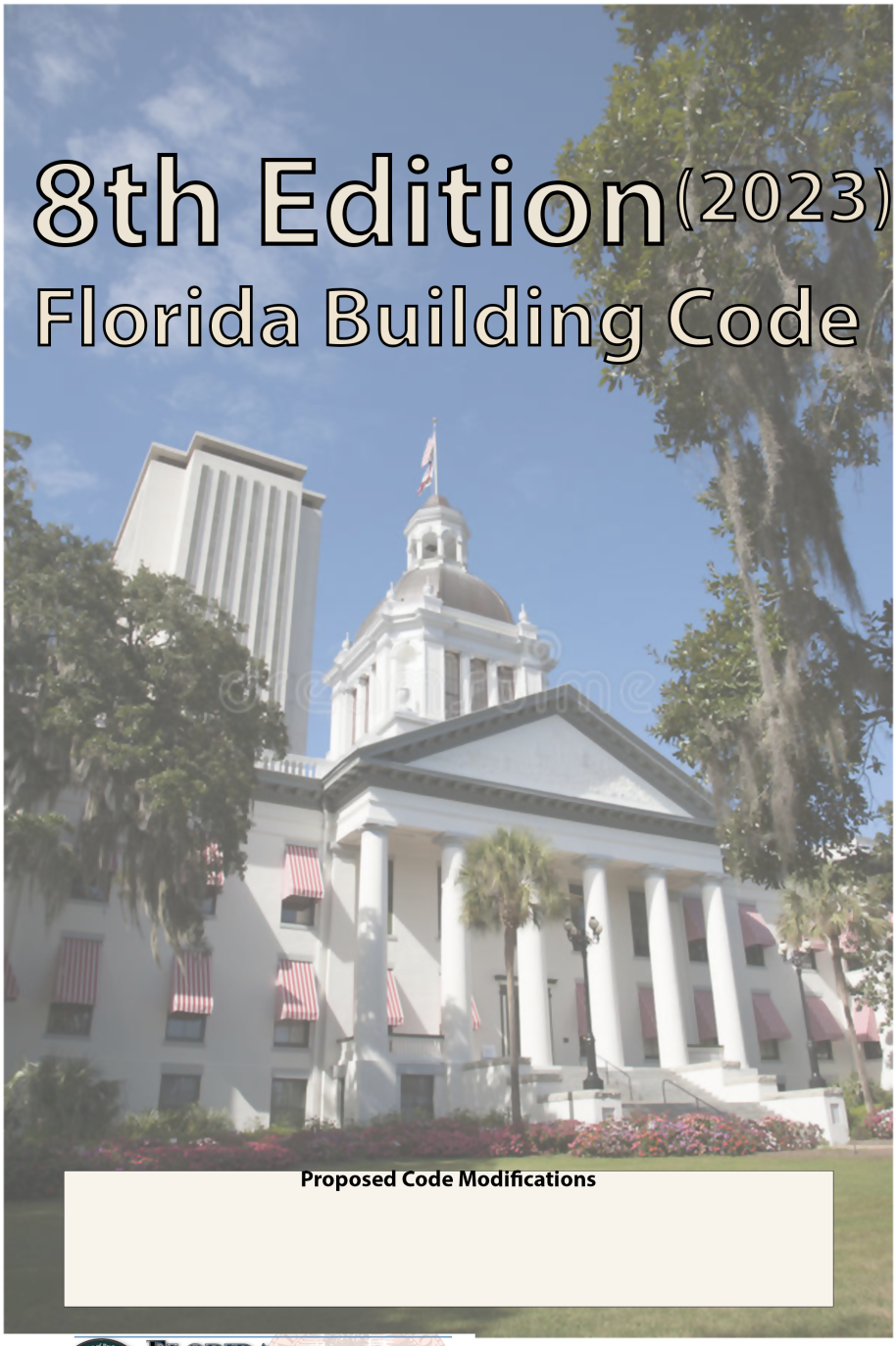

FLORIDA BUILDING COMMISSION
"Stronger Codes Through Science and Consensus"

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850-487-1824

TAC: Roofing

Total Mods for **Roofing** in **Approved as Modified : 3**

Total Mods for report: 23

Sub Code: Building

R10071

Date Submitted	02/03/2022	**Section**	1507.1.1	**Proponent**	Michael Silvers (FRSA)
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Residential Chapter 9 Section R905 Requirements for Roof Coverings R905.1.1 Underlayment

Summary of Modification

Reduces repetitive language by combining several similar methods of application into one description. The actual methods of installation remain unchanged except the additional overlap required beyond half the width of full sheets to 2". (See a completed version of the section attached).

Rationale

This section underwent numerous amendments during the last code cycle leaving it overly complex. The modification reduces repetitive and redundant language in this section by combining several similar methods of application into one description. The actual methods of installation remain unchanged except to change all additional overlap required beyond half the width of full sheets to 2". This change will highlight the similarities of underlayment requirements for most steep slope roof coverings while clarifying the few differences.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

R10071-A5

Proponent Michael Silvers (FRSA) **Submitted** 8/25/2022 1:48:52 PM **Attachments** Yes

Rationale:

This alternate language addresses two concerns voiced during the June TAC meetings. The exception was added that excludes the use of synthetic underlayment with cedar shakes and shingles. The changed language in option 3. changes the overlap method to conform to manufacturers existing ply lines and concerns about the need to use chalk lines.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does degrade

2nd Comment Period

R10071-A4

Proponent Zachary Priest **Submitted** 8/26/2022 9:52:59 AM **Attachments** Yes

Rationale:

Underlayments are composed of numerous materials. This code change is proposed to recognize the materials and their respective required ASTM specification. This paradigm of the code recognizing the material and its respective ASTM specification is present through chapter 15 and elsewhere, but has not yet been incorporated into the underlayment section of Chapter 15. This code change will help to ensure products are tested and labeled correctly and reduce confusion among end users and building owners about which ASTM specification is required for the material.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact to local entity relative to enforcement of code.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners relative to cost of compliance with code.

Impact to industry relative to the cost of compliance with code

There is no impact to industry relative to the cost of compliance with code.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This code change will help to ensure products are tested and labeled correctly, which will help with the welfare and the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This code change will help to strengthen that requirement that products are tested and labeled correctly.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This code change only clarifies the requirements, its does not add or remove any requirements for materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

It does the opposite in fact. The change is proposed to clarify and make the code intent less ambiguous.

2nd Comment Period

R10071-A3

Proponent T Stafford **Submitted** 8/24/2022 5:09:37 PM **Attachments** Yes

Rationale:

This public comment corrects an error in the underlayment criteria for asphalt shingles that was overlooked during the last code cycle. Section 1507.1.1 specifies the underlayment types for all roof coverings. This current language implies that a self-adhered underlayment could not be used under asphalt shingles on roofs with slopes from 2:12 to 4:12. That was not the intent as Section 1507.1.1 clearly allows the use of self-adhered underlayment for any roof slope but does require the double underlayment application when felt or synthetic underlayment is used in combination with the taped joints for roof slopes of 2:12 to 4:12. This language in Section 1507.2.2 has existed in the code for many editions and should have been deleted last code cycle when the underlayment requirements in the code were updated to be consistent with the IBHS requirements for a sealed roof deck. Approving this public comment makes it clear that self-adhered underlayments can be used under asphalt shingles on roofs with slopes of 2:12 to 4:12.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entities relative to enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

No impact to building and property owners relative to cost of compliance with the code.

Impact to industry relative to the cost of compliance with code

No impact to industry relative to cost of compliance with the code.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This public comment clarifies the permitted underlayment types for asphalt shingles on roofs with slopes of 2:12 to 4:12.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This public comment improves the code by permitting the use of equivalent or better products.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This public comment does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This public comment does not degrade the effectiveness of the code.

1st Comment Period History

R10071-A1

Proponent Greg Keeler **Submitted** 4/16/2022 9:52:04 PM **Attachments** Yes

Rationale:

This modification will provide clarity due to varying widths of synthetic underlayment. This modification has been discussed with the proponent.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

R10071 (Original +A1)

SECTION 1507 REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1

for the applicable roof covering shall be applied over the entire roof over the ~~4 inch wide (102 mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3 3/4 inch wide (96 mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4 inchwide (102 mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19 inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36 inch wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5. Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic u~~Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 6757 ASTM D8257	Apply in accordance with Section 1507.1.1.1, Item ~~4~~ 3 ~~or Section 1507.1.1.3, Item 3 as applicable to the type of roof covering~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~. Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV ASTM D8257		

1507.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.

~~1507.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

~~1.A minimum 4-inch-wide (102 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.~~

~~2.A minimum 33/4-inch-wide (96-mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment complying with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) flashing strips.~~

~~3.Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483-mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914-mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Powerdriven metal caps shall have a minimum thickness of 0.010 inch (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

R10071 (Original +A1)

SECTION 1507 REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1

for the applicable roof covering shall be applied over the entire roof over the ~~4 inch wide (102 mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3 3/4 inch wide (96 mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4 inchwide (102 mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19 inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36 inch wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5. Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic u~~Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 6757 ASTM D8257	Apply in accordance with Section 1507.1.1.1, Item ~~4~~ 3 ~~or Section 1507.1.1.3, Item 3 as applicable to the type of roof covering~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~. Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV ASTM D8257		

1507.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.

~~1507.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

~~1.A minimum 4-inch-wide (102 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.~~

~~2.A minimum 33/4-inch-wide (96-mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment complying with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) flashing strips.~~

~~3.Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483-mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914-mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Powerdriven metal caps shall have a minimum thickness of 0.010 inch (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

Alternate Language for Modification R10071-R1

SECTION 1507

REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4-inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied

over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheets ~~of reinforced~~ underlayment, for the second course. Apply the third course of underlayment overlapping the second course ~~successive sheets~~ half the width of a full sheet plus 2 inches. Overlap all successive courses half the width of a full sheet plus 1 inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

Exception:

1. Use of ASTM D8257 underlayment is not permitted for wood shingles or shakes.

TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D 675 ASTM D8257	Apply in accordance with Section 1507.1.1.1Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate Type Shingles ~~Wood Shingles, Wood Shakes~~	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D8257		
Wood Shingles, Wood Shakes	ASTM D226 Type II ASTM D4869 Type III or IV		

			be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.

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

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials ~~required to~~shall comply with Section 1507.1.1.1~~ASTM D226, D1970, D4869 and, D6757 and ASTM D8257 shall~~ and bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.2~~1,~~ or 1507.1.1.3~~2 or 1507.1.1.3~~ as applicable.

1507.1.1.1 Materials

1507.1.1.1.1 Asphalt-Saturated Organic Felt. Asphalt-saturated organic felts shall comply with ASTM D226 or ASTM D4869.

1507.1.1.1.2 Felt Containing Inorganic Fibers. Asphaltic organic felts containing inorganic fibers, inorganic fiber-based asphaltic felts, and inorganic fiber-based nonasphaltic felts shall comply with ASTM D6757.

1507.1.1.1.3 Self-Adhering, Polymer Modified Bitumen Sheet. Self-adhering, polymer modified bitumen sheet shall comply with ASTM D1970.

1507.1.1.1.4 Polymeric Sheet. Polymeric sheet shall comply with ASTM D8257.

1507.1.1.2~~1~~ Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

TABLE 1507.1.1.1~~2~~ UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 6757	Apply in accordance with Section 1507.1.1.2~~1~~, Item 4 3 ~~or Section 1507.1.1.3, Item 3 as applicable to the type of roof covering~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c., and one row at the
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV		

			end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.

1507.1.1.~~2~~3 Underlayment for concrete and clay tile.

Further revise Mod 10071 as follows:

1507.2.2 Slope. Asphalt shingles shall only be used on roof slopes of two units vertical in 12 units horizontal (17-percent slope) or greater. ~~For roof slopes from two units vertical in 12 units horizontal (17-percent slope) up to four units vertical in 12 units horizontal (33-percent slope), double underlayment application is required in accordance with Section 1507.2.8.~~

REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, or ~~and~~ ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, re-nailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4-inch-wide (102 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment,

overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05mm) into the roof sheathing.

TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 6757 ASTM D8257	Apply in accordance with Section 1507.1.1.1, Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. The cap nail shank shall have a length sufficient to penetrate
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV ASTM D8257		

			through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.

hour = 0.447 m/s

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.

SECTION 1507 REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the ~~4 inch wide (102 mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum~~

~~tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3 3/4 inch wide (96 mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4 inchwide (102 mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ , Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19 inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36 inch wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5. Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic u~~Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 675	Apply in accordance with Section 1507.1.1.1, Item ~~4~~ 3 ~~or Section 1507.1.1.3, Item 3 as applicable to the type of roof covering~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c., and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV		

1507.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.

~~1507.1.1.3Underlayment for wood shakes and shingles.~~

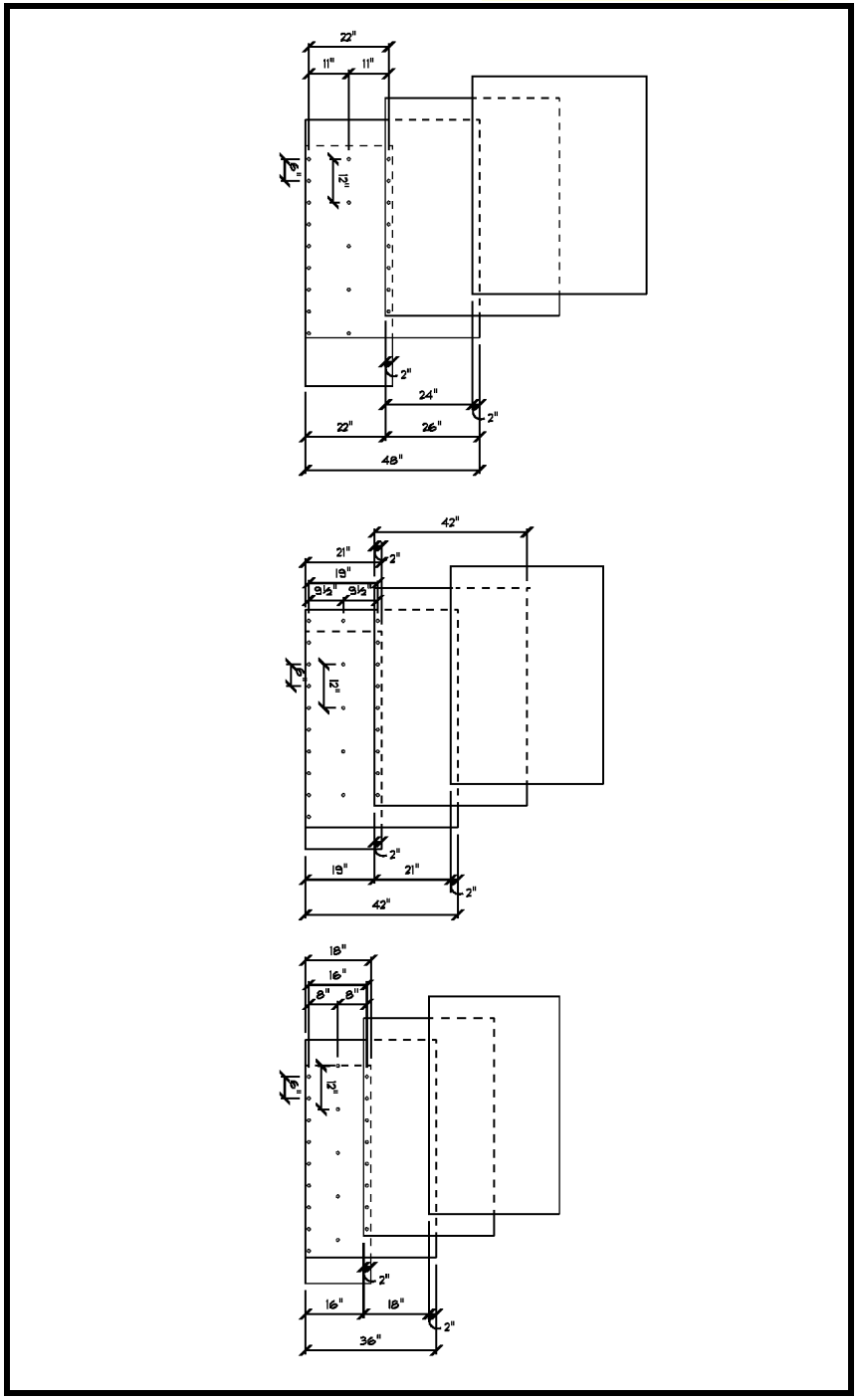
~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

~~1.A minimum 4-inch-wide (102-mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) membrane strips.~~

~~2.A minimum 33/4-inch-wide (96-mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment complying with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) flashing strips.~~

~~3.Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483-mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914-mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Powerdriven metal caps shall have a minimum thickness of 0.010 inch (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring-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 (19.05 mm) into the roof sheathing.~~

R10071Text Modification



Mod_10071_Text_2023 FBC Modification FRSA 19 Underlayment Sealed Deck Rework (Bldg) Underlayment Lapping and Fastening Januar

SECTION 1507 (After changes included in this modification)

REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1507.1.1.1, 1507.1.1.2 or 1507.1.1.3 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1507.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4_-inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in

accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring shank cap nails. The cap nail shank shall have a length sufficient to 1507.1.1.2 Underlayment for concrete and clay tile.

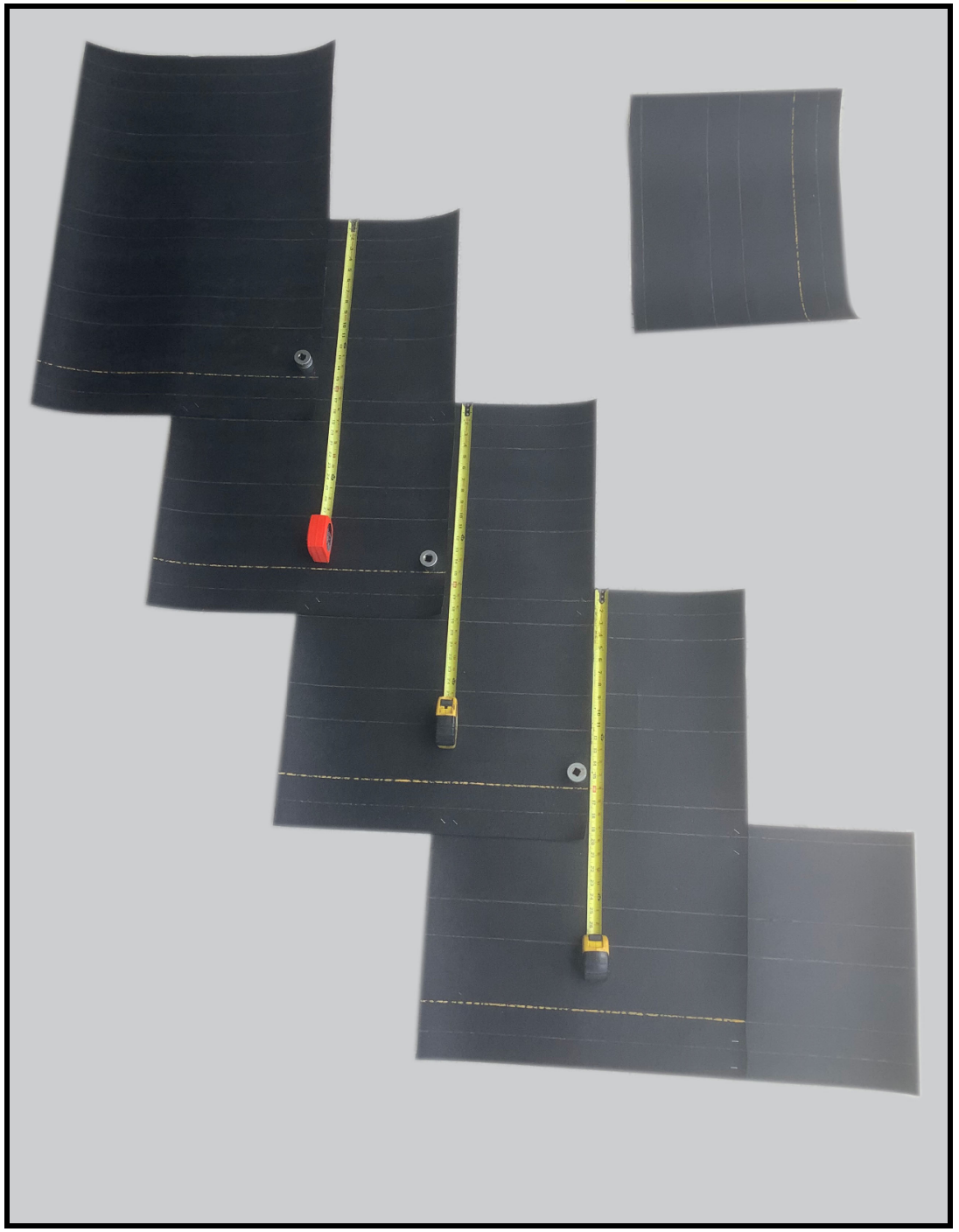
TABLE 1507.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

<table>
<tr><th rowspan="2">Roof Covering</th><th rowspan="2">Underlayment Type</th><th colspan="2">Underlayment Attachment</th></tr>
<tr><th>Roof Slope 2:12 and Less Than 4:12</th><th>Roof Slope 4:12 and Greater</th></tr>
<tr><td>Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles</td><td>ASTM D226Type IIASTM D4869Type III or IV
ASTM D 675</td><td rowspan="2">Apply in accordance with Section 1507.1.1.1, Item 3</td><td rowspan="2">Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c., and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035</td></tr>
<tr><td>Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake</td><td>ASTM D226Type II ASTM D4869 Type III or IV</td></tr>
</table>

			inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.

