates Directly

Comments

General Comments **Yes**

Related Modifications

1507.15.2

TAC Action - Approved as Submitted - Consent

Summary of Modification

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

Rationale

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

Comment Period History

R9519-G1

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

Comment:

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

Approved as Submitted

2018 International Building Code

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

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

Revise as follows:

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

Code Change No: S32-19

Original Proposal

Section(s): 1507.15.2

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

2018 International Building Code

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

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

Revise as follows:

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

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

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

Assembly Action: **None**

Final Action

S32-19 **AS**