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

Underlayment for concrete and clay tile shall comply with Section 1507.3.3.



TAC: Roofing

Total Mods for **Roofing** in **Approved as Modified : 3**

Total Mods for report: 23

Sub Code: Building

R10115

Date Submitted	02/15/2022	**Section**	1510.8	**Proponent**	Amanda Hickman
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Lightning protection systems

Rationale

NFPA 780 and UL 96A are currently silent on the impact the attachment of LPS have on the roof. In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity. Even in moderate wind events, there have been documented failures of code compliant and tested roof assembly components where LPS were attached. Roof assembly components such as coping and gutters are required by code to be tested to specific wind loads. LPS attachments to these roof component systems not only alter the wind load on of these tested components, but also alter their performance by restricting thermal movement causing galvanic reaction, leak point, etc. This modification clarifies that attachment of LPS to any part of the roof needs to be done in accordance with the installation instructions for the roof assembly, roof covering, metal edge systems, or gutter. Where LPS components attach to or penetrate the roof, they must be properly flashed. Reasonable and readily available methods and details exist to attach LPS systems independent of coping, fascia, gutter and roof assembly components and for flashing of existing LPS attachment methods where penetrations are required. This proposal clarifies that regardless of sequencing challenges which may exist in new or retrofit applications of LPS, the integrity of tested components and the envelope shall be maintained.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will improve enforcement of code by clarifying that attachment of LPS to the roof needs to be done in accordance with the installation instructions.

Impact to building and property owners relative to cost of compliance with code

No impact to cost of compliance with code. This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer’s installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Impact to industry relative to the cost of compliance with code

No impact to cost of compliance with code. This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer's installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification clarifies that the integrity of tested components and the envelope shall be maintained, which will improve the safety and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification strengthens the code by maintaining the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against other materials or products as it just clarifies that LPS must be installed in accordance with the roofing component manufacturer's installation instructions.

Does not degrade the effectiveness of the code

This modification will strengthen the effectiveness of the code by providing clarity on lightning protection systems.

Alternate Language

2nd Comment Period

R10115-A4

Proponent Amanda Hickman **Submitted** 8/22/2022 11:36:44 AM **Attachments** Yes

Rationale:

Working with the lightning protection industry, both industries (roofing and lightning protection) thought this language better addressed the issues that can arise from lightning protection system roof/roof component attachments. This proposed language was also submitted to the ICC for consideration this cycle to the IBC. The standards (NFPA 780 and UL 96A) that are used for lightning protection system installations are currently silent on the impact the attachment of LPS have on the roof. In order to preserve the building envelope in a wind or weather event, it is critical to maintain the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity. Roof assembly components such as coping, and gutters are required by code to be tested to specific wind loads. Any attachments to these edge metal systems can alter the wind load on these tested components and therefore the performance of the systems. This proposal clarifies that attachment of LPS needs to be done in accordance with the manufacturer installation instructions for the roof assembly, roof covering, metal edge systems, or gutter they are being attached to. Manufacturer is defined as a person or business that produced for sale or installation, the roof components referenced above (coping, gutters, roof membranes) and is often the roofing contractor, the roofing membrane manufacturer, or another manufacturing company responsible for the manufacturing of these tested components. Where LPS components attach to or penetrate the roof, they must be properly flashed. There are situations where the manufacturer of the metal edge system, gutter, or roof covering is unknown, or out of business. In these situations, a registered design professional can provide direction on an attachment method that will retain the integrity of the roof, while allowing a lightning protection system to be installed.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will improve enforcement of code by clarifying requirements.

Impact to building and property owners relative to cost of compliance with code

No impact to cost of compliance with code. This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer’s installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Impact to industry relative to the cost of compliance with code

No impact to cost of compliance with code. This proposal just clarifies that LPS must be installed in accordance with the roofing component manufacturer’s installation instructions. Flashing is already required for penetrations. There will, however, be a reduction in failure costs.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification clarifies that the integrity of tested components and the envelope shall be maintained, which will improve the safety and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification strengthens the code by maintaining the integrity of the roof components which are required by code to be tested and to ensure weatherproofing continuity.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against other materials or products as it just clarifies that LPS must be installed in accordance with the roofing component manufacturer’s installation instructions.

Does not degrade the effectiveness of the code

This modification will strengthen the effectiveness of the code by providing clarity on lightning protection systems.

1st Comment Period History

R10115-A3

Proponent Michael Silvers (FRSA) **Submitted** 4/15/2022 9:44:45 AM **Attachments** Yes

Rationale:

The recommended additional language clarifies that this section does not add to the code's requirements as to when or where lightning protection is required.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

1st Comment Period History

R10115-A2

Proponent Amanda Hickman **Submitted** 4/11/2022 10:49:51 AM **Attachments** Yes

Rationale:

This comment clarifies that lightning protection is not mandatory and also updates the referenced sections to the correct section in the Florida Building Code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None, just clarifies language and updates section numbers.

Impact to building and property owners relative to cost of compliance with code

None, just clarifies language and updates section numbers.

Impact to industry relative to the cost of compliance with code

None, just clarifies language and updates section numbers.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, clarifies language and updates section numbers.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, clarifies language and updates section numbers.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, only clarifies language and updates section numbers.

Does not degrade the effectiveness of the code

No, only clarifies language and updates section numbers.

R10115 (Original+A2)

Revise as follows:

[BG]1510.8 Other rooftop structures. Rooftop structures not regulated by Sections 1510.2 through 1510.7 shall comply with Sections 1510.8.1 through 1510.8.~~5~~6, as applicable.

Add new text as follows:

1510.8.6 Lightning Protection Systems. When installed, lightning protection system components shall be installed in accordance with Section 1510.8.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM ES- 1/4435 or ANSI/SPRI GT-1 in accordance with Sections 1504.5 or 1504.5.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

1510.8.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

R10115 (Original+A2)

Revise as follows:

[BG]1510.8 Other rooftop structures. Rooftop structures not regulated by Sections 1510.2 through 1510.7 shall comply with Sections 1510.8.1 through 1510.8.~~5~~6, as applicable.

Add new text as follows:

1510.8.6 Lightning Protection Systems. When installed, lightning protection system components shall be installed in accordance with Section 1510.8.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM ES- 1/4435 or ANSI/SPRI GT-1 in accordance with Sections 1504.5 or 1504.5.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

1510.8.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

1510.8.6 Lightning Protection Systems. Where lightning protection systems are required by this code, the components shall be installed in accordance with Sections 1510.8.6.1, and 1510.8.6.2. ~~Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested to ANSI/SPRI/FM ES-1/4435 or ANSI/SPRI GT- 1 in accordance with Sections 1504.6 or 1504.6.1.~~

~~Exception:~~

~~Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.~~

1510.8.6.1 Installation on metal edge systems or gutters. Lightning protection system components ~~directly~~attached to ANSI/SPRI/FM 4435/ES-1 or ANSI/SPRI GT-1 tested metal edge systems or gutters shall be installed with compatible brackets, fasteners, or adhesives, in accordance with the metal edge systems or gutter manufacturer's installation instructions. When metal edge system or gutter manufacturer is unknown, installation shall be directed by a registered design professional. ~~or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.~~

1510.8.6.2 Installation on roof coverings. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof covering. When the roof covering manufacturer is unknown, installation shall be as directed by a registered design professional.

1510.8.6 Lightning Protection Systems. Where ~~L~~ lightning protection system are required by this code, the components shall be installed in accordance (remainder of the modification remains unchanged)

1510.8.6 Lightning Protection Systems. When installed, ~~L~~lightning protection system components shall be installed in accordance with Section 1510.8.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested toANSI/SPRI/FM ES- 1/4435 or ANSI/SPRI GT-1 in accordance with Sections ~~1504.6~~ 1504.5 or ~~1504.6.1~~ 1504.5.1.

Exception: Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

Revise as follows:

[BG]1510.8 Other rooftop structures. Rooftop structures not regulated by Sections 1510.2 through 1510.7 shall comply with Sections 1510.8.1 through 1510.8.~~5~~6, as applicable.

Add new text as follows:

1510.8.6 Lightning Protection Systems. Lightning protection system components shall be installed in accordance with Section 1510.8.6.1. Lightning protection systems shall not be attached directly to metal edge systems, including gutters, where these roof assembly components are required to be tested toANSI/SPRI/FM ES-1/4435 or ANSI/SPRI GT-1 in accordance with Sections 1504.6 or 1504.6.1.

Exception:
Where permitted by the manufacturer's installation instructions for the metal edge systems or gutters.

1510.8.6.1 Installation. Lightning protection system components directly attached to or through the roof covering shall be installed in accordance with this chapter and the roof covering manufacturer's installation instructions. Flashing shall be installed in accordance with the roof assembly manufacturer's installation instructions and Sections 1503.2 and 1507 where the lightning protection system installation results in a penetration through the roof plane.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Modified : 3**

Total Mods for report: 23

Sub Code: Residential

3

R10073

Date Submitted	02/03/2022	**Section**	905.1.1	**Proponent**	Michael Silvers (FRSA)
Chapter	9	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Building Chapter 15 Section 1507 Requirements for Roof Coverings 1507.1.1 Underlayment

Summary of Modification

Reduces repetitive language by combining several similar methods of application into one description. The actual methods of installation remain unchanged except the additional overlap required beyond half the width of full sheets to 2". (See a completed version of the section attached).

Rationale

This section underwent numerous amendments during the last code cycle leaving it overly complex. The modification reduces repetitive and redundant language in this section by combining several similar methods of application into one description. The actual methods of installation remain unchanged except to change all additional overlap required beyond half the width of full sheets to 2". This change will highlight the similarities of underlayment requirements for most steep slope roof coverings while clarifying the few differences.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

R10073-A5

Proponent Zachary Priest **Submitted** 8/26/2022 10:11:56 AM **Attachments** Yes

Rationale:

Underlayments are composed of numerous materials. This code change is proposed to appropriately recognize the materials and their respective required ASTM specification. This paradigm of the code recognizing the material and its respective ASTM specification is present through chapter 15 and elsewhere, but has not yet been incorporated into the underlayment section of Chapter 15. This code change will help to ensure products are tested and labeled correctly and reduce confusion among end users and building owners about which ASTM specification is required for the material.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Clarifies materials approved by code, avoids unintended meanings and/or misinterpretation of code

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Makes the code more specific and less ambiguous

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Consistent with original proposed change

Does not degrade the effectiveness of the code

Makes code easier to interpret

2nd Comment Period

R10073-A3

Proponent Michael Silvers (FRSA) **Submitted** 8/25/2022 1:57:34 PM **Attachments** Yes

Rationale:

This alternate language addresses two concerns voiced during the June TAC meetings. The exception was added that excludes the use of synthetic underlayment with cedar shakes and shingles. The changed language in option 3. changes the overlap method to conform to manufacturers existing ply lines and addresses concerns about the need to use chalk lines.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

2nd Comment Period

R10073-A2

Proponent T Stafford **Submitted** 8/24/2022 5:16:49 PM **Attachments** Yes

Rationale:

This public comment corrects an error in the underlayment criteria for asphalt shingles that was overlooked during the last code cycle. Section R905.1.1 specifies the underlayment types for all roof coverings. This current language implies that a self-adhered underlayment could not be used under asphalt shingles on roofs with slopes from 2:12 to 4:12. That was not the intent as Section R905.1.1 clearly allows the use of self-adhered underlayment for any roof slope but does require the double underlayment application when felt or synthetic underlayment is used in combination with the taped joints for roof slopes of 2:12 to 4:12. This language in Section R905.2.2 has existed in the code for many editions and should have been deleted last code cycle when the underlayment requirements in the code were updated to be consistent with the IBHS requirements for a sealed roof deck. Approving this public comment makes it clear that self-adhered underlayments can be used under asphalt shingles on roofs with slopes of 2:12 to 4:12.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entities relative to enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

No impact to building and property owners relative to the cost of compliance with the code.

Impact to industry relative to the cost of compliance with code

No impact to industry relative to the cost of compliance with the code.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This public comment clarifies the permitted underlayment types for asphalt shingles on roofs with slopes of 2:12 to 4:12.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This public comment improves the code by permitting the use of equivalent or better products.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This public comment does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This public comment does not degrade the effectiveness of the code.

1st Comment Period History

R10073-A1

Proponent Greg Keeler **Submitted** 4/16/2022 10:06:24 PM **Attachments** Yes

Rationale:

This modification provides clarity for fastening due to varying widths of synthetic underlayment. This modification has been discussed with the proponent.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

R10073 (Original With A1)

Text of Modification

Modification SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.1. Roof covering application.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757, or ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

Exception: Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

Table R905.1.1(1)
Underlayment Types.

Reserved.

Table R905.1.1(2)
Underlayment Application.

Reserved.

Table R905.1.1(3)
Underlayment Attachment.

Reserved.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the ~~4-inch-wide (102-mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102-mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3-3/4-inch-wide (96-mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inchwide (102-mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102-mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19-inch (483-mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914-mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5. Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile~~

~~strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic~~ underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

ROOF COVERING	UNDERLAYMENT TYPE	UNDERLAYMENT ATTACHMENT	
Roof Slope 2:12 and Less Than 4:12	**Roof Slope 4:12 and Greater**		
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757 ASTM D8257 M D226 Type IIASTM D4869 Type III or IVASTM D6757 ASTM D8257	Apply in accordance with Section R905.1.1.1, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c.~~. Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles,	ASTM D226 Type IIASTM D4869 Type III or IV		

Wood Shingles, Wood Shakes	ASTM D8257		nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.

R905.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 905.3.3.

~~R905.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

-

~~1. 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 instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) membrane strips.~~

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~~2. A minimum 33/4-inch-wide (96-mm) strip of self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment~~

~~complying with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) flashing strips.~~

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~~3. Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.~~

R10073 (Original With A1)

Text of Modification

Modification SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.1. Roof covering application.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757, or ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

Exception: Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

Table R905.1.1(1)
Underlayment Types.

Reserved.

Table R905.1.1(2)
Underlayment Application.

Reserved.

Table R905.1.1(3)
Underlayment Attachment.

Reserved.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the ~~4-inch-wide (102-mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102-mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3-3/4-inch-wide (96-mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inchwide (102-mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4-inchwide (102-mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19-inch (483-mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914-mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5. Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile~~

~~strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic~~ underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

ROOF COVERING	UNDERLAYMENT TYPE	UNDERLAYMENT ATTACHMENT	
Roof Slope 2:12 and Less Than 4:12	**Roof Slope 4:12 and Greater**		
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757 ASTM D8257 M D226 Type IIASTM D4869 Type III or IVASTM D6757 ASTM D8257	Apply in accordance with Section R905.1.1.1, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c.~~. Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles,	ASTM D226 Type IIASTM D4869 Type III or IV		

Wood Shingles, Wood Shakes	ASTM D8257		nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.

R905.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 905.3.3.

~~R905.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

-

~~1. 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 instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102-mm) membrane strips.~~

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~~2. A minimum 33/4-inch-wide (96-mm) strip of self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment~~

~~complying with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) flashing strips.~~

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~~3. Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.~~

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials ~~required to~~ shall comply with Section R905.1.1.1~~ASTM D226, D1970, D4869 and, D6757 and ASTM D8257 shall~~ and bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.2~~1,~~ or R905.1.1.3~~2 or 905~~

R905.1.1.1 Materials

R905.1.1.1.1 Asphalt-Saturated Organic Felt. Asphalt-saturated organic felts shall comply with ASTM D226 or ASTM D4869.

R905.1.1.1.2 Felt Containing Inorganic Fibers. Asphaltic organic felts containing inorganic fibers, inorganic fiber-based asphaltic felts, and inorganic fiber-based nonasphaltic felts shall comply with ASTM D6757.

R905.1.1.1.3 Self-Adhering, Polymer Modified Bitumen Sheet. Self-adhering, polymer modified bitumen sheet shall comply with ASTM D1970.

R905.1.1.1.4 Polymeric Sheet. Polymeric sheet shall comply with ASTM D8257.

R905.1.1.2~~1~~

TABLE R905.1.1.2~~1~~ UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

ROOF COVERING	UNDERLAYMENT TYPE	UNDERLAYMENT ATTACHMENT	
Roof Slope 2:12 and Less Than 4:12	**Roof Slope 4:12 and Greater**		
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757	Apply in accordance with Section R905.1.1.2~~1~~, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type	ASTM D226 Type IIASTM D4869 Type III or IV		

Shingles, Wood Shingles, Wood Shakes			staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through

			the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing.

R905.1.1.3~~2~~

Alternate Language for Modification R10073-R1

SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.1. Roof covering application.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, or ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

Exception: Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

Table R905.1.1(1)

Underlayment Types.

Reserved.

Table R905.1.1(2)

Underlayment Application.

Reserved.

Table R905.1.1(3)

Underlayment Attachment.

Reserved.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels orshingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, woodshingles shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4-inch-wide (96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane the strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheets of underlayment, for the second course. Apply the third course of underlayment overlapping the second course successive sheets half the width of a full sheet plus 2". Overlap all successive courses half the width of a full sheet plus 1 inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

Exception:

1. Use of ASTM D8257 underlayment is not permitted for wood shingles or shakes.

TABLE 905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type II ASTM D4869 Type III or IV ASTM D 675 ASTM D8257	Apply in accordance with Section R905.1.1.1Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate	ASTM D226 Type II ASTM D4869 Type III or IV		

Type Shingles ~~Wood Shingles, Wood Shakes~~	ASTM D8257		attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.
Wood Shingles, Wood Shakes	ASTM D226 Type II ASTM D4869 Type III or IV		

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

Underlayment for concrete and clay tile shall comply with Section 905.3.3.

R905.2.2 Slope. Asphalt shingles shall be used only on roof slopes of two units vertical in 12 units horizontal (2:12) or greater. ~~For roof slopes from two units vertical in 12 units horizontal (2:12) and less than four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.1.1.~~

REQUIREMENTS FOR ROOF COVERINGS

R905.1 Scope.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757, or ~~and~~ ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

Exception:

1. Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, re-nailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4-inch-wide (102 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between

side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 into the roof sheathing.

TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 6757 ASTM D8257	Apply in accordance with Section R905.1.1.1, Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. ~~The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches o.c.~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps and one row at the end and side laps fastened 6 inches o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. 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. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083inch for ring shank cap nails and 0.091 inch 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 into the roof sheathing.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV ASTM D8257		

hour = 0.447 m/s

Modification SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.1. Roof covering application.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

R905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869 ~~and~~, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or 905.1.1.3 as applicable.

Exception: Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

Table R905.1.1(1)
Underlayment Types.

Reserved.

Table R905.1.1(2)
Underlayment Application.

Reserved.

Table R905.1.1(3)
Underlayment Attachment.

Reserved.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or ~~roof~~ shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles ~~and metal roof panels~~ shall comply with one of the following methods:

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

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum ~~4~~ 3-3/4 -inch-wide (~~102~~ 96 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the ~~4 inch wide (102 mm)~~ membrane strips.

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~3. A minimum 3 3/4 inch wide (96 mm) strip of selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4 inchwide (102 mm) flashing strips.~~

~~Exception: A synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength of 15 lbf in accordance with ASTM D4533 and a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 shall be permitted to be applied over the entire roof over the 4 inchwide (102 mm) membrane strips. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table R905.1.1.1 for the applicable roof covering and slope and the underlayment manufacturer's installation instructions.~~

~~4~~ 3. Two layers of ASTM D226 Type II or ASTM D4869 Type III ~~or~~ ,Type IV, or ASTM D8257 underlayment shall be installed as follows: ~~Apply a 19 inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36 inch wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). The underlayment shall be attached to a nailable deck with corrosion resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm). The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.~~

~~5.Two layers of a synthetic underlayment that has a product approval as an alternative to underlayment complying with ASTM D226 Type II shall be permitted to be used. Synthetic underlayment shall have a minimum tear strength of 15 lbf in accordance with ASTM D4533, shall have a minimum tensile strength of 20 lbf/inch in accordance with ASTM D5035 and shall meet the liquid water transmission test of Section 8.6 of ASTM D4869. Synthetic underlayment shall be installed as follows:~~ Apply a strip of ~~synthetic~~ underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of ~~reinforced synthetic~~ underlayment, overlapping successive sheets half the width of a full sheet plus 2" ~~the width of the manufacturer's single ply overlap~~. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). ~~Synthetic u~~ Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. ~~Synthetic~~ underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch

(25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. 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 (0.254 mm).~~ The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

ROOF COVERING	UNDERLAYMENT TYPE	UNDERLAYMENT ATTACHMENT	
Roof Slope 2:12 and Less Than 4:12	**Roof Slope 4:12 and Greater**		
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757	Apply in accordance with Section R905.1.1.1, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shakes	ASTM D226 Type IIASTM D4869 Type III or IV		

			the roof sheathing or not less than 3/4 inch into the roof sheathing.

R905.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 905.3.3.

~~R905.1.1.3Underlayment for wood shakes and shingles.~~

~~Underlayment for wood shakes and shingles shall comply with one of the following methods:~~

-

~~1. 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 instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.~~

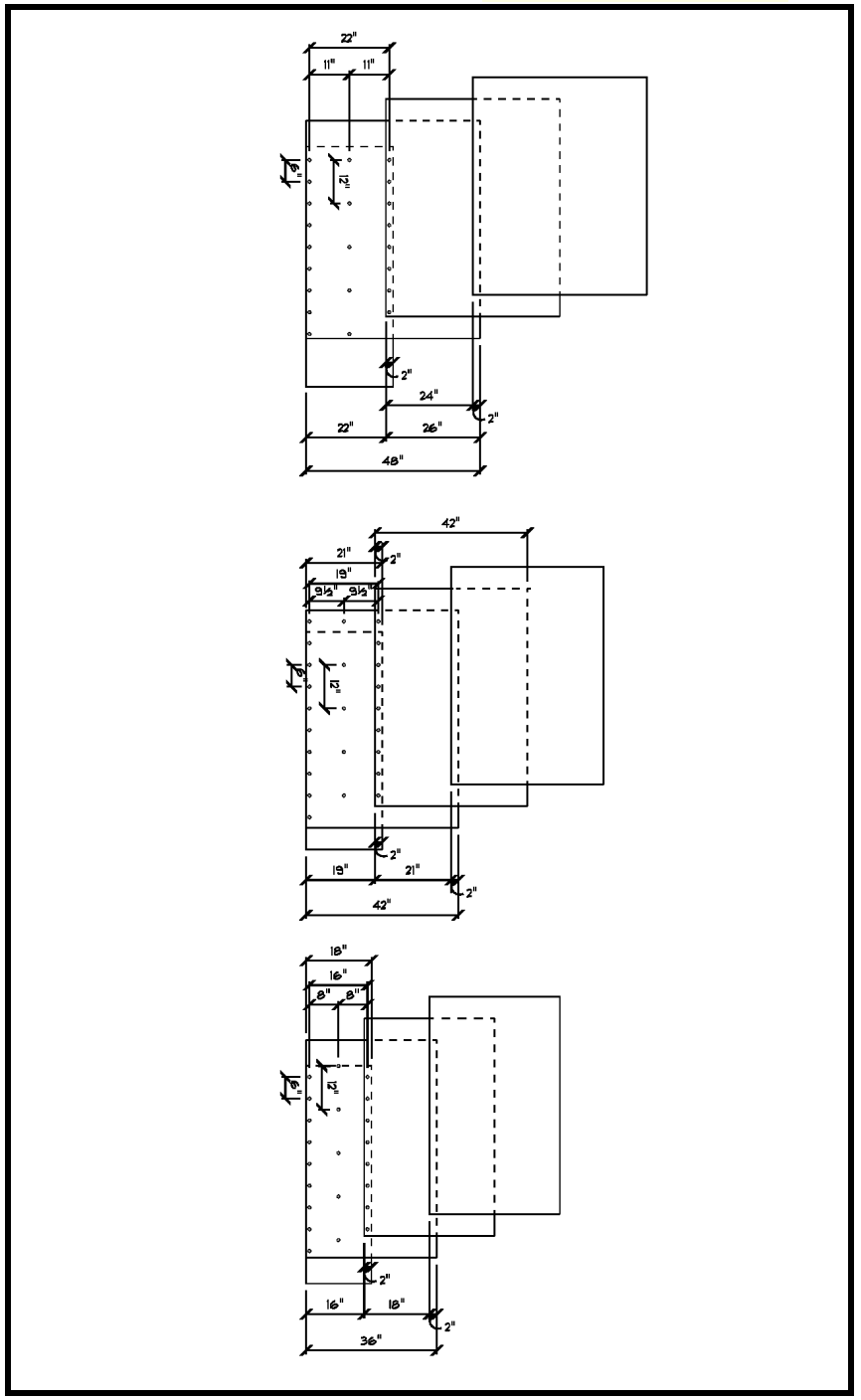
-

~~2. A minimum 33/4-inch-wide (96 mm) strip of self-adhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An underlayment complying with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) flashing strips.~~

-

~~3. Two layers of ASTM D226 Type II or ASTM D4869 Type III or Type IV underlayment shall be installed as follows: Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm); end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32 gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.~~

R10073Text Modification



Mod_10073_Text_2023 FBC Modification FRSA 20 Underlayment Sealed Deck Rework (Residential) Underlayment Lapping and Fastening

2023 FBC Modification FRSA #20 Underlayment Sealed Deck Rework (Residential) Attachment

SECTION R905 (After changes included in this modification)

REQUIREMENTS FOR ROOF COVERINGS

R905.1 Roof covering application.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2 (2), adjusted for height and exposure in accordance with Table R301.3(3).

905.1.1 Underlayment.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section R905.1.1.1, R905.1.1.2 or R905.1.1.3 as applicable.

> **Exception:** Compliance with Section R905.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

Table R905.1.1(1)

Underlayment Types.

Reserved.

Table R905.1.1(2)

Underlayment Application.

Reserved.

Table R905.1.1(3)

Underlayment Attachment.

Reserved.

R905.1.1.1 Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles, wood shakes, wood shingles shall comply with one of the following methods:

1. The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen underlayment complying with ASTM D1970 installed in accordance with both the underlayment

manufacturer's and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed.

Exceptions:

1. This method is not permitted for wood shingles or shakes.

2. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4-inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table R905.1.1.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

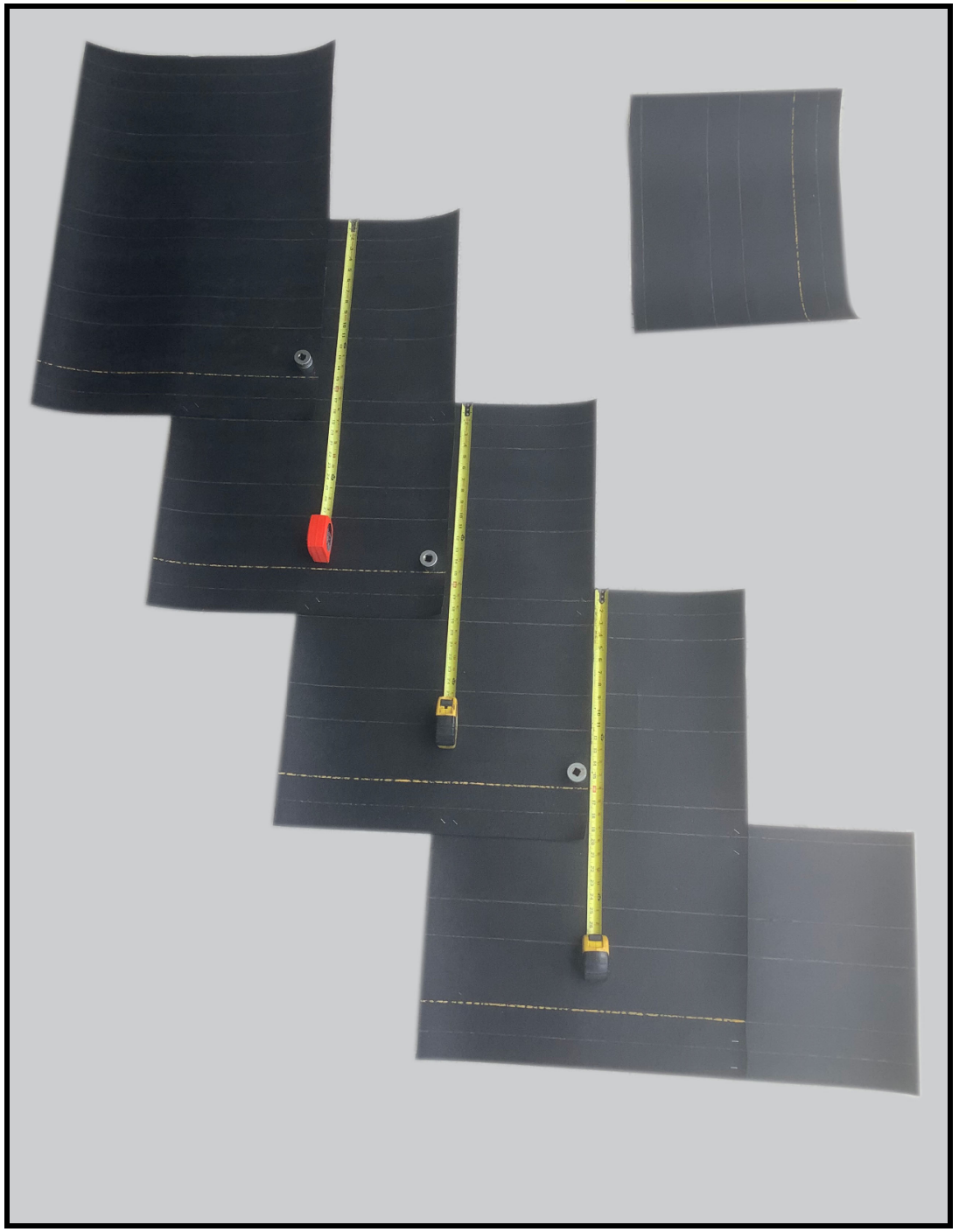
TABLE R905.1.1.1 UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

ROOF COVERING	UNDERLAYMENT TYPE	UNDERLAYMENT ATTACHMENT	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater

Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226 Type IIASTM D4869 Type III or IVASTM D6757	Apply in accordance with Section R905.1.1.1, Item 3 ~~4or Section R905.1.1.3, Item 3 as applicable to the type of roof covering.~~	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm); end laps shall be 6inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch. Metal caps are required where the ultimate design wind speed, V_{ult}, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010inch. Minimum thickness of the outside edge of plastic caps shall be0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shakes	ASTM D226 Type IIASTM D4869 Type III or IV		

R905.1.1.2Underlayment for concrete and clay tile.

Underlayment for concrete and clay tile shall comply with Section 905.3.3



TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

R9893

Date Submitted	01/12/2022	**Section**	1505	**Proponent**	Aaron Phillips
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Clarify fire classification provisions.

Rationale

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

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entity enforcement.

Impact to building and property owners relative to cost of compliance with code

Changes are to improve clarity and should not affect cost of compliance.

Impact to industry relative to the cost of compliance with code

Changes are to improve clarity and should not affect cost of compliance.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

As a life safety issue, clear understanding of roofing fire classification provisions is important.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves understanding of fire classification provisions for roofing.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Improves understanding of fire classification provisions for roofing.

Alternate Language

2nd Comment Period

R9893-A1

Proponent Aaron Phillips **Submitted** 7/22/2022 5:44:19 PM **Attachments** Yes

Rationale:

Change relative to the original MOD is shown via yellow highlight. One instance of "roof covering" was overlooked during preparation of the original R9893. This alternative language comment corrects that oversight. With this change, the entire section is internally consistent and correctly recognizes that "roof assemblies" are tested and classified for fire resistance, not "roof coverings."

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact is expected on local entity enforcement.

Impact to building and property owners relative to cost of compliance with code

No technical changes are made so there should be no effect on cost of compliance.

Impact to industry relative to the cost of compliance with code

No technical changes are made so there should be no effect on cost of compliance.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Clarifies roofing fire classification provisions, which are important for safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves understanding of fire classification provisions for roofing.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Improves understanding of fire classification provisions for roofing.

[See attached file for Text of Modification]

Revise as shown:

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

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

TABLE 1505.1[a, b]

MINIMUM ROOF ASSEMBLY ~~COVERING~~ CLASSIFICATION

FOR TYPES OF CONSTRUCTION

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

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m2.

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

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

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

Revise as shown:

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

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

TABLE 1505.1[a, b]

MINIMUM ROOF ASSEMBLY ~~COVERING~~ CLASSIFICATION

FOR TYPES OF CONSTRUCTION

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

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m2.

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

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

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

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

5

R9952

Date Submitted	01/24/2022	**Section**	1515.2	**Proponent**	Michael Silvers (FRSA)
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Summary of Modification

Removes a reference to outdated standard in footnote 1. in the table.

Rationale

FM 4471, Appendix G. is no longer valid, FM dropped it from their test criteria.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

2nd Comment Period

Proponent Gaspar Rodriguez Submitted 8/23/2022 8:36:58 AM Attachments No

Comment:

This change should be included in FBC Sec 1523.6.5.2.4.1.1 and TAS 110 Sec 15.

9952-G1

TABLE 1515.2 MINIMUM SLOPE

SYSTEM TYPE	SLOPE
Fibrous Cement Shingles	**4:12**
Metal Panels	
Architectural	**2:12**[1]
Metal Shingles	**4:12**
Mortar or Adhesive Tile	**2:12**
Mechanically Fastened Tile	**4:12**
Asphalt Shingles	
Laminated	**2:12**
3-Tab	**2:12**
Quarry Slate	**3 1/2:12**
Wood	
Shakes	**4:12**
Shingles	**3 1/2:12**

1.Standing seam metal roof panel systems that pass the requirements of the Static Water Leakage Test criteria of ~~FM 4471, Appendix G or~~ ASTM E2140 shall be permitted to be installed to a minimum slope of 1:12.

Approval Standard for Class 1 Panel Roofs

Class Number 4471

March 2010

Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing and/or applications shall ensure a consistently uniform and reliable product or service. Approval Standards strive to be performance-oriented and to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and

b) must be readily identifiable.

Continuance of Approval and Listing depends on compliance with the Approval Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials and services as appropriate, and on periodic follow-up audits of the manufacturing facility or service/application.

FM Approvals LLC reserves the right in its sole judgment to change or revise its standards, criteria, methods or procedures.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Purpose

1.1.1 This standard states Approval requirements for Class 1 Panel Roofs. A Class 1 Panel Roof is one which meets the criteria of this standard for fire, wind, foot traffic, and hail damage resistance.

1.1.2 Approval criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility (ies), audit of quality assurance procedures, and a follow-up program.

1.2 Scope

1.2.1 This standard sets performance requirements for panel roofs which include all components necessary for installation of the panel roof assembly. The assembly which exhibits low fire spread below and above the panel, adequate simulated wind uplift resistance, and adequate strength and durability during the Approval examination will qualify as a Class 1 assembly. To be rated as a Class 1 panel roof assembly, only Class 1 Approved components may be used.

1.2.2 This standard applies to any component intended for use in assembling a panel roof, including metal and plastic panel roofs.

1.2.3 The performance of a panel roof depends in part on all components in its makeup, and on how these components interact. It is therefore necessary to evaluate the roof assembly as a whole when measuring the potential for fire spread on the underside and exterior of the roof, and/or its ability to resist wind forces.

1.3 Basis for Requirements

1.3.1 The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and loss control specialists was also considered.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of panel roofs for the purpose of obtaining Approval. Panel roofs having characteristics not anticipated by this standard may be FM Approved if performance equal, or superior, to that required by this standard is demonstrated, or if the intent of the standard is met. Alternatively, panel roofs which meet all of the requirements identified in this Standard may not be FM Approved if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for Approval

Approval is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate

- the suitability of the product;
- the performance of the product as specified by the manufacturer and required by FM Approvals; and as far as practical,

R9952Requirements

From: Tyrol, Mark <mark.tyrol@fmapprovals.com>
Sent: Monday, June 20, 2016 9:03 AM
To: Delfino, Sal <sdelfino@petersenmail.com>
Subject: RE: FM4471 App. G

Hello Sal,

We no longer have a water leakage test requirement in the FM 4471 Approval Standard. So the reference to FM 4471 App. G should be removed. We will contact Miami-Dade to let them know.

Thank you and regards,

Mark Tyrol
FM Approvals

Mark D. Tyrol, P.E. | Senior Engineer - Materials, Americas Business Development
FM Approvals | P.O. Box 9102 | 1151 Boston-Providence Turnpike | Norwood, MA 02062 U.S.A.
T: +1 (1) 781-255-4786 | E: mark.tyrol@fmapprovals.com
www.fmapprovals.com | www.roofnav.com | www.approvalguide.com

Mod_9952_Requirements_2023 FBC Modification FRSA 8 FM 4471 email to Sal.pdf

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

6

R9990

Date Submitted	02/01/2022	**Section**	1507.2.9.3	**Proponent**	Michael Silvers (FRSA)
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Residential Chapter9 Section R905

Summary of Modification

Eliminates option to install the drip edge at eave under the underlayment except when using a self-adhering underlayment.

Rationale

Allowing the underlayment to be installed over the drip edge at the eaves offers no resistance to wind uplift and little resistance to water intrusion. This change uses the existing gable language for both eaves and gables (rakes). It does allow self-adhering underlayment to be installed over the primed drip edge flange.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

Proponent Zachary Priest **Submitted** 8/26/2022 10:00:46 AM **Attachments** Yes

R9990-A3

Rationale:

The additional language proposed for adding ASTM D1970 is consistent with language for underlayments in 1507.1.1. This provided to further clarify the meaning of this proposed change.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Helps to clarify the products described in the proposed change to avoid misinterpretation or unintended meanings

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provide better specificity and less generic language

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Consistent with the code in 1507.1.1

Does not degrade the effectiveness of the code

Consistent with the original proposed change

1507.2.9.3 Drip edge. Provide drip edge at eaves and gables of shingle roofs. Overlap is to be a minimum of 3 inches (76 mm). Eave drip edges shall extend 1/2 inch (13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge ~~at gables~~ shall be installed over the underlayment. ~~Drip edge at eaves be permitted to be installed either over or under the underlayment~~. ~~If installed over the underlayment~~, Self-adhering, ASTM D1970 underlayment may be installed over a primed drip edge flange. ~~t~~There shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange or the self-adhering underlayment. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the Vasd, as determined in accordance with Section 1609.3.1, is 110 mph (177 km/h) or greater or the mean roof height exceeds 33 feet (10 058 mm), drip edges shall be mechanically fastened a maximum of 4 inches (102 mm) on center.

1507.2.9.3 Drip edge. Provide drip edge at eaves and gables of shingle roofs. Overlap is to be a minimum of 3 inches (76 mm). Eave drip edges shall extend 1/2 inch (13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge ~~at gables~~ shall be installed over the underlayment. ~~Drip edge at eaves be permitted to be installed either over or under the underlayment~~. ~~If installed over the underlayment~~, Self-adhering underlayment may be installed over a primed drip edge flange. ~~t~~There shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange or the self-adhering underlayment. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the Vasd, as determined in accordance with Section 1609.3.1, is 110 mph (177 km/h) or greater or the mean roof height exceeds 33 feet (10 058 mm), drip edges shall be mechanically fastened a maximum of 4 inches (102 mm) on center.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

7

R9998

Date Submitted	02/02/2022	**Section**	1507.3	**Proponent**	Michael Silvers (FRSA)
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Residential Chapter 9 Roof Assemblies Section 905.3

Summary of Modification

Removes references to Miami/Dade Roofing Application Standards (RAS) 118, 119 or 120 for tile roofs from standard (Non HVHZ) sections of the roofing chapters.

Rationale

Prescriptive methods described in the tile related RAS and TAS standards have been called into question. Underlayment applications described in the standards when tested using currently available performance testing standards indicate that some of the underlayment material and the fastener placement and density do not meet the current wind uplift resistance requirements based on ASCE-7. Test results from testing commissioned by FRSA using these proposed test standards are attached and indicate very low resistance to uplift pressures for systems described in the RAS and TAS. The numbers shown in Test 2 are before applying the safety factor of two that further reduces the listed uplift resistance of the underlayment. Independent testing by manufacturers of underlayment components produced similar results. The uplift resistance shown in many product approvals also confirms the need for these changes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

2nd Comment Period

R9998-G2

Proponent ashley ong Submitted 8/20/2022 1:31:45 PM Attachments No

Comment:

BOAF is OPPOSED to this proposed modification. The roofing application standard has been accepted for multiple code cycles and there is no hard data to support that this has been a problem. It is important for all stakeholders (design professionals, contractors, code officials and owners) to have code options comply.

1st Comment Period History

R9998-G1

Proponent Paul Malanaphy Submitted 3/10/2022 12:16:53 PM Attachments No

Comment:

This modification will eliminate the misconception that installation in accordance with RAS 118, 119 or 120 meets all required wind loads. I am in full support.

1507.3.2 Deck slope.

Clay and concrete roof tile shall be installed in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section 1609.3.1 ~~or the recommendations of RAS 118, 119 or 120.~~

1507.3.3 Underlayment.

Unless otherwise noted, underlayment shall be applied according to the underlayment manufacturer's installation instructions or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the basic wind speed, Vasd, is determined in accordance with Section 1609.3.1 ~~or the recommendations of RAS 118, 119 or 120.~~

1507.3.3.1 Slope and underlayment requirements.

Refer to FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the basic wind speed Vasd is determined in accordance with Section 1609.3.1 for underlayment and slope requirements for specific roof tile systems ~~or the recommendations of RAS 111, 118, 119 or 120.~~

Clay and Concrete Tile Attachment

1507.3.8 Application.

Tile shall be applied according to the manufacturer's installation instructions or recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the basic wind speed, Vasd, is determined in accordance with Section 1609.3.1 ~~or the recommendation of RAS 118, 119 or 120.~~

1507.3.9 Flashing.

At the juncture of the roof vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the basic wind speed, Vasd, is determined in accordance with Section 1609.3.1 ~~or the recommendation of RAS 118, 119 or 120.~~

PRI Construction Materials Technologies LLC
6412 Badger Drive
Tampa, FL 33610
813.621.5777
https://www.pri-group.com/

Laboratory Test Report

Report for:	Mike Silvers FRSA 3855 N. Econlockhatchee Trail Orlando, FL 32817
Product Name:	Self-adhered underlayment applied to ASTM D226 anchor sheet
Project No.:	2368T0002
Dates Tested:	May 10, 2021
Test Methods:	UL 1897-12

Purpose: Determine uplift resistance in accordance with **UL 1897-12 *Uplift Tests for Roof Covering* Systems.**

Test Methods: Testing was completed as described in UL 1897-12 *Uplift Tests for Roof Covering* Systems. Specimens were incrementally loaded in accordance with UL 1897 until failure.

Deck Description:	Framing:	2x10 No. 2 SYP lumber installed 24" o.c.
	Deck:	15/32 APA rated plywood sheathing installed over No. 2 lumber supports spaced 24" on center. Decking was attached with 2-3/8 inch x 0.113 inch ring shank nails spaced 6" o.c. along the perimeter and intermediate supports.
	Underlayment:	An anchor sheet of ASTM D226 type II material was mechanically attached to sheathed specimen with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps (see Results Table for spacing details). A self-adhering underlayment was applied atop the mechanically attached anchor sheet in accordance with manufacturer's installation instructions. The laps of the self-adhered underlayment were backnailed with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps and spaced 12 inches on center along the lap.

Results:

Table 1. Summary of Test Results

Specimen No.	Underlayment	Attachment	Passing Uplift Pressure (psf)	Failure Mode
1	2 / A	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
2	2 / A	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	45	Fastener Pull-through
3	2 / A	Plywood joints taped[1] Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through
4	2 / D	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
5	2 / D	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through

Notes: 1 - Specimen #3 construction details included taping of the plywood joints with AAMA 711 compliant seam tape.

Statement of Attestation:

Testing was conducted in accordance with **UL 1897-12** ***Uplift Tests for Roof Covering*** **Systems.** The test results and interpretations presented herein are representative of the materials supplied by the client.

Signed: _____
Jason Simmons
Director

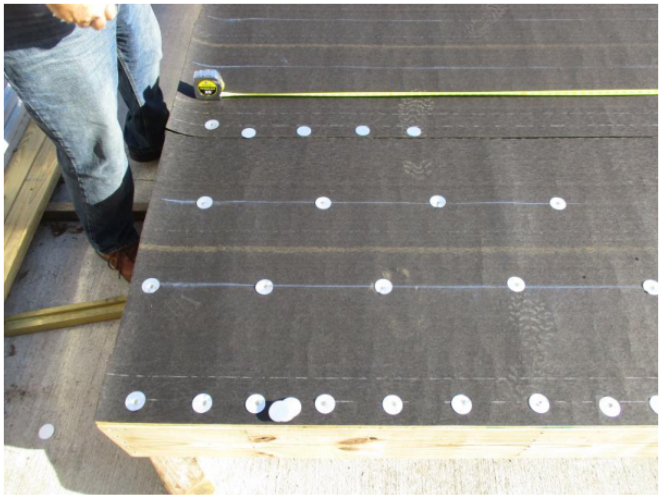
Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	07/07/2021	8	NA
Revision	07/14/2021	7	Remove product identification

APPENDIX ATTACHED

Appendix A: Representative Photographs

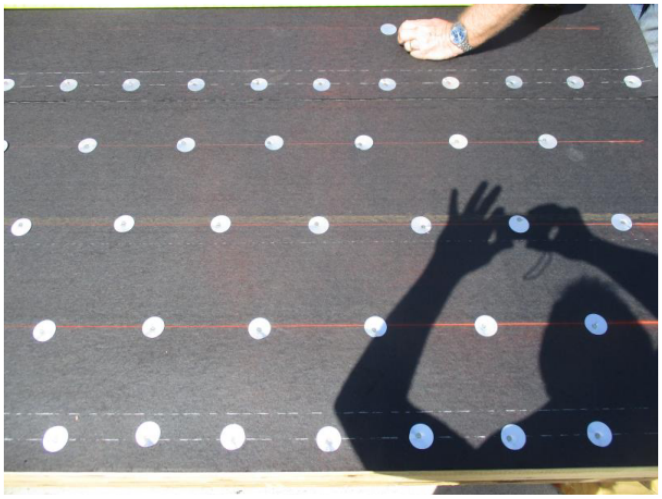
PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



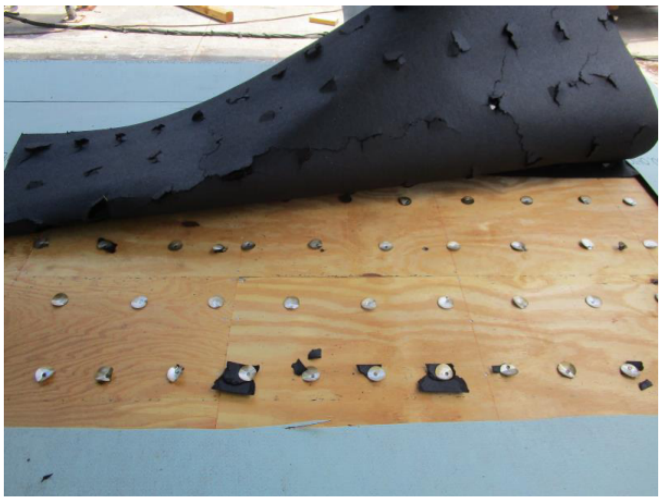
Specimen #1 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field

Specimen #1 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

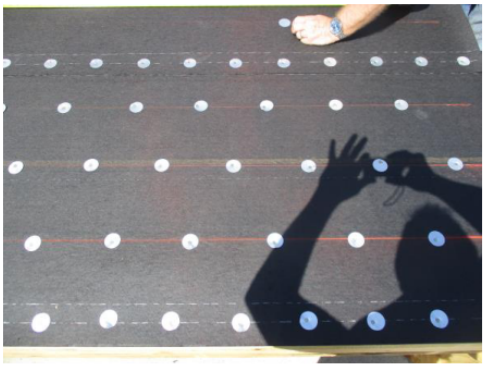


Specimen #2 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field

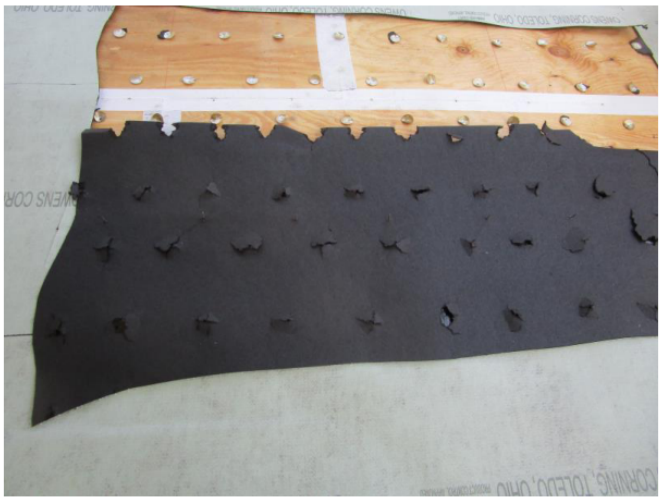


Specimen #2 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

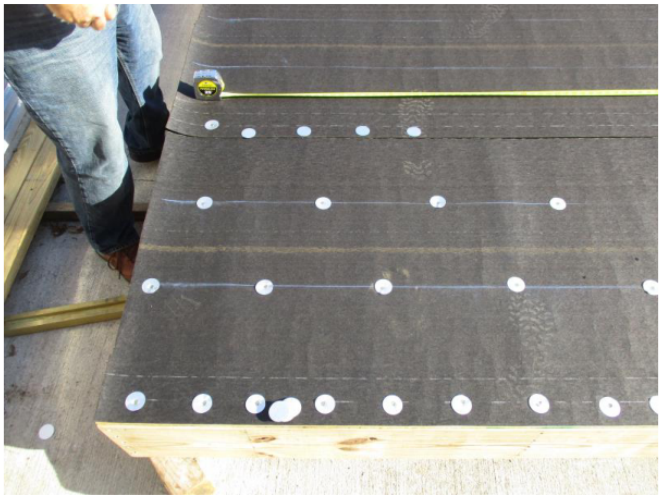


Specimen #3 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field over taped plywood joints

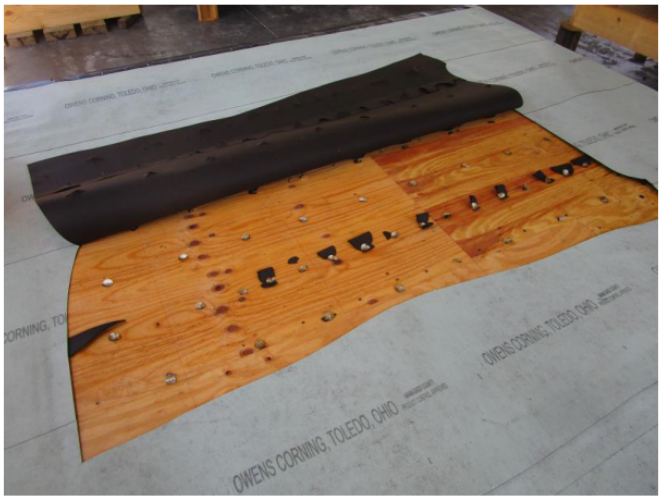


Specimen #3 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

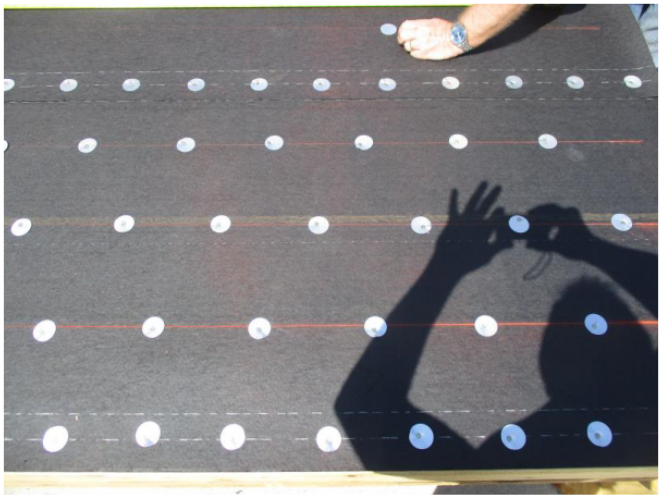


Specimen #4 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field

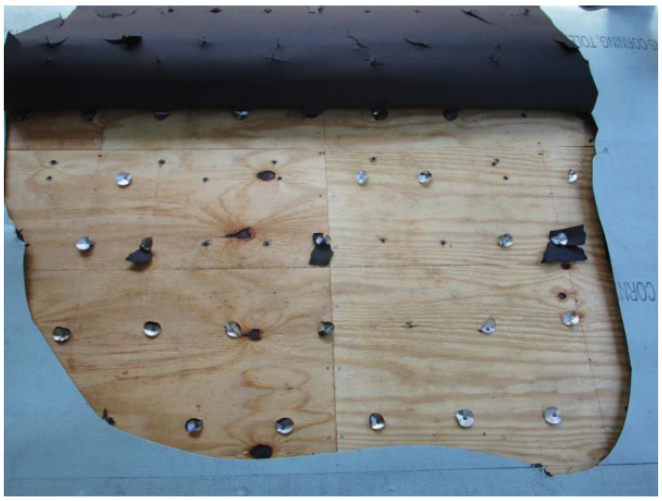


Specimen #4 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



Specimen #5 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field



Specimen #5 failure – fastener pull-through

END OF REPORT

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

PRI Construction Materials Technologies LLC
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https://www.pri-group.com/

Test Status Email

Report for:	Mike Sivers FRSA 3855 N. Econlockhatchee Trail Orlando, FL
Product Name:	Various D226 30# underlayments and various self-adhering underlayments
Project No.:	2368T0001
Dates Tested:	April 1, 2021 – April 2, 2021
Test Methods:	ASTM D1876 T-peel TAS 117 (B) fastener pull-through
Results Summary:	*See Results table herein*

Mike,

Per your request, PRI completed resistance to T-peel between PSU30 and four (4) different ASTM D226, 30# underlayments. Identifying the 30# with which the PSU30 adhered the best, we completed testing for adhesion between that underlayment and the other three (3) self adhered products.

Additionally, we completed fastener pull-through testing in accordance with TAS 117 (B) for the four 30# underlayments.

The results of testing can be found herein in the following two results tables.

Please pass this on to your counterparts in preparation for the assembly work next week.

Feel free to call or email with any questions:

-Jason

ASTM D1876 T-Peel

Sample	Test Method	Results						
T-Peel Strength (lbf/in); 10 specimens; 1in x 12in; Test Rate @ 10in/min; Self adhered to anchor sheet	ASTM D1876							
1 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.18	1.01	1.01	1.46	0.88		
		6	7	8	9	10		
		0.93	0.86	0.70	0.83	0.74	0.96	0.22
1 / B		1	2	3	4	5	**Avg.**	St. Dev
		0.54	0.42	0.49	0.39	0.46		
		6	7	8	9	10		
		0.73	0.40	0.41	0.49	0.50	0.48	0.10
1 / C		1	2	3	4	5	**Avg.**	St. Dev
		0.36	0.26	0.37	0.35	0.35		
		6	7	8	9	10		
		0.36	0.32	0.45	0.35	0.48	0.37	0.06
1 / D		1	2	3	4	5	**Avg.**	St. Dev
		0.53	0.57	0.59	0.62	0.53		
		6	7	8	9	10		
		0.58	0.47	0.56	0.53	0.45	0.54	0.05
2 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.00	1.10	1.06	1.26	1.16		
		6	7	8	9	10		
		1.22	0.94	0.96	0.83	1.16	1.07	0.14
3 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.19	1.23	1.34	0.95	1.12		
		6	7	8	9	10		
		0.92	0.82	0.88	0.80	1.32	1.05	0.20
4 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.40	0.35	0.45	0.41	0.55		
		6	7	8	9	10		
		0.41	0.41	0.47	0.52	0.40	0.44	0.06

Notes: None

PRI Construction Materials Technologies LLC 6408 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

TAS 117 (B) Fastener Pull-Through Resistance

Sample	Test Method	Results Maximum Load (lbf)								
Fastener Pull-Through Resistance (lbf) 14 specimens; 18" by 18"; Test Rate @ 2in/min	TAS 117 Appendix B									
A		1	2	3	4	5	6	7	Avg.	St. Dev
		61.7	59.0	64.7	64.4	64.3	55.5	56.4		
		8	9	10	11	12	13	14		
		62.4	66.8	61.1	56.3	56.2	57.8	60.5	60.5	3.7
B		1	2	3	4	5	6	7	Avg.	St. Dev
		41.0	51.0	56.0	49.1	49.6	46.8	53.7		
		8	9	10	11	12	13	14		
		40.9	52.6	36.2	44.8	44.5	45.9	44.7	46.9	5.5
C		1	2	3	4	5	6	7	Avg.	St. Dev
		42.4	41.2	52.0	48.0	45.8	52.5	48.4		
		8	9	10	11	12	13	14		
		49.3	47.6	52.0	43.2	44.7	50.2	44.3	47.2	3.7
D		1	2	3	4	5	6	7	Avg.	St. Dev
		81.9	84.9	91.9	86.8	83.9	83.7	80.9		
		8	9	10	11	12	13	14		
		82.9	78.6	83.5	82.4	89.7	86.8	83.9	84.4	3.5

Notes: None

PRI Construction Materials Technologies LLC 6408 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

8

R10118

Date Submitted	02/15/2022	**Section**	1504.5	**Proponent**	Amanda Hickman
Chapter	15	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

none

Summary of Modification

Edge systems for low-slope roofs

Rationale

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.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Improves enforcement of the code by clarifying that the edge metal systems need to be properly tested.

Impact to building and property owners relative to cost of compliance with code

No impact to cost, as this modification only clarifies that this test applies to edge metal regardless of installation method.

Impact to industry relative to the cost of compliance with code

No impact to cost, as this modification only clarifies that this test applies to edge metal regardless of installation method.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Will improve the safety and welfare of the general public by ensuring metal edge systems are tested per ES-1 whether they secure the membrane or not.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will strengthen the code by ensuring edge metal systems are properly tested.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate, as it only clarifies that this test applies to edge metal regardless of installation method.

Does not degrade the effectiveness of the code

This modification will improve the effectiveness of the code by clarifying existing language.

Alternate Language

2nd Comment Period

Proponent Amanda Hickman **Submitted** 8/22/2022 11:00:27 AM **Attachments** Yes

RB10118-A1

Rationale:

This edit updated this language to be consistent with the 2021 IBC as approved. It was our intent to include this language with the original submission. This language clarifies the testing requirements to appropriate standards. The modification clarifies that the counterflashings are excluded from the proposed requirement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Improves enforcement of the code by clarifying testing requirements.

Impact to building and property owners relative to cost of compliance with code

No impact to cost of compliance; just an editorial change.

Impact to industry relative to the cost of compliance with code

No impact to cost of compliance; just an editorial change.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Will improve the safety and welfare of the general public by ensuring metal edge systems are tested per ES-1 whether they secure the membrane or not.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the code by ensuring edge metal systems are properly tested.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification will not discriminate, as it only clarifies that this test applies to edge metal regardless of installation method.

Does not degrade the effectiveness of the code

This modification will improve the effectiveness of the code by clarifying existing language.

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, or RAS 111 except Vult wind speed shall be determined from Figure 1609.3(1), 1609.3(2), 1609.3(3) or 1609.3(4) as applicable.

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, or RAS 111 except V_{ult} wind speed shall be determined from Figure 1609.3(1), 1609.3(2), 1609.3(3) or 1609.3(4) as applicable.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

R10176

Date Submitted	02/14/2022	**Section**	1518	**Proponent**	Michael Silvers (FRSA)
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

10175, 10179, 10180 and 10238

Summary of Modification

This modification will align HVHZ roof underlayment requirements with the more stringent secondary water barrier requirements used in the rest of Florida and will also allow the use of self-adhering membrane applied direct to deck in the HVHZ.

Rationale

This modification will align HVHZ roof underlayment requirements with the more stringent secondary water barrier requirements used in the rest of Florida and will also allow the use of self-adhering membrane applied direct to deck in the HVHZ. Self-adhering underlayments have been accepted outside the HVHZ for well over a decade. They have proven to be the most effective secondary water barrier (SWB) capable of helping building owners and occupants to utilize their structures after hurricanes. Their proven resistance to wind uplift and wind driven rain makes them an excellent SWB. They have also shown to be an important part of the load path when used as a tile underlayment. These underlayments currently offer the highest resistance to uplift available when used as the tile underlayment in adhered tile systems. This is an important consideration with the higher design wind speeds in the HVHZ. Language was previously added to the code that describes how future roof systems can be installed when a self-adhering underlayment has been previously installed as part of a roof system. Their use has been widely accepted and eventually embraced by Florida's roofing industry for good reason. The building owners and citizens residing in the HVHZ deserve this option.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not discriminate.

Alternate Language

2nd Comment Period

R10176-A3

Proponent Michael Silvers (FRSA) **Submitted** 8/25/2022 2:27:38 PM **Attachments** Yes

Rationale:

This alternate language addresses a concern voiced during the June TAC meetings. The changed language in option 3. changes the overlap method to conform to manufacturers existing ply lines and addresses concerns about the need to use chalk lines.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

2nd Comment Period

R10176-A2

Proponent Michael Silvers (FRSA) **Submitted** 8/18/2022 1:46:14 PM **Attachments** Yes

Rationale:

1518.1 Does not specifically apply to underlayment should not have been included in the original modification language.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

Alternate Language for Modification R10176R1

SECTION 1518 HIGH-VELOCITY HURRICANE ZONES-ROOF COVERINGS WITH SLOPES 2:12 OR GREATER

1518.1 General.

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1518.2 Underlayments.

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section ~~1518.1~~, 1518.2, 1518.5, 1518.6, 1518.7, 1518.8, 1518.9, 1518.10, or 1518.11 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

1518.2.1

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles.

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles shall comply with one of the following methods:

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

Exception:

1. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4 -inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved

underlayment in accordance with Table 1518.2.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheets of underlayment, for the second course. Apply the third course of underlayment overlapping the second course ~~successive sheets~~ half the width of a full sheet plus 2". Overlap all successive courses half the width of a full sheet plus 1 inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

TABLE 1518.2.1UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D6757	Apply in accordance with Section 1518.2.1, Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. Underlayments shall be fastened with approved minimum 12 gage by 11/4 in. corrosion-resistant annular ring shank roofing nails fastened through minimum 32 gage by 15/8 in. diameter approved tin caps. Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps. Nails shall be of sufficient length to penetrate through the sheathing or wood plank a minimum of 3/16 in. or penetrate 1 inch (25 mm) or greater thickness of lumber a minimum of 1 in., except where architectural appearance is to be preserved, in which case a minimum of 3/4 in. nail may be used.
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV		

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

1518.2.2

Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.

1518.2.3

Tin caps and nails or cap nails shall be as defined in Section 1517.5.2.

1518.2.4

Underlayment nails shall be as defined in Section 1517.5.1.

1518.3 Reserved.

1518.4 Reserved

1518.8 Clay and concrete roof tile.

Tile shall be clay, concrete or composition material of various configurations complying with the physical property requirements of this code. All tile and tile systems shall be tested in compliance with the provisions set forth in Section 1523. *Note: Remaining sections remain unchanged.*

1518.1 General.

~~Prepared roof coverings shall be as defined in Section 1513 and in general limited to application over sloped roof decks capable of receiving mechanical fasteners. Prepared roof coverings may be mechanically fastened or, in specific limited cases when noted in the product approval, set in with an adhesive bond.~~

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

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1518.2 Underlayments.

~~Underlayment shall be as defined in Section 1513. Underlayment shall be installed in compliance with the roofing component product approval and shall be in compliance with the following minimum requirements:~~

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section ~~1518.1,~~ 1518.2, 1518.5, 1518.6, 1518.7, 1518.8, 1518.9, 1518.10, or 1518.11 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

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1518.2.1

~~Underlayment described in 1518.4 (1), (2) and (3) shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6 inch (152 mm) spacing at the overlaps~~.

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles~~.~~

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles shall comply with one of the following methods:

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

Exception:

1. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in

accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4 -inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1518.2.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

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TABLE 1518.2.1UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D6757	Apply in accordance with Section 1518.2.1, Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. Underlayments shall be fastened with approved minimum 12 gage by 11/4 in. corrosion-resistant annular ring shank roofing nails fastened through minimum 32 gage by 15/8 in. diameter approved tin caps. Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps. Nails shall be of sufficient length to penetrate through the sheathing or wood plank a minimum of 3/16 in. or penetrate 1 inch (25 mm) or greater thickness of lumber a minimum of 1 in., except where architectural appearance is to be preserved, in which
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV		

			case a minimum of 3/4 in. nail may be used.

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

1518.2.2

Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.

1518.2.3

Tin caps and nails or cap nails shall be as defined in Section 1517.5.2.

1518.2.4

Underlayment nails shall be as defined in Section 1517.5.1.

1518.3 Reserved.

~~If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor sheet, attached in compliance with Section 1518.2.1.~~

1518.4 Reserved

~~All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following:~~

~~(1) a double layer of an ASTM D226 Type I~~ II, ~~with a 19-inch (483 mm) headlap; or~~

~~(2) a single layer of an ASTM D226, Type II with a 4-inch (102 mm) headlap; or~~

~~(3) a single layer of an ASTM D2626 coated base sheet with a 4-inch (102 mm) headlap,~~

~~and (4~~ 6) ~~all endlaps shall be a minimum of 6 inches (152 mm).~~

1518.8 Clay and concrete roof tile.

Tile shall be clay, concrete or composition material of various configurations complying with the physical property requirements of this code. All tile and tile systems shall be tested in compliance with the provisions set forth in Section 1523. ~~Tile shall have a product approval for a complete tile system, which shall include the tile, underlayment and all tile related accessories required to provide a waterproof system.~~

Note: Remaining sections remain unchanged.

1518.1 General.

~~Prepared roof coverings shall be as defined in Section 1513 and in general limited to application over sloped roof decks capable of receiving mechanical fasteners. Prepared roof coverings may be mechanically fastened or, in specific limited cases when noted in the product approval, set in with an adhesive bond.~~

Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

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1518.2 Underlayments.

~~Underlayment shall be as defined in Section 1513. Underlayment shall be installed in compliance with the roofing component product approval and shall be in compliance with the following minimum requirements:~~

Underlayment for roof slopes 2:12 and greater shall conform to the applicable standards listed in this chapter. Underlayment materials required to comply with ASTM D226, D1970, D4869, D6757 and ASTM D8257 shall bear a label indicating compliance to the standard designation and, if applicable, type classification indicated. Underlayment for roof slopes 2:12 and greater shall be applied and attached in accordance with Section 1518.1, 1518.2, 1518.5, 1518.6, 1518.7, 1518.8, 1518.9, 1518.10, or 1518.11 as applicable.

Exceptions:

1. For areas of a roof that cover exterior walkways and roofs of agricultural buildings, underlayment shall comply with the manufacturer's installation instructions.

2. Compliance with Section 1507.1.1.1 is not required for structural metal panels that do not require a substrate or underlayment.

-

1518.2.1

~~Underlayment described in 1518.4 (1), (2) and (3) shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6 inch (152 mm) spacing at the overlaps~~.

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles~~:~~

Underlayment for asphalt shingles, metal roof panels or shingles, mineral surfaced roll roofing, slate and slate-type shingles shall comply with one of the following methods:

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

Exception:

1. An existing self-adhering modified bitumen underlayment that has been previously installed over the roof decking and, where it is required, renailing off the roof sheathing in accordance with Section 706.7.1 of the Florida Building Code, Existing Building can be confirmed or verified. An approved underlayment in

accordance with Table 1507.1.1.1 for the applicable roof covering shall be applied over the entire roof over the existing self-adhered modified bitumen underlayment.

2. A minimum 3-3/4 -inch-wide (102 96 mm) strip of selfadhering polymer-modified bitumen membrane complying with ASTM D1970 or selfadhering flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1518.2.1 for the applicable roof covering shall be applied over the entire roof over the membrane strips.

3. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using annular ring or deformed shank nails with metal or plastic caps with a nominal cap diameter of not less than 1 inch (25.4 mm). Metal caps are required where the ultimate design wind speed, Vult, equals or exceeds 170 mph. Metal caps shall have a thickness of not less than 32-gage sheet metal. The minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.889 mm). The cap nail shank shall be not less than 0.083 inch (2.1082 mm) for ring 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 (19.05 mm) into the roof sheathing.

-

TABLE 1518.2.1UNDERLAYMENT WITH SELF-ADHERING STRIPS OVER ROOF DECKING JOINTS

Roof Covering	Underlayment Type	Underlayment Attachment	
		Roof Slope 2:12 and Less Than 4:12	Roof Slope 4:12 and Greater
Asphalt Shingles, Metal Roof Panels, Photovoltaic Shingles	ASTM D226Type IIASTM D4869Type III or IV ASTM D 675	Apply in accordance with Section 1518.2.1, Item 3	Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches; end laps shall be 6 inches and shall be offset by 6 feet. Underlayments shall be fastened with approved minimum 12 gage by 11/4 in. corrosion-resistant annular ring shank roofing nails fastened through minimum 32 gage by 15/8 in. diameter approved tin caps. Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps. Nails shall be of sufficient length to penetrate through the sheathing or wood plank a minimum of 3/16 in. or penetrate 1 inch (25 mm) or greater thickness of lumber a minimum
Metal Roof Shingles, Mineral-Surface Roll Roofing, Slate and Slate-type Shingles, Wood Shingles, Wood Shake	ASTM D226Type II ASTM D4869 Type III or IV		

			of 1 in., except where architectural appearance is to be preserved, in which case a minimum of 3/4 in. nail may be used.

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

1518.2.2

Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.

1518.2.3

Tin caps and nails or cap nails shall be as defined in Section 1517.5.2.

1518.2.4

Underlayment nails shall be as defined in Section 1517.5.1.

1518.3 Reserved.

~~If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor sheet, attached in compliance with Section 1518.2.1.~~

1518.4 Reserved

~~All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following:~~

~~(1) a double layer of an ASTM D226 Type I~~ II, ~~with a 19-inch (483 mm) headlap; or~~

~~(2) a single layer of an ASTM D226, Type II with a 4-inch (102 mm) headlap; or~~

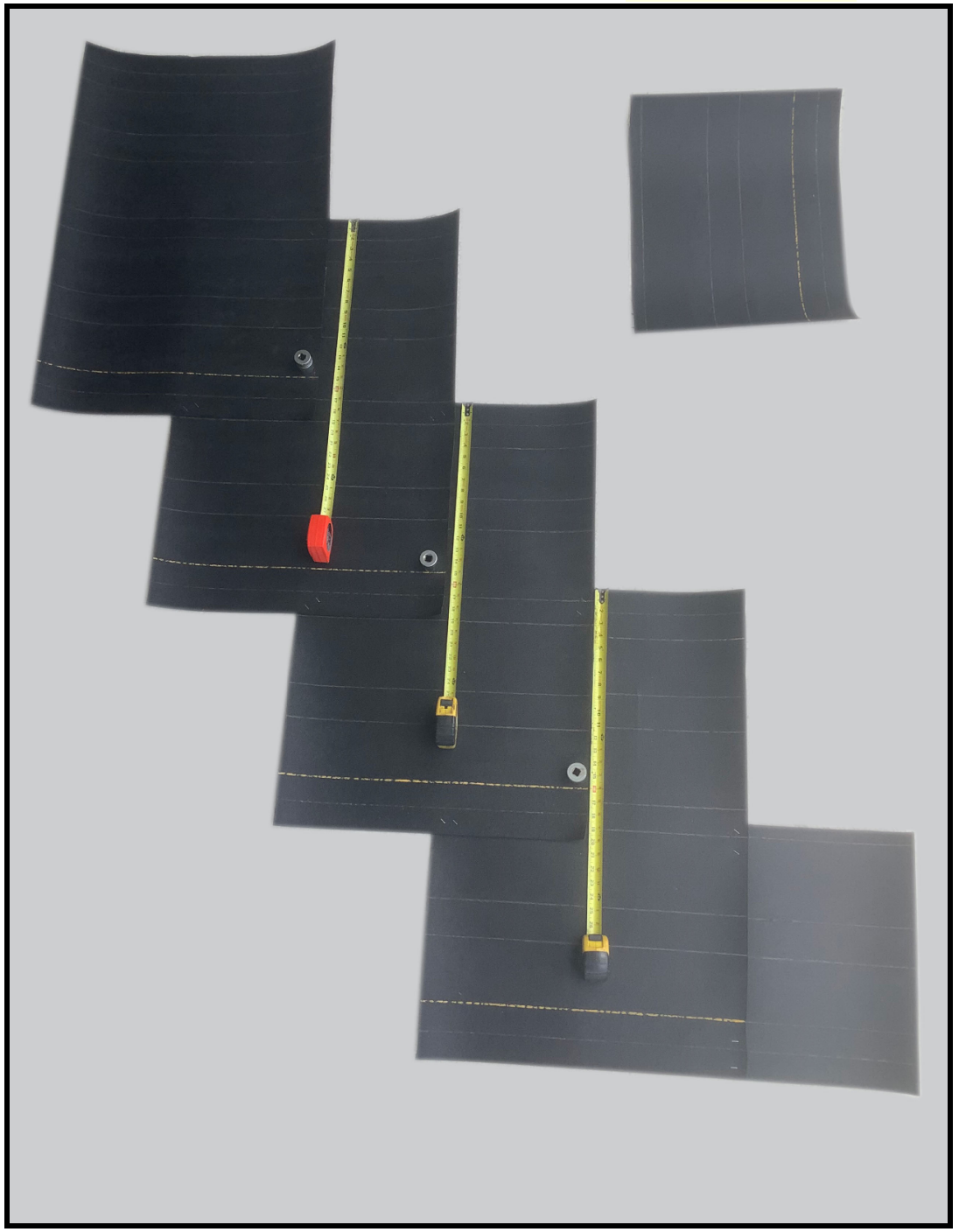
~~(3) a single layer of an ASTM D2626 coated base sheet with a 4-inch (102 mm) headlap,~~

~~and (4~~ 6) ~~all endlaps shall be a minimum of 6 inches (152 mm).~~

1518.8 Clay and concrete roof tile.

Tile shall be clay, concrete or composition material of various configurations complying with the physical property requirements of this code. All tile and tile systems shall be tested in compliance with the provisions set forth in Section 1523. ~~Tile shall have a product approval for a complete tile system, which shall include the tile, underlayment and all tile related accessories required to provide a waterproof system.~~

Note: Remaining sections remain unchanged.



TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

10

R10269

Date Submitted	02/12/2022	**Section**	1515.2	**Proponent**	Gaspar Rodriguez
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Summary of Modification

On Table 1515.2 Note 1, replace outdated FM 4471 with current TAS 114.

Rationale

TAS 114, Appendix G, is equivalent to FM 4471 and should remain as an alternate test standard.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
None.
Impact to building and property owners relative to cost of compliance with code
None.
Impact to industry relative to the cost of compliance with code
Allows manufacturers to continue to use testing which has been performed recently.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Yes, maintains testing standard.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Maintains current standards.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate.
Does not degrade the effectiveness of the code
Does not degrade.

2nd Comment Period

Proponent Gaspar Rodriguez Submitted 8/23/2022 8:27:29 AM Attachments No

Comment:

I would like to withdraw this mod, the proposed TAS substitute is hardly ever used. Therefore, to not clutter up the code we would ask it be withdrawn.

Note 1, below Table 1515.2

1. Standing seam metal roof panel systems that pass the requirements of the Static Water Leakage Test criteria of ~~FM 4471~~TAS 114, Appendix G or ASTM E2140 shall be permitted to be installed to a minimum slope of 1:12.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Building

11

R10119

Date Submitted	02/15/2022	**Section**	1	**Proponent**	Amanda Hickman
Chapter	35	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

nom

Summary of Modification

ANSI/SPRI/FM4435-ES-1 update

Rationale

This modification updates Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems standard to the current version.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will improve enforcement of the code by updating the reference standard to the current version.

Impact to building and property owners relative to cost of compliance with code

No impact to cost, as this only updates the standard to the current version.

Impact to industry relative to the cost of compliance with code

No impact to cost, as this only updates the standard to the current version.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will improve welfare of general public by updating the standard to the current version.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification strengthens the code by updating the standard to the current version.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate, as this modification only updates the standard to the current version.

Does not degrade the effectiveness of the code

Improves effectiveness of the code by updating the standard to the current version.

Alternate Language

2nd Comment Period

Proponent McQuillen Tim **Submitted** 8/26/2022 10:38:41 AM **Attachments** Yes

R10119-A1

Rationale:

The updated version of the TPO standard will ensure the materials are appropriate for use when testing ANSI/SPRI/FM 4435-ES-1 under the test method RE-1 which utilizes the roof membrane material in conjunction with the metal edging.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The change does not impact health, safety and welfare of general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change ensures that code is referencing the most up to date standard for the roof covering.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not discriminate against other products, methods or systems or systems of construction

Does not degrade the effectiveness of the code

The change does not degrade the effectiveness of the code

Revise reference standard as follows:

ANSI/SPRI/FM4435-ES-1—~~11~~17

Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems

ANSI/SPRI/FM 4435/ES-1 2017

Test Standard for Edge Systems Used with Low Slope Roofing Systems

Approved January 24, 2017

Table of Contents

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Disclaimer
This standard is for use by architects, engineers, roofing contractors, manufacturers, testing agencies, and owners of low slope roofing systems. SPRI, its members and employees do not warrant that this standards is proper and applicable under all conditions.

1.0 Introduction

1.1 Scope

This Standard provides the basic requirements only for resistance testing for *roof edge systems* under simulated *wind load* conditions. This Standard is intended for use by those that design, specify, manufacturer, and test roofing materials and *roof edge systems* used in the roofing industry.

This Standard applies to low slope roof systems, with low slope defined here as roofs having a slope ≤9.5 degrees (2:12). The test methods found in this document address *copings* and *roof edge systems*.

1.2 Definitions

All words defined within this section are *italicized* throughout the standard.

ANSI
American National Standards Institute

Ballast
An anchoring material, such as aggregate or precast concrete pavers, which employs its mass and the force of gravity to hold (or assist in holding) single-ply roof *membranes* in place.

Cleat
A continuous *metal* strip, or angled piece, used to secure *metal* components.

Clip
A non-continuous *metal* component or angle piece used to secure two or more *metal* components together.

Coping
The covering piece on top of a *parapet wall* exposed to the weather, usually made of *metal*, and sloped to carry off water.

Deck
The uppermost structural component of the building immediately below the *roof system*. The *deck* must be capable of safely supporting the weight of the *roof system*, and the loads required by the governing building codes.

Design load
The total load on a structural system for the most severe combination of loads and forces which it is designed to sustain.

Drip edge
A *metal* flashing or other overhanging component with an outward projecting lower edge, intended to control the direction of dripping water and help protect underlying building components.

Fascia
The vertical or steeply sloped roof trim located at the perimeter of a building. Typically, it is a border for the *low-slope roof system*.

Fastener
Any of a wide variety of mechanical securement devices and assemblies, including nails, screws, *cleats*, *clips* and bolts, which may be used to secure various *roof edge system* components.

Fastener Pull-out
A type of failure mode in which a *fastener* pulls away from a *substrate* (e.g.: nailer) under load.

Fastener Pull-through
A type of failure mode in which a *fastener* head pulls through a *substrate*, *clip* or *cleat* under load.

Field of Roof Pressure
The wind pressure (generally upwards) imparted on a central area of the roof.

Gravel stop
A flanged device, frequently metallic, designed to prevent loose aggregate from washing off the roof and to provide a continuous *roof edge system* for the roofing *membrane*.

Gutter
A channeled component installed along the down slope perimeter of a roof to convey runoff water from the roof to the drain leaders or downspouts.

Low-slope roof
A category of roofs that generally include weatherproof *membrane* types of *roof systems* installed on slopes at or less than 2:12 (9.5 degrees).

Membrane
A flexible or semi-flexible roof covering or waterproofing whose primary function is to exclude water.

Metal
Any of a category of electropositive elements that usually have a shiny surface, are generally good conductors of heat and electricity, and can be melted or fused, hammered into thin sheets.

Parapet wall
The part of a perimeter wall that extends above the roof.

Roof Edge
The point of transition from a *low-slope roof* to a lower vertical or near vertical building element, including but not limited to walls, windows, *fascia* boards, and mansard roofs.

Roof edge system
A component or system of components at the perimeter of the roof that typically is integrated into the *roof system* for the purpose of flashing and securing the roof *membrane*.

Roof slope
The angle a roof surface makes with the horizontal, expressed as a ratio of the units of vertical rise to the units of horizontal length (sometimes referred to as run), the amount or degree of such deviation. If the slope is given in inches, slope may be expressed as a ratio of rise of run, such as 2:12, or as an angle.

Roof system
A system of interacting roof components, generally consisting of a *membrane*, roof insulation and *roof edge systems* (not including the roof *deck*) designed to weatherproof and, sometimes, to improve the building's thermal resistance.

Soffit
The exposed undersurface of any exterior overhanging section of a roof eave.

Substrate
The upper surface of the roof *deck*, insulation, or other roofing structure upon which a roofing *membrane* or other component of the roofing system is placed or to which it is attached.

Wind load
Force exerted by the wind on a roof or any component of a roof.

2.0 Background Information

2.1 Wind Related Roofing Damage

No area of the country is exempt from wind related roofing damage.

Public law 108-360, National Windstorm Impact Reduction Act of 2004, was signed into law by President Bush to reduce the risk wind hazards propose to life and property. It recommended improvements in and enhancements of, "standards and technologies that will enable cost effective, state of the art windstorm resistant provisions to be adopted as part of state and local building codes"

In addition, public law 114-52, National Windstorm Impact Reduction Act Reauthorization of 2015 2015, reauthorized the national windstorm impact reduction act and noted: SEC. 202. FINDINGS. NOTE: 42 USC 15701.

The Congress finds the following:

1. Hurricanes, tropical storms, tornadoes, and thunderstorms can cause significant loss of life, injury, destruction of property, and economic and social disruption. All States and regions are vulnerable to these hazards.

   A study of 145 FM Global losses involving built-up roof (BUR) systems showed 85 losses (59 percent) occurred because the roof perimeter failed[1]. The Roofing Industry Committee on Weather Issues (RICOWI) has issued several reports summarizing their findings regarding roof damage after significant wind events. The committee found "many examples of damage appeared to originate at failed edge details"[2]. RICOWI notes that their "studies reinforced the need for secure *roof edge systems*, and codes that require secure roof edging need to be enforced"[3].

3.0 Membrane Termination

Two types of *membrane* termination are industry accepted: dependently and independently terminated systems.

3.1 Dependently Terminated Systems

Ballasted systems, ribbon/spot adhered systems, or systems in which the mechanically attached roof cover is secured to the *substrate* at a distance greater than 12 in (300 mm) from the *roof edge* are considered dependently terminated by the *roof edge system*. For these systems the RE-1 and RE-2 tests are required.

3.2 Independently Terminated Systems

Systems in which the roof cover is fully adhered to the *substrate* or a mechanically attached roof cover is secured to the *substrate* at a distance less than or equal to 12 in (300 mm) from the *roof edge* are considered independently terminated. For these systems the RE-2 test or RE-3 test is required.

4.0 Edge System Resistance

Roof edge systems shall be tested in accordance with tests RE-1, RE-2 or RE-3 as appropriate for the application. See Appendix A—Roof Edge System Testing.

4.1 Dependently Terminated Systems

Roof edge systems designed to act as *membrane* termination shall be tested according to tests RE-1 and RE-2.

4.2 Edge Flashing, Gravel Stops

For *roof edge systems* where the **exposed** horizontal component is 4 in (100 mm) or less, the exposed vertical component (face) area shall be tested according to test RE-2. For exposed horizontal components greater than 4 in (100 mm), RE-3 test is required. See RE-2 test for more information.

4.3 Copings

Coping and other *roof edge systems* for which the **exposed** horizontal component exceeds 4 in (100 mm) shall be tested according to test RE-3.

5.0 Packaging and Identification

Roof edge system components or packaging shall contain written documentation, which identifies the components, which have been ES-1 tested. Documentation, in the form of manufacturer's printed product literature or letter, shall be made available to the building owner or his/her representative.

6.0 Installation Instructions

Installation instructions shall be provided for all *roof edge systems* in compliance with the ES-1 test standard, and shall include *fastener* and *cleat* requirements.

7.0 References

1. Factory Mutual Approved Product News Vol. 21, No. 2, 2005
2. Roofing Industry Committee on Weather Issues (RICOWI), *Hurricane Katrina Wind Investigation Report*, 2007, pp. xiv
3. Roofing Industry Committee on Weather Issues (RICOWI), *Hurricanes Charley and Ivan Wind Investigation Report*, 2006, pp.xxiv

Appendix A

Roof Edge System Testing

RE-1 Test

Test Method for Dependently Terminated Roof Membrane Systems

Note: This test is only required for systems described in 3.1, which do NOT contain a mechanical termination (commonly referred to as a "peel stop") within 12 in (300 mm) of the *roof edge*.

RE1.1 Apparatus

The description of the apparatus is general in nature. Any equipment capable of performing the test procedure within the allowed tolerances shall be permitted. A schematic drawing of this apparatus is shown in Figure RE1.1. The test apparatus shall be constructed so that the performance of individual components are unaffected by end constraints on the test sample. Load shall be applied and measured with calibrated load cells, each accurate to within +/-3% of full scale load cell values. Calibration shall be performed annually (minimum) and should be performed and recorded at 5%, 25%, 50%, and 75% of the expected maximum test values.

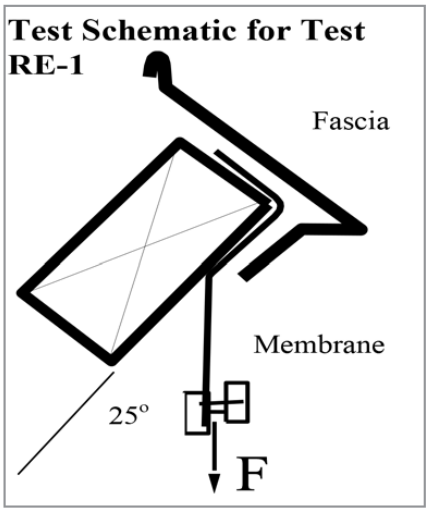


Figure RE1.1

RE1.2 Safety Precautions

Proper precautions shall be taken to protect the operating personnel and observers in case of any failure.

RE1.3 Test Method

To test the *roof edge system's* ability to restrain a *membrane* force, uniform tension shall be applied along the length of the *membrane* used in the test. The minimum length of the *membrane* and *roof edge system* shall be such that the *roof edge system* sample contains three (3) attachment *fasteners* at the design *fastener* spacing, or is 3 ft 0 in (915 mm) in length, whichever is greater. The *roof edge system* shall be constructed and mounted on the base of a tensile testing device so the *membrane* is pulled at a 25º angle to the roof *deck* to simulate a billowing *membrane* (see Figure RE1.2).

Note that:

Applied Load = F * L

Where:

L = the length of the *roof edge system* sample, use 1 ft (300 mm) to determine the load per linear foot.

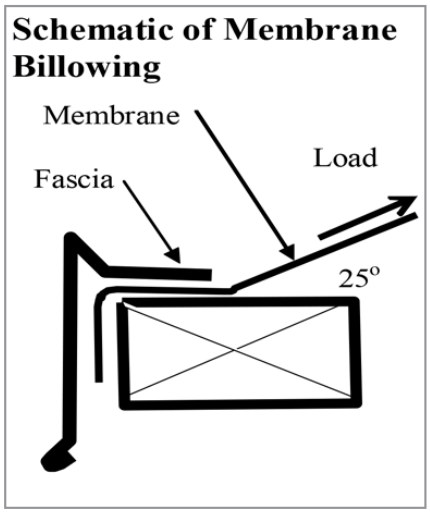


Figure RE1.2

The jaws of the tester shall be connected to two bars that clamp the *membrane* securely between them so that the load is distributed uniformly along the width of the *membrane* (see Commentary for Test RE-1). The tester is loaded at a rate of no less than 2 in/min (50 mm/min) until failure occurs or the desired *membrane* tension load is achieved. Failure is defined as any event that allows the *membrane* to come free of the *roof edge system* or the *roof edge system* to come free of its mount.

RE1.4 Test Results

The results of the test shall be stated in pounds/lineal foot. The results are rounded down to the nearest pound/lineal foot.

RE-2 Test

Test Method for Dependently or Independently Terminated Roof edge systems

(Exposed horizontal component 4 in (100mm) or less)

RE2.1 Apparatus

The description of the apparatus is general in nature. Any equipment capable of performing the test procedure within the allowed tolerances shall be permitted. A schematic drawing of this apparatus is shown in Figure RE2.1. The test apparatus shall be constructed so that the performance of individual components are unaffected by end constraints on the test sample. Load shall be applied and measured with calibrated load cells, each accurate to within +/-3% of full scale load cell values. Calibration shall be performed annually (minimum) and should be performed and recorded at 5%, 25%, 50%, and 75% of the expected maximum test values.

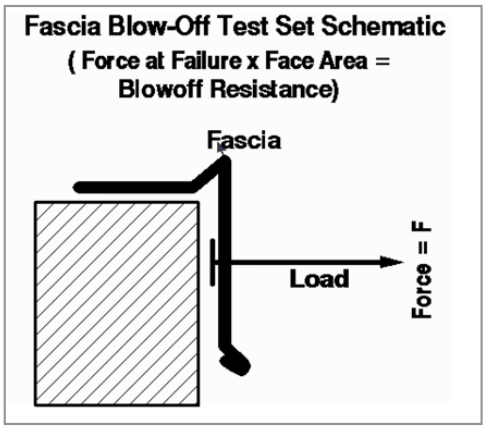


Figure RE2.1

RE2.2 Safety Precautions

Proper precautions shall be taken to protect the operating personnel and observers in case of any failure.

RE2.3 Test Specimens

All parts of the test specimen shall be full size in length, width and all other dimensions, using the same materials, details and methods of construction and anchoring devices (such as *clips*, *cleats*, and *fasteners*) as used on the actual building. Sample length shall be a minimum of 8 ft (2.4 m). When the anchoring means at the ends of the *roof edge system* are normally used to restrain other additional lengths of the *roof edge system*, then the anchoring means shall be modified so that only that percentage that might restrain rotational movement in the test specimen is used.

RE2.4 Procedure

RE2.4.1 Gravity

Any undue influence from gravity that does not occur during actual installation shall be omitted from the test specimen. If the test specimen is inverted, a gravity correction shall be made in the determination of the allowable superimposed loading. Tests run in an inverted position shall include data from pressure reversal or an upright specimen to show that unlatching of the *drip edges* at the *cleats* will not occur in the normal orientation.

RE2.4.2 Loading

Loading shall be applied uniformly on centers no greater than 12 in (300 mm) to the centerline of the vertical face of the *roof edge system*. Loading shall be applied on the horizontal centerline of the face. Loads shall be applied incrementally and held for not less than 60 seconds after stabilization has been achieved at each incremental load. Between incremental loads, the load shall be reduced to zero until the specimen stabilizes (5 minutes maximum). After this stabilization period, initiate the next higher incremental load. Loading to the face of the *roof edge system* shall be applied in **increments** not to exceed 25-lb/ft^2 (120 kg/m^2) until approximately ½ of the expected failure load is obtained. Thereafter, increments of load shall not exceed 10-lb/ft^2 (50-kg/m^2). Loading **speed** shall be such that each incremental load up to and including 150 psf (7.2 kPa) shall be achieved in 60 seconds or less. Above 150 psf (7.2 kPa), incremental loading shall be achieved in 120 seconds or less.

Loading shall proceed as indicated until the test specimen either fails or exceeds the required design pressure. The last 60-second load sustained without failure is the maximum load recorded.

RE2.4.3 Failure

Failure shall be loss of securement of a component of the *roof edge system*.

RE2.4.4 Test Results

The data for the conditions described in 2.4.3 above shall be recorded. If this data is in units of force (pounds), the data shall be converted to pressure by dividing the force by the area of the face:

$$\text{Pressure} = \frac{\text{Outward Force}}{\text{Face Height} \times \text{Face Length}}$$

- Pressure is measured in pounds per square foot
- Force is measured in Pounds Force
- Face Length is the test sample length in feet
- Face Height is in feet (inches÷12)

RE-3 Test for Copings

(Exposed horizontal component exceeds 4 in (100 mm))

RE3.1 Apparatus

This description of the apparatus is general in nature. Any equipment capable of performing the test procedure within the allowed tolerances shall be permitted. A schematic drawing of this apparatus is shown in Figures RE3.1 and RE3.2. The test apparatus shall be constructed so that the performance of individual components are unaffected by end constraints on the test sample. Load shall be applied and measured with calibrated load cells, each accurate to within +/-3% of full scale load cell values. Calibration shall be performed annually (minimum) and should be performed and recorded at 5%, 25%, 50%, and 75% of the expected maximum test values.

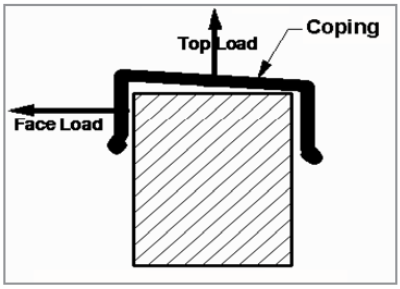


Figure RE-3.1 RE-3 Test–Face Leg Pull

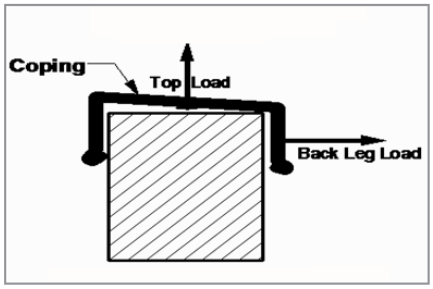


Figure RE-3.2 RE-3 Test–Back Leg Pull

RE3.2 Safety Precautions

Proper precautions shall be taken to protect the operating personnel and observers in case of any failure.

RE3.3 Test Specimens

All parts of the test specimen shall be full size in length, width and all other dimensions, using the same materials, details and methods of construction and anchoring devices (*fasteners*, *clips* and *cleats*) as used on the actual building. Sample length shall be a minimum of 8 ft (2.4 m). When the anchoring means at the ends of the *roof edge system* are normally used to restrain other additional lengths of the *roof edge system*, then the anchoring means shall be modified so that only that percentage that might restrain rotational movement in the test specimen is used. A minimum of 1 face/top test and 1 top/back test shall be performed.

RE3.4 Procedure

RE3.4.1 Gravity

Any undue influence from gravity that does not occur during actual installation shall be omitted from the test specimen. If the test specimen is inverted, a gravity correction shall be made in the determination of the allowable superimposed loading. Tests run in an inverted position shall include data from pressure reversal or an upright specimen to show that unlatching of the *drip edges* at the *cleats* will not occur in the normal orientation.

RE3.4.2 Loading

Top and face loadings shall be applied simultaneously in the vertical and horizontal directions in the ratio of 1.73 lbs/sf top (vertical load) to 1 lb/sf face (horizontal load). Loading shall be applied uniformly on centers no greater than 12 in (300 mm) to the top of the *coping* and to one of the faces of the *coping* at the same time. Loads shall be applied on parallel horizontal centerlines of the surfaces tested.

Loads shall be applied incrementally and held for not less than 60 seconds after stabilization has been achieved at each incremental load. Between incremental loads, the load shall be reduced to zero until the specimen stabilizes (5 minutes maximum), before the next higher incremental load is initiated. Vertical loading to the top of the *roof edge system* shall be applied in **increments** not to exceed 25 lb/ft^2 (120 kg/m^2) until approximately ½ of the expected failure load is obtained. Thereafter, increments of load shall not exceed 10 lb/ft^2 (50 kg/m^2). Loading **speed** shall be such that each incremental load up to and including 150 psf (7.2 kPa) shall be achieved in 60 seconds or less. Above 150 psf (7.2k Pa), incremental loading shall be achieved in 120 seconds or less.

Loading shall proceed as indicated until the test specimen either fails or exceeds the required design pressure. The last 60-second load sustained without failure is the maximum load recorded.

Both face and back legs shall be tested in this manner using separate test samples. Thus, one sample to test the face while loading the top (Figure RE3.1), and the other to test the back leg while loading the top (Figure RE3.2).

RE3.4.3 Failure

Failure shall be loss of securement of a component of the *roof edge system*.

RE3.4.4 Test Results

The data for the conditions described in 3.4.3 above shall be recorded. If this data is units of force (in pounds), it shall be converted to pressure by dividing the force by the area of the face:

$$\text{Pressure} = \frac{\text{Outward Force}}{\text{Face Height} \times \text{Face Length}}$$

- Pressure is measured in pounds per square foot
- Force is measured in Pounds Force
- Face Length is the test sample length in feet
- Face Height is in feet (inches÷12)

Appendix B

Commentary

This Commentary consists of explanatory and supplementary material designed to help designers, roofing contractors, manufacturers, testing facilities, and others in applying the requirements of the preceding Standard.

This Commentary is intended to create an understanding of the requirements through brief explanations of the reasoning employed in arriving at these requirements.

The sections of this Commentary are numbered to correspond to sections of the Standard to which they refer. Since having supplementary material for every section of the Standard is not necessary, not all sections are referenced in this Commentary.

C1.1 Scope

This test Standard was developed for use with Built-Up (BUR), Single-Ply and Modified Bitumen roofing systems.

The low slope value defined in this Standard comes from an industry accepted value of ≤9.5 degrees (2:12).

Roof edge systems serve aesthetic as well as performance functions for a building. Aesthetically, they provide an attractive finish and sometimes even a key feature to the exterior of a building. Of course, no matter how aesthetically pleasing, a *roof edge system* must act primarily as an effective mechanical termination and transition between the roof and other building components such as *parapet walls*, vertical walls, corners, *soffits*, *fascia* boards, etc.

A high performance *roof edge system* provides many benefits. It acts as a water seal at the *roof edge*. When it is the means by which the *membrane* is attached to the building at the *roof edge*, it must also exhibit sufficient holding power to prevent the *membrane* from pulling out at the *roof edge* under design wind conditions. Furthermore, the *roof edge system* itself must not come loose in a design wind. A loose component of a *roof edge system* not only endangers surrounding property or persons, but it also exposes the roofing to blow-off, starting at the *roof edge*.

C2.0 Background Information

The 1980s saw a dramatic increase in the popularity of single-ply *roof systems*. With this increase, *roof edge systems* began receiving additional attention. Throughout the 1980s into the early 1990s a variety of organizations developed *roof edge* termination recommendations and testing criteria. These standards, however, were not universal and each was focused on the specific needs or purpose of that organization. This created a challenge for design professionals in selecting the appropriate *roof edge system*, which would perform to the needs of their particular project.

In 1995 the Single Ply Roofing Industry (SPRI) began the process of developing a consensus *roof edge* performance standard. The goal was to create a standard that would have real-world practicality and provide unified guidance to design professionals as well as those that fabricate and install *roof edge systems*.

In 1998 the American National Standards Institute (*ANSI*) approved what was to become the ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems. In 2003 the ES-1 Standard was included in the International Building Code (IBC). 2006 and later versions of IBC all require *roof edge systems* to be tested per the test methods in this standard.

Today, the central role that *roof edge systems* play in protecting against *wind loads* is gaining increasing awareness due to renewed attention of significant wind events.

C3.0 Membrane Termination Systems

The *roof edge system* may be the only restraint preventing a roof blow-off. Mechanically attached *membranes* may be attached only by the *roof edge system* at the building's *roof edge*. In *ballasted* systems, ballast may be scoured away from the *roof edge*. *Ballasted* roofs should be designed to meet ANSI/SPRI RP-4, *Wind Design Standard for Ballasted Single-Ply Roofing Systems*, to prevent excessive scour.

Consideration should be given to sealing the *roof edge* against air infiltration. Air infiltration may affect the loads on the roofing and the *roof edge system* by adding a positive pressure under the roofing, thus compounding the effect of negative pressure above the roofing.

BUR and most modified bitumen *membranes* are fully adhered to roof *deck* or insulation. When they are mechanically attached they shall follow the rules for all mechanically attached systems.

C3.1 Dependently terminated

Ballasted Systems or systems in which the mechanically attached roof cover is secured to the *substrate* at a distance greater than 12 in (300 mm) from the *roof edge system* are considered dependently terminated by the *roof edge system*. For these systems Test RE-1 is applicable. Dependently Terminated *roof edge systems* are often called Edge Flashings or *Gravel Stops*. These products or designs complete the horizontal *deck* or *membrane* plane at its transition to a vertical wall drop, typically at a 90° angle.

Normally the roofing *membrane* is restrained at the *roof edge* by means of a mechanical gripping of the *membrane* by the *roof edge system* or by a bond between the *membrane* and *roof edge system*.

A *roof edge system* may also function as an air seal, when combined with an air retarder throughout the field of the roof, by preventing air infiltration under the roofing *membrane*. To resist air infiltration, nailers should be sealed to the building with appropriate sealant material. Where multiple courses of nailers are used, these nailer courses should also be sealed to each other. Butt joints should also be sealed.

Termination devices against higher vertical walls inboard of the *roof edge* are not considered by this Standard.

C3.2 Independently terminated

Systems in which the roof cover is fully adhered to the *substrate* or a mechanically attached roof cover that is secured the *substrate* at a distance less than or equal to 12 in (300 mm) from the roof side of the *roof edge system* are considered independently terminated. For these systems Tests RE-2 or RE-3 are applicable.

Copings/Caps

Copings/Caps are independently terminated systems: These are *roof edge systems* that cover the tops of *parapet walls*, usually with the roofing *membrane* terminated under them.

Gutters

Gutters and other rain-carrying devices are beyond the scope of this Standard. However, the designer should be aware that their securement is important to the proper functioning of the building, and reference ANSI/SPRI GT-1 *Test Standard for Gutter Systems* for the testing of gutter systems.

C 4.0 Edge System Resistance

Roof edge systems may be selected from manufacturers who certify certain minimum performance to meet design requirements, based upon testing. Any *roof edge system* may be used provided that it is tested and certified by an independent testing laboratory to meet the wind design requirements.

The vertical face of an edge flashing (gravel stop) shall be tested according to Test RE-2 and provide a strength that meets or exceeds the required horizontal design pressure. The test shall be applicable to systems with exposed horizontal components less than 4 in (100 mm) as detailed in the RE-2 Test Method; otherwise Test RE-3 is applicable.

The vertical and horizontal faces of *copings* (and like *roof edge systems*) shall be tested according to Test RE-3 and provide a strength that meets or exceeds the **horizontal and vertical pressures** required.

The *roof edge system*, when used for securing dependently terminated roofing systems, shall be tested according to Test RE-1 to provide a strength that meets

or exceeds the calculated *membrane* tension. See RE-1 Classification Tables in Commentary.

See Test Method RE-1, RE-2, and RE-3 for further information.

C5.0 Packaging and Identification

Because IBC requires that *roof edge systems* be tested per ES-1, owners and code officials need documentation packaged with the *roof edge system* to identify that it has been tested. Recognized or certified third party organizations may require additional auditing.

C6.0 Installation Instructions

In order for the *roof edge system* to perform as tested it must be installed in the same manner as the tested *roof edge system*. Installation instructions are required to assure the proper *cleats*, *clips*, *fasteners* and other components are installed in the correct location and at the correct spacing.

Test Method RE-1 Commentary

The *roof edge system* is a key anchor point holding the *membrane* in place. During high-speed wind loading, the *roof system* can create extreme loads on the *roof edge system*.

Referring to Figure RE1.3 for a mechanically attached system, the loading depends upon the distance, r, of the first row of *fasteners* to the edge termination. The overall shape of the *membrane* is based upon previous tests indicating that the *membrane* deformation can be well approximated by a 25 degree angle[4, 5]. Figure RE1.4 shows a closer look at the *membrane* forces.

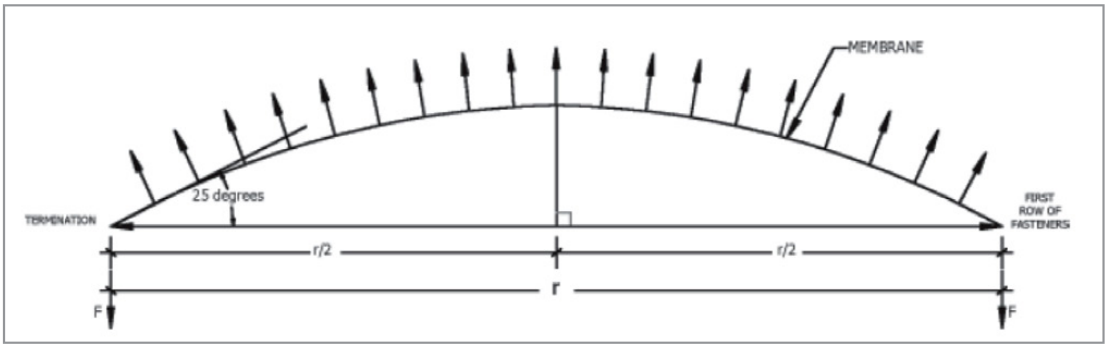


Figure RE1.3—Mechanically Attached Roof Forces

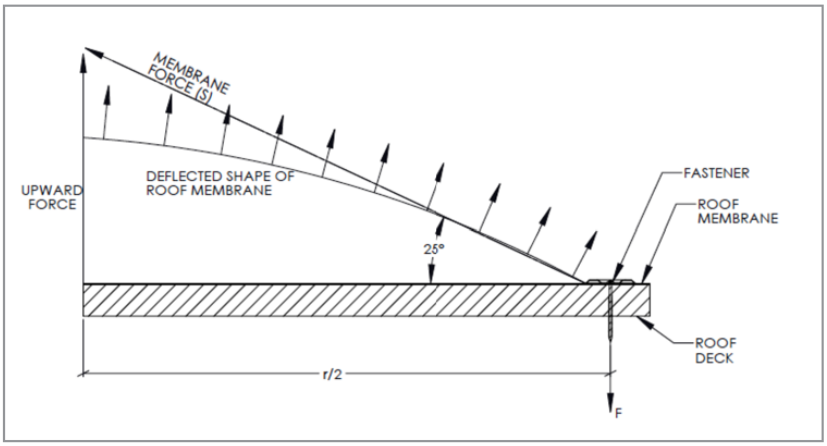


Figure RE1.4—System of Forces, ½ of Membrane width between Fasteners

ANSI/SPRI/FM 4435/ES-1 2017
Test Standard for Edge Systems Used with Low Slope Roofing Systems

Approved
January 24, 2017

4 Allen, D.J., and Phalen, T.E., *Stress-Strain Characteristics for EPDM, CSPE, and PVC for the Development of Stresses in Membranes Utilized as Single-Ply Roof Systems*, 1991 International Symposium on Roofing Technology.

5 Garrigus, P.C. The Stress-Strain, Stress-Thickness and Stress-Width Characteristics of Non-Reinforced, Glass Reinforced and Polyester Reinforced PVC Roofing Membrane, Graduate Thesis, NU Student School of Engineering Technology, March 1991.

If an upward pressure (lb/ft^2) is applied to the *membrane*, then the upward force = upward pressure x r/2 for one half of the *membrane* width r (a single *fastener* will have a force, F, to resist this load). Assuming a 25° deflected shape, then the *membrane* force, S, can be found from the equations:

$$\sin 25° = \frac{UpwardForce}{S}$$

$$\sin 25° = \frac{UpwardPressure^* \frac{r}{2}}{S}$$

Thus,

$$S = \frac{UpwardPressure^* \frac{r}{2}}{\sin 25°}$$

The precision and bias of this test measure has not been determined. In the absence of third party witness testing/verification, the ES-1 committee recommends round robin testing of standard, pre-manufactured edge systems to establish lab-to-lab variability of individual test results.

Test Method RE-1 Commentary—Fully Adhered Roof Systems

Fully adhered systems are assumed to apply no stress on the *roof edge system* under consideration, unless either the *metal* is loosened or the *membrane* is in peel from the pressure differential between the exterior and interior of the system; however, recent hurricane investigations have shown that both can occur.

Test Method RE-1 Commentary—Membrane Tension

The following tables are provided as a reference, when testing according to RE-1, for approximating *membrane* tension based upon the calculated Field of Roof or Vertical Perimeter Pressure, and the distance to the first row of *fasteners* in a mechanically attached system. For *ballasted* system $5 < r \leq 6$ is used. These tables are not intended to be used for design. *Design load* should be determined as required by the Authority Having Jurisdiction.

RE-1 Classifications—Dependently Terminated Systems

Occupancy Category II (Importance Factor, I=1.0)[1]

For h≤60 feet, Enclosed Buildings

Field of Roof Pressure q_{fz} psf (kPa)	Vertical Perimeter Pressure P_{vp} psf (kPa)	Membrane Tension lb/ft (kg/m) Distance to first Row of Fasteners ft (m)				
		1< r ≤ 2 (0.3< r ≤0.6)	2< r ≤ 3 (0.6< r ≤ 0.9)	3< r ≤ 4 (0.9< r ≤1.2)	4< r ≤ 5 (1.2< r ≤0.5)	(note 2) 5< r ≤ 6 (1.5< r ≤1.8)
q_{fz} ≤ 30.0 (q_{fz} ≤ 1.44)	101 (4.83)	239 (356)	358 (533)	477 (710)	596 (887)	716 (1066)
30.0< q_{fz} ≤37.5 (1.44< q_{fz} ≤1.8)	126 (6.03)	298 (443)	447 (664)	5 (887)	745 (1109)	894 (1330)
37.5< q_{fz} ≤45.0 (1.8< q_{fz} ≤2.15)	151 (7.24)	358 (533)	537 (799)	716 (1066)	894 (1330)	1073 (1597)
45.0< q_{fz} ≤52.5 (2.15< q_{fz} ≤2.51)	176 (8.45)	417 (21)	62 (932)	835 (1243)	1042 (1552)	11 (1863)
52.5< q_{fz} ≤60.0 (2.51<q_{fz} ≤2.87)	202 (9.65)	477 (710)	716 (1066)	954 (1419)	1193 (1775)	1431 (2130)
60.0< q_{fz} ≤67.5 (2.87< q_{fz} ≤3.23)	227 (10.9)	537 (799)	84 (1198)	107 (1597)	1342 (1997)	1610 (2395)
67.5< q_{fz} ≤75.0 (3.23< q_{fz}≤3.59)	252 (12.1)	596 (887)	894 (1330)	1193 (1775)	1490 (2218)	1789 (2661)
75.0< qfz ≤82.5 (3.59< q_{fz}≤3.95)	277 (13.3)	656 (976)	984 (1464)	1312 (191)	1640 (244)	1968 (2928)
82.5< q_{fz} ≤90.0 (3.95< q_{fz}≤4.31)	302 (14.5)	716 (1066)	1073 (1597)	1431 (2130)	1789 (2661)	2146 (3194)
90.0< q_{fz} ≤97.5 (4.31< q_{fz}≤4.67)	328 (15.7)	775 (1152)	1163 (1731)	1550 (2307)	1937 (2884)	2326 (3460)
97.5< q_{fz} ≤105.0 (4.67< q_{fz}≤5.03)	353 (16.9)	83 (1243)	1251 (1863)	1669 (2484)	2087 (3106)	2504 (3725)
105< q_{fz} ≤112.5 (5.03< q_{fz} ≤5.39)	378 (18.1)	894 (1330)	1342 (1997)	1789 (2661)	2236 (3328)	2683 (3992)
112.5< q_{fz} ≤120 (5.39< q_{fz}≤5.75)	403 (19.3)	954 (1419)	1431 (2130)	1907 (2839)	2384 (3548)	2861 (4258)
120< q_{fz} ≤127.5 (5.75< q_{fz}≤6.11)	428 (20.5)	1013 (1509)	1521 (2263)	2027 (3016)	2534 (3770)	3040 (4525)

Table Notes:

1. I = 1 so this table is also applicable when no importance factor is required. Adjust for other I values.
2. 5< r ≤ 6 column to be used for *ballasted* systems. See Appendix A–RE-1 test information.

Approved
January 24, 2017

RE-1 Classifications—Dependently Terminated Systems

Occupancy Category II (Importance Factor I=1.0)[1]

For h>60 feet, Enclosed Buildings

Field of Roof Pressure q_{fz} psf (kPa)	Vertical Perimeter Pressure P_{vp} psf (kPa)	Membrane Tension lb/ft (kg/m) Distance to first Row of Fasteners ft				
		1< r ≤ 2 (0.3< r ≤0.6)	2< r ≤ 3 (0.6< r ≤ 0.9)	3< r ≤ 4 (0.9< r ≤1.2)	4< r ≤ 5 (1.2< r ≤0.5)	(note 2) 5< r ≤ 6 (1.5< r ≤1.8)
q_{fz} ≤ 30.0 (q_{fz} ≤ 1.44)	94 (4.51)	224 (333)	336 (498)	446 (664)	559 (830)	670 (997)
30.0< q_{fz} ≤37.5 (1.44< q_{fz} ≤1.8)	118 (5.64)	278 (415)	41 622)	559 (830)	698 (1037)	836 (1245)
37.5< q_{fz} ≤45.0 (1.8< q_{fz} ≤2.15)	141 (6.77)	336 (498)	502 (747)	670 (997)	836 (1245)	1004 (1494)
45.0< q_{fz} ≤52.5 (2.15< q_{fz} ≤2.51)	165 (7.89)	390 (581)	586 (873)	782 (1163)	975 142)	1171 (1742)
52.5< q_{fz} ≤60.0 (2.51<q_{fz} ≤2.87)	188 (9.02)	446 (664)	670 (997)	893 (1329)	1116 (1661)	1339 (1993)
60.0< q_{fz} ≤67.5 (2.87< q_{fz} ≤3.23)	212 (10.2)	502 (747)	752 (1121)	1004 (1494)	1255 (1869)	1506 (2242)
67.5< q_{fz} ≤75.0 (3.23< q_{fz}≤3.59)	236 (11.3)	559 (830)	836 (1245)	1116 (1661)	1395 (2075)	1674 (2491)
75.0< qfz ≤82.5 (3.59< q_{fz}≤3.95)	259 (12.4)	613 (914)	920 (1370)	1229 (1827)	1535 (2283)	1842 (2740)
82.5< q_{fz} ≤90.0 (3.95< q_{fz}≤4.31)	283 (13.5)	670 (997)	1004 (1494)	1339 (1993)	1674 (2491)	2008 (2989)
90.0< q_{fz} ≤97.5 (4.31< q_{fz}≤4.67)	306 (14.7)	725 (1078)	1088 (1620)	1451 (2159)	1813 (2698)	2176 (3238)
97.5< q_{fz} ≤105.0 (4.67< q_{fz}≤5.03)	330 (15.8)	78 (1163)	1171 (1742)	1562 (2325)	953 (2907)	2343 (3487)
105< q_{fz} ≤112.5 (5.03< q_{fz} ≤5.39)	353 (16.9)	836 (1245)	1255 (1869)	1674 (2491)	2093 (3114)	2511 (3735)
112.5< q_{fz} ≤120 (5.39< q_{fz}≤5.75)	377 (18.0)	893 (1329)	339 (1993)	1785 (2656)	2231 (3320)	28 (3985)
120< q_{fz} ≤127.5 (5.75< q_{fz}≤6.11)	400 (19.2)	948 (1412)	1424 (2118)	1896 (2823)	2371 (3528)	2846 (4235)

Table Notes:

1. I = 1 so this table is also applicable when no importance factor is required. Adjust for other I values.
2. 5< r ≤ 6 column to be used for *ballasted* systems. See Appendix A–RE-1 test information.

Test Methods RE-2 and RE-3 Commentary

Stabilization

Stabilization is necessary during loading to ensure that the specimen has reached equilibrium before considering a sustained load for a period of 60 seconds. As the specimen approaches its ultimate capacity, stabilization of the specimen will generally take longer to achieve.

Loading

These test methods consist of applying loads on surfaces of a test specimen and observing deformations and the nature of any failures of principal or critical elements of the *roof edge systems*. Loads are applied to simulate the static wind loading of the members. Test RE-2 requires horizontal loading on only the vertical face since the upward wind loading on an edge system member is considered to be negligible because of the small area exposed to uplift.

A recovery period between increases in incremental loading is allowed for the test specimen to attempt to assume its original shape prior to applying the next load level. The rate of sustained loading can be a critical issue when specimens are subjected to continuously increasing load until failure is achieved. Loading rate has little meaning in RE-2 and RE-3 because these methods employ incrementally increased loads sustained for long times followed by brief recovery periods. An incremental method is more stringent than continuous loading due to the requirement of a 60 second holding load.

The RE-2 and RE-3 Test procedures require full-length specimens because end conditions of discreet sections of *copings* and edge flashings can play a profound role in the failure mode of the materials. Furthermore, those products having *clips* (not continuous *cleats*) can exhibit different performance under testing than in the field if the *clips* do not act upon the products as they would in the field.

No special testing is required of fabricated miters. However, the *roof edge system* from which the miter has been fabricated shall have been tested to meet the calculated design loads of the corner region. The precision and bias of these test measures have not been determined. In the absence of third party witness testing/verification, the ES-1 committee recommends round robin testing of standard, pre-manufactured *roof edge systems* to establish lab-to-lab variability of individual test results.

The external Pressure Coefficients (GCp) used to calculate horizontal and vertical pressures vary by building height (<60 or >60') and location on the roof (perimeter or corner region). The ratio of top (vertical) pressure to face (horizontal) pressure ranges from 1.71 to 2.30 depending on the building height and roof location. To simplify testing and avoid having to test *roof edge systems* at four different pressure ratios, the ratio for testing has been set at 1.73. This 1:73 ratio is deemed to be the most conservative as greater loads are applied to the face and back of the *coping* where failure most often occurs. 1.73 is also the ratio typically was used when testing per ANSI/SPRI ES-1 2003 and ANSI/SPRI/FM 4435/ES-1 2011; therefore, products tested in accordance with one of those previous versions should not require re-testing.

Failure

Some examples of component failure that will not enable the *roof edge system* to perform as designed would be:

- Full *fastener pull-out*
- *Fastener pull-through*
- Collapse of a *cleat*, *fascia* or cover
- Disengagement of cover from a *cleat* or *clip*

Consideration should be given to permanent deformation observed during testing. A *roof edge system* with no load being applied, which exhibits permanent deformation from its original shape, may allow water infiltration and be subjected to peeling wind forces that could compromise the intended performance of the *roof edge system*.

Test Method RE-2 and RE-3 Commentary
Horizontal and Vertical Edge Pressures

The following tables are provided as a reference, when testing according to RE-2 and RE-3, for approximating the Horizontal and Vertical Loads at the perimeter and corner based upon the calculated Field of Roof pressure. These tables are not intended to be used for design. *Design load* should be determined as required by the Authority Having Jurisdiction.

Horizontal and Vertical Edge Pressures
Enclosed Buildings
Occupancy Category II (I=1.0)[1]
$h \leq 60$ feet

Field of Roof Pressure q_{fz} psf (kPa)	Horizontal Load psf (kPa)		Vertical Load psf (kPa)	
	Perimeter P_{hp}	Corner P_{hc}	Perimeter P_{hp}	Corner P_{hc}
30 (1.44)	58 (2.8)	73 (3.5)	101 (4.8)	152 (7.3)
37.5 (1.80)	73 (3.5)	91 (4.3)	126 (6.0)	190 (9.1)
45 (2.15)	87 (4.2)	109 (5.2)	151 (7.2)	228 (10.9)
52.5 (2.51)	102 (4.9)	127 (6.1)	176 (8.4)	266 (12.7)
60 (2.87)	116 (5.6)	145 (7.0)	202 (9.7)	304 (14.5)
67.5 (3.23)	131 (6.3)	163 (7.8)	227 (10.9)	342 (16.4)
75 (3.59)	146 (7.0)	182 (8.7)	252 (12.1)	380 (18.2)
82.5 (3.95)	160 (7.7)	200 (9.6)	277 (13.3)	417 (20.0)
90 (4.31)	175 (8.4)	218 (10.4)	302 (14.5)	455 (21.8)
97.5 (4.67)	189 (9.1)	236 (11.3)	328 (15.7)	493 (23.6)
×	1.94* ×	2.42* ×	3.36* ×	5.06* ×

Table Notes:

1. I = 1 so this table is also applicable when no importance factor is required. Adjust for other I values as required.
2. Horizontal and vertical load values are calculated directly using field of roof pressure given in column 1
3. Horizontal and vertical load values are calculated using External Pressure Coefficients (GC_p) of 0.97 horizontal perimeter, 1.21 horizontal corner, 1.68 vertical perimeter, and 2.53 vertical corner.
4. Horizontal and vertical load values contain a safety factor of 2.0.

Horizontal and Vertical Edge Pressures
Enclosed Buildings
Occupancy Category II (I=1.0)[1]
***h*>60 feet**

Field of Roof Pressure q_{hz} psf (kPa)	Horizontal Load psf (kPa)		Vertical Load psf (kPa)	
	Perimeter P_{hp}	Corner P_{hc}	Perimeter P_{hp}	Corner P_{hc}
30 (1.44)	41 (2.0)	75 (3.6)	94 (4.5)	128 (6.1)
37.5 (1.80)	51 (2.4)	94 (4.5)	118 (5.6)	161 (7.7)
45 (2.15)	61 (2.9)	113 (5.4)	141 (6.8)	193 (9.2)
52.5 (2.51)	71 (3.4)	131 (6.3)	165 (7.9)	225 (10.8)
60 (2.87)	82 (3.9)	150 (7.2)	188 (9.0)	257 (12.3)
67.5 (3.23)	92 (4.4)	169 (8.1)	212 (10.1)	289 (13.8)
75 (3.95)	102 (4.9)	188 (9.0)	236 (11.3)	321 (15.4)
82.5 (3.95)	112 (5.4)	206 (9.9)	259 (12.4)	353 (16.9)
90 (4.31)	122 (5.9)	225 (10.8)	283 (13.5)	385 (18.4)
97.5 (4.67)	133 (6.3)	244 (11.7)	306 (14.7)	417 (20.0)
105 (5.03)	143 (6.8)	263 (12.6)	330 (15.8)	449 (21.5)
112.5 (5.39)	153 (7.3)	281 (13.5)	353 (16.9)	482 (23.1)
120 (5.75)	163 (7.8)	300 (14.4)	377 (18.0)	514 (24.6)
127.5 (6.10)	173 (8.3)	319 (15.3)	400 (19.2)	546 (26.1)
×	1.36* ×	2.5* ×	3.14* ×	4.28* ×

Table Notes:

1. I = 1 so this table is also applicable when no importance factor is required. Adjust for other I values as required.
2. Horizontal and vertical load values are calculated directly using field of roof pressure given in column 1
3. Horizontal and vertical load values are calculated using External Pressure Coefficients (GCp) of 0.68 horizontal perimeter, 1.25 horizontal corner, 1.57 vertical perimeter, and 2.14 vertical corner.
4. Horizontal and vertical load values contain a safety factor of 2.0.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Existing Building

12

R9870

Date Submitted	01/07/2022	**Section**	706.1.1	**Proponent**	Michael Silvers (FRSA)
Chapter	7	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

The modification facilitates changing the term replaced to reroofed in this paragraph. The existing language has been interpreted to prohibit recovering more than 25% of a roof or roof section which is not the intent of this section.

Rationale

The modification facilitates changing the term replaced to reroofed in this paragraph. The existing language has been interpreted to prohibit recovering more than 25% of a roof or roof section which is not the intent of this section. This change will not alter current practices, but will eliminate unintended restrictions being placed on recovering more than 25% of a roof. There is currently no definition of roof system in the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

By clarify intent and thereby the correct interpretation of the code

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

By clarify intent and thereby the correct interpretation of the code

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

Alternate Language

2nd Comment Period

Proponent Michael Silvers (FRSA) **Submitted** 8/24/2022 3:10:58 PM **Attachments** Yes

R9870-A1

Rationale:

The new language better reflects that used in the new exception.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

2nd Comment Period

Proponent Michael Fox Submitted 8/18/2022 9:00:39 AM Attachments No

R9870-G1

Comment:

The proposed Mod on first reading seems to be in conflict with SB 4D, which is now law, so it is suggested that it should be reviewed for compliance to the statutes referenced therein prior to moving forward with approval.

Modification Correlation Request:

FBC – Building, 1511.1.1 and 1521.4

FBC – Residential, R908.1.1

706.1.1

Not more than 25 percent of the total roof area or roof section of any existing building or structure shall be repaired, replaced or recovered in any 12-month period unless the roof covering on the entire existing roof~~ing~~ system or roof section is ~~replaced~~ reroofed to conform to the requirements of this code.

Not more than 25 percent of the total roof area or roof section of any existing building or structure shall be repaired, replaced or recovered in any 12-month period unless the roof covering on the entire existing ~~roofing system~~ roof or roof section is ~~replaced~~ reroofed to conform to the requirements of this code.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Existing Building

13

R10179

Date Submitted	02/14/2022	**Section**	706.7.2	**Proponent**	Michael Silvers (FRSA)
Chapter	7	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

10175, 10176, 10180 and 10238

Summary of Modification

The modification eliminates the prescriptive language in this volume and section and instead directs the user to the proper underlayment sections of the code where additional options are available. This section will then indicate when a secondary water barrier is required.

Rationale

The modification eliminates the prescriptive language in this sub-code and section and instead directs the user to the proper underlayment sections of the code where additional options are available. This section will then indicate only when a secondary water barrier is required.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not discriminate.

Alternate Language

2nd Comment Period

Proponent Michael Silvers (FRSA) **Submitted** 8/18/2022 1:53:49 PM **Attachments** Yes

R10179-A1

Rationale:

The last .1 in 1507.1.1.1 is a typographical error and should be deleted. The proper reference is 1507.1.1

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

706.7.2 Roof secondary water barrier for existing structures with wood roof decks.

A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:

~~1. In High-Velocity Hurricane Zone regions:~~

~~a) All joints in structural panel roof sheathing or decking shall be covered with a 4 inch (102 mm) to 6 inch (153 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The deck and selfadhering polymer modified bitumen tape shall be covered with one of the underlayment systems approved for the particular roof covering to be applied to the roof.~~

~~b) The entire roof deck shall be covered with an approved asphalt impregnated 30# felt underlayment or approved synthetic underlayment installed with nails and tin-tabs in accordance with Section 1518.2, 1518.3 or 1518.4 of the Florida Building Code, Building. (No additional underlayment shall be required over the top of this sheet.) The synthetic underlayment shall be fastened in accordance with the manufacturer's recommendations.~~

~~2. Outside the High-Velocity Hurricane Zone:~~

a) Underlayment shall comply with Section 1507.1.1~~1~~ or 1518.2, of the Florida Building Code, Building, or Section R905.1.1 of the Florida Building Code, Residential.

Exceptions:

1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section 706.7.2 requirements for a secondary water barrier.

2. Clay and concrete tile roof systems installed as required by the Florida Building Code are deemed to comply with the requirements of Section 706.7.2 for Secondary Water Barriers.

706.7.2 Roof secondary water barrier for existing structures with wood roof decks.

A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:

~~1. In High-Velocity Hurricane Zone regions:~~

~~a) All joints in structural panel roof sheathing or decking shall be covered with a 4 inch (102 mm) to 6 inch (153 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The deck and selfadhering polymer modified bitumen tape shall be covered with one of the underlayment systems approved for the particular roof covering to be applied to the roof.~~

~~b) The entire roof deck shall be covered with an approved asphalt impregnated 30# felt underlayment or approved synthetic underlayment installed with nails and tin-tabs in accordance with Section 1518.2, 1518.3 or 1518.4 of the Florida Building Code, Building. (No additional underlayment shall be required over the top of this sheet.) The synthetic underlayment shall be fastened in accordance with the manufacturer's recommendations.~~

~~2. Outside the High-Velocity Hurricane Zone:~~

a) Underlayment shall comply with Section 1507.1.1.1 or 1518.2, of the Florida Building Code, Building, or Section R905.1.1 of the Florida Building Code, Residential.

Exceptions:

1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section 706.7.2 requirements for a secondary water barrier.

2. Clay and concrete tile roof systems installed as required by the Florida Building Code are deemed to comply with the requirements of Section 706.7.2 for Secondary Water Barriers.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Residential

14

R9887

Date Submitted	01/10/2022	**Section**	905	**Proponent**	Aaron Phillips
Chapter	9	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

9885

Summary of Modification

Remove provision for printed instructions.

Rationale

Manufacturer instructions are increasingly made available in media other than “printed” versions. This proposal removes the word “printed” from the only instance in the FBC-Residential Chapter 9 where it is used in conjunction with “instructions.” Removal of the word “printed” will permit alternative methods for providing instructions, including digital formats that support greater sustainability. The proposed change also is important in light of events such as the COVID-19 pandemic, which brought attention to the need to be able to deliver information using alternative methods.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
No impact to local entity enforcement.
Impact to building and property owners relative to cost of compliance with code
Cost of compliance should not change.
Impact to industry relative to the cost of compliance with code
Cost of compliance should not change.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Provides opportunity for more efficient use of limited resources by permitting alternative means to provide manufacturer instructions.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Clears the way for improved and more efficient means to deliver manufacturer instructions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The only roof covering type with code provisions requiring "printed" instructions is asphalt shingles. This proposal removes that material specific requirement.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

2nd Comment Period

9887-G1

Proponent David Hilman - RCCIW Submitted 8/17/2022 2:14:11 PM Attachments No

Comment:

I agree with the modification just curious if there is a word or wording we can use that makes sure somebody doesn't think it is ok to get "verbal" instructions from the manufacturer.

Revise as shown:

R905.2.8.4 Other flashing. Flashing against a vertical front wall, as well as soil stack, vent pipe and chimney flashing, shall be applied in accordance with the asphalt shingle manufacturer's ~~printed~~ instructions.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Residential

15

R9991

Date Submitted	02/01/2022	**Section**	905.2.8.5	**Proponent**	Michael Silvers (FRSA)
Chapter	9	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Building Chapter 15 Section 1507

Summary of Modification

Eliminates option to install the drip edge at eave under the underlayment except when using a self-adhering underlayment.

Rationale

Allowing the underlayment to be installed over the drip edge at the eaves offers no resistance to wind uplift and little resistance to water intrusion. This change uses the existing gable language for both eaves and gables (rakes). It does allow self-adhering underlayment to be installed over the primed drip edge flange.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

Proponent Zachary Priest **Submitted** 8/26/2022 10:18:16 AM **Attachments** Yes

R9991-A1

Rationale:

ASTM D1970 is added to be consistent with R905.1.1. Avoids potential ambiguity about what constitutes an approved self-adhering underlayment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Further clarifies to avoid misinterpretation or unintended meanings

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Adds more specificity to avoid ambiguity

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Consistent with original proposed code change

Does not degrade the effectiveness of the code

Clarifies code to avoid variations in enforcement

Text of Modification

R905.2.8.5 Drip edge. Provide drip edge at eaves and gables of shingle roofs. Overlap is to be a minimum of 3 inches (76 mm). Eave drip edges shall extend 1/2 inch (13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge ~~at gables~~ shall be installed over the underlayment. ~~Drip edge at eaves be permitted to be installed either over or under the underlayment. If installed over the underlayment~~, Self-adhering ASTM D1970 underlayment may be installed over a primed drip edge flange. ~~t~~There shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange or the self-adhering underlayment. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the Vasd, as determined in accordance with Section 1609.3.1, is 110 mph (177 km/h) or greater or the mean roof height exceeds 33 feet (10 058 mm), drip edges shall be mechanically fastened a maximum of 4 inches (102 mm) on center.

R905.2.8.5 Drip edge. Provide drip edge at eaves and gables of shingle roofs. Overlap is to be a minimum of 3 inches (76 mm). Eave drip edges shall extend 1/2 inch (13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge ~~at gables~~ shall be installed over the underlayment. ~~Drip edge at eaves be permitted to be installed either over or under the underlayment~~. ~~If installed over the underlayment~~, Self-adhering underlayment may be installed over a primed drip edge flange. ~~t~~There shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange or the self-adhering underlayment. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the Vasd, as determined in accordance with Section 1609.3.1, is 110 mph (177 km/h) or greater or the mean roof height exceeds 33 feet (10 058 mm), drip edges shall be mechanically fastened a maximum of 4 inches (102 mm) on center.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Residential

16

R10066

Date Submitted	02/02/2022	**Section**	905.3	**Proponent**	Michael Silvers (FRSA)
Chapter	9	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Building Chapter 15 Roof Assemblies Section 1507.3

Summary of Modification

Removes references to Miami/Dade Roofing Application Standards (RAS) 118, 119 or 120 for tile roofs from standard (Non HVHZ) sections of the roofing chapters.

Rationale

Prescriptive methods described in the tile related RAS and TAS standards have been called into question. Underlayment applications described in the standards when tested using currently available performance testing standards indicate that some of the underlayment material and the fastener placement and density do not meet the current wind uplift resistance requirements based on ASCE-7. Test results from testing commissioned by FRSA using these proposed test standards are attached and indicate very low resistance to uplift pressures for systems described in the RAS and TAS. The numbers shown in Test 2 are before applying the safety factor of two that further reduces the listed uplift resistance of the underlayment. Independent testing by manufacturers of underlayment components produced similar results. The uplift resistance shown in many product approvals also confirms the need for these changes

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

2nd Comment Period

RE10066-G1

Proponent ashley ong Submitted 8/20/2022 1:33:16 PM Attachments No

Comment:

BOAF is OPPOSED to this proposed modification. The roofing application standard has been accepted for multiple code cycles and there is no hard data to support that this has been a problem. It is important for all stakeholders (design professionals, contractors, code officials and owners) to have code options to comply.

R905.3 Clay and concrete tile.

The installation of clay and concrete tile shall be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.2 Deck slope.

Clay and concrete roof tile shall be installed on roof slopes in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.3 Underlayment.

Required underlayment shall comply with the underlayment manufacturer's installation instructions in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.3.1 Slope and underlayment requirements.

Refer to manufacturer's installation instructions, FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or RAS 118, 119 or 120~~ for underlayment and slope requirements for specific roof tile systems.

R905.3.6Fasteners.

Nails shall be corrosion resistant and not less than 11 gage, 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 or in accordance with the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or in accordance with the recommendations of RAS 118, 119 or 120~~. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm).

R905.3.7 Application.

Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.7.1 Hip and ridge tiles.

Hip and ridge tiles shall be installed in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 118, 119 or 120~~.

R905.3.8 Flashing.

At the juncture of roof vertical surfaces, flashing and counterflashing shall be provided in accordance with this chapter and the manufacturer's installation instructions, recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition where the Vasd is determined in accordance with Section R301.2.1.3 ~~or the recommendations of RAS 111, 118, 119 or 120~~.

PRI Construction Materials Technologies LLC
6412 Badger Drive
Tampa, FL 33610
813.621.5777
https://www.pri-group.com/

Laboratory Test Report

Report for:	Mike Silvers FRSA 3855 N. Econlockhatchee Trail Orlando, FL 32817
Product Name:	Self-adhered underlayment applied to ASTM D226 anchor sheet
Project No.:	2368T0002
Dates Tested:	May 10, 2021
Test Methods:	UL 1897-12

Purpose: Determine uplift resistance in accordance with **UL 1897-12 *Uplift Tests for Roof Covering* Systems.**

Test Methods: Testing was completed as described in UL 1897-12 *Uplift Tests for Roof Covering* Systems. Specimens were incrementally loaded in accordance with UL 1897 until failure.

Deck Description:	Framing:	2x10 No. 2 SYP lumber installed 24" o.c.
	Deck:	15/32 APA rated plywood sheathing installed over No. 2 lumber supports spaced 24" on center. Decking was attached with 2-3/8 inch x 0.113 inch ring shank nails spaced 6" o.c. along the perimeter and intermediate supports.
	Underlayment:	An anchor sheet of ASTM D226 type II material was mechanically attached to sheathed specimen with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps (see Results Table for spacing details). A self-adhering underlayment was applied atop the mechanically attached anchor sheet in accordance with manufacturer's installation instructions. The laps of the self-adhered underlayment were backnailed with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps and spaced 12 inches on center along the lap.

Results:

Table 1. Summary of Test Results

Specimen No.	Underlayment	Attachment	Passing Uplift Pressure (psf)	Failure Mode
1	2 / A	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
2	2 / A	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	45	Fastener Pull-through
3	2 / A	Plywood joints taped[1] Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through
4	2 / D	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
5	2 / D	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through

Notes: 1 - Specimen #3 construction details included taping of the plywood joints with AAMA 711 compliant seam tape.

Statement of Attestation:

Testing was conducted in accordance with **UL 1897-12** ***Uplift Tests for Roof Covering*** **Systems.** The test results and interpretations presented herein are representative of the materials supplied by the client.

Signed: _____
Jason Simmons
Director

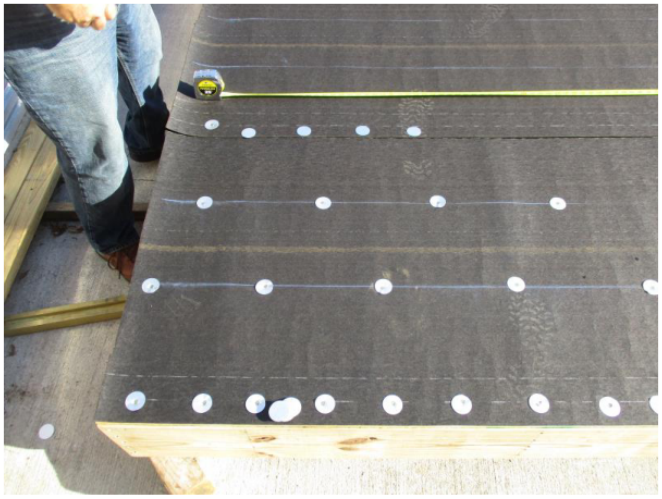
Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	07/07/2021	8	NA
Revision	07/14/2021	7	Remove product identification

APPENDIX ATTACHED

Appendix A: Representative Photographs

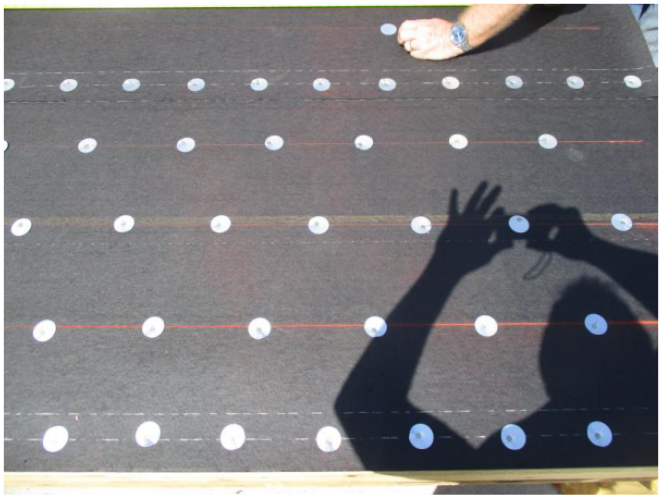
PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



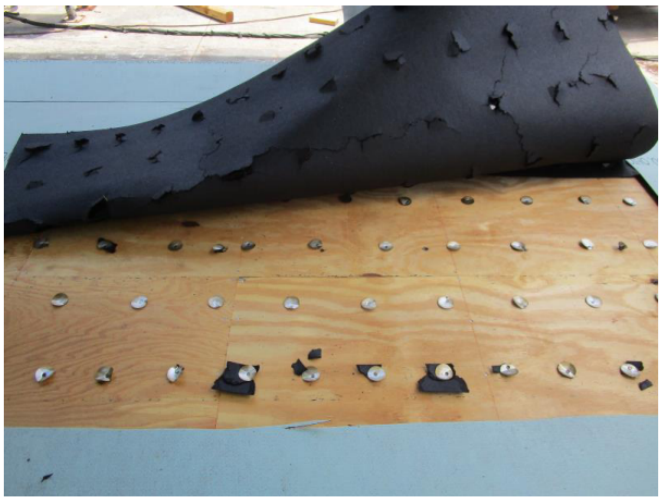
Specimen #1 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field

Specimen #1 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

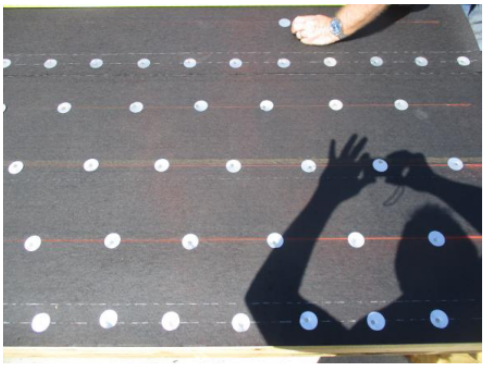


Specimen #2 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field

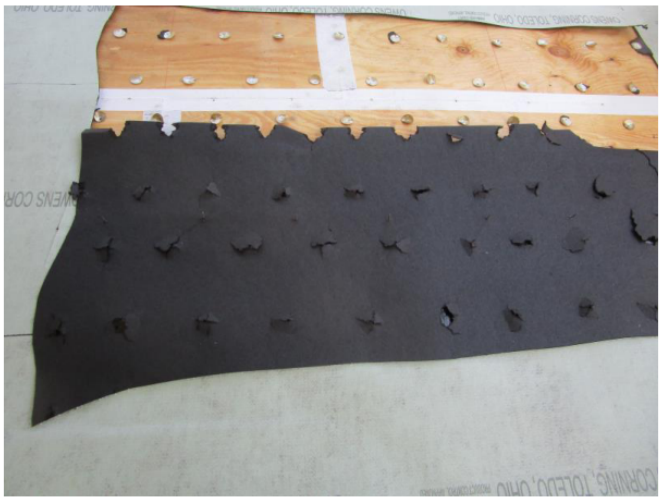


Specimen #2 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

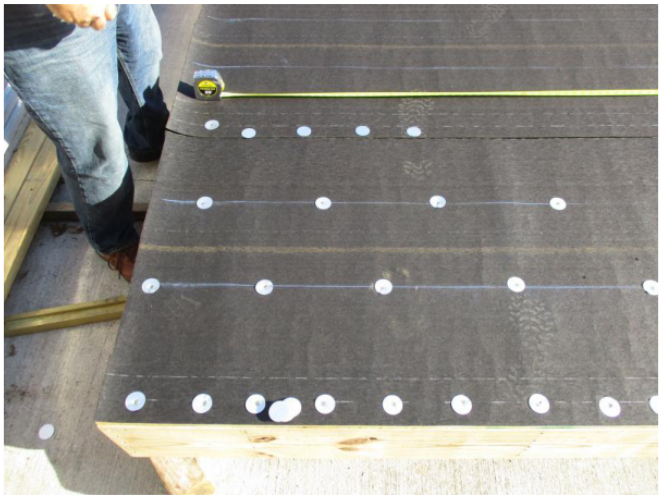


Specimen #3 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field over taped plywood joints

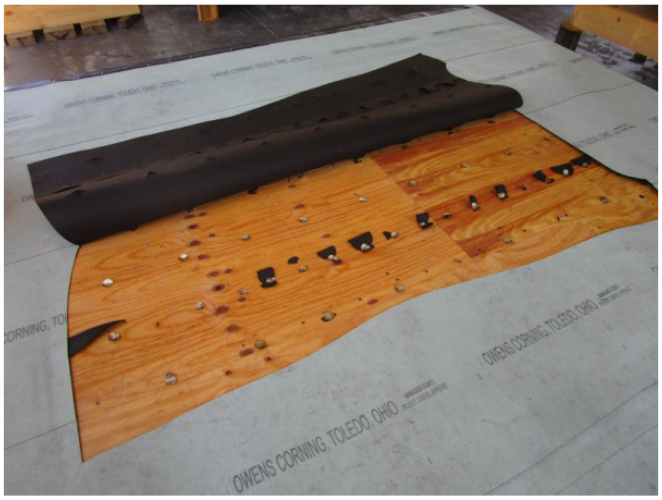


Specimen #3 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

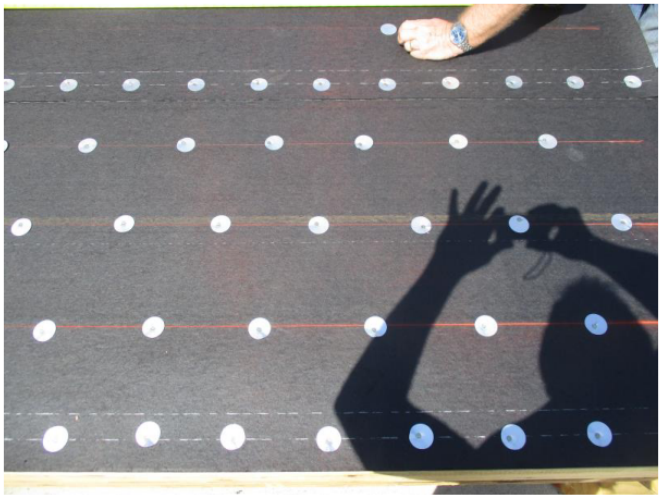


Specimen #4 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field

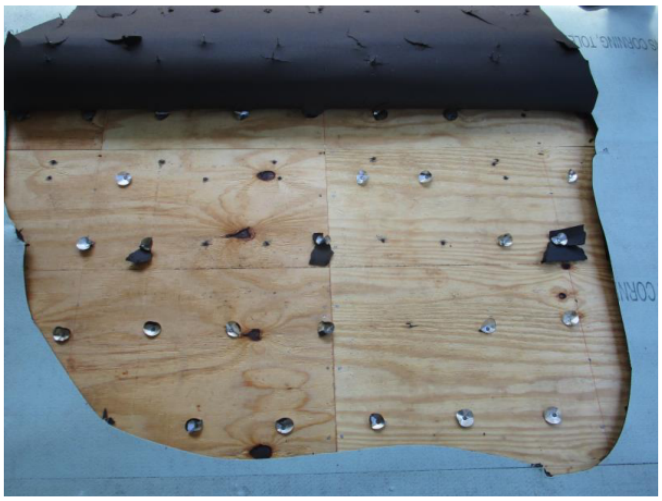


Specimen #4 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



Specimen #5 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field



Specimen #5 failure – fastener pull-through

END OF REPORT

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PRI Construction Materials Technologies LLC
6412 Badger Drive
Tampa, FL 33610
813.621.5777
https://www.pri-group.com/

Test Status Email

Report for:	Mike Sivers FRSA 3855 N. Econlockhatchee Trail Orlando, FL
Product Name:	Various D226 30# underlayments and various self-adhering underlayments
Project No.:	2368T0001
Dates Tested:	April 1, 2021 – April 2, 2021
Test Methods:	ASTM D1876 T-peel TAS 117 (B) fastener pull-through
Results Summary:	*See Results table herein*

Mike,

Per your request, PRI completed resistance to T-peel between PSU30 and four (4) different ASTM D226, 30# underlayments. Identifying the 30# with which the PSU30 adhered the best, we completed testing for adhesion between that underlayment and the other three (3) self adhered products.

Additionally, we completed fastener pull-through testing in accordance with TAS 117 (B) for the four 30# underlayments.

The results of testing can be found herein in the following two results tables.

Please pass this on to your counterparts in preparation for the assembly work next week.

Feel free to call or email with any questions:

-Jason

ASTM D1876 T-Peel

Sample	Test Method	Results						
T-Peel Strength (lbf/in); 10 specimens; 1in x 12in; Test Rate @ 10in/min; Self adhered to anchor sheet	ASTM D1876							
1 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.18	1.01	1.01	1.46	0.88		
		6	7	8	9	10		
		0.93	0.86	0.70	0.83	0.74	0.96	0.22
1 / B		1	2	3	4	5	**Avg.**	St. Dev
		0.54	0.42	0.49	0.39	0.46		
		6	7	8	9	10		
		0.73	0.40	0.41	0.49	0.50	0.48	0.10
1 / C		1	2	3	4	5	**Avg.**	St. Dev
		0.36	0.26	0.37	0.35	0.35		
		6	7	8	9	10		
		0.36	0.32	0.45	0.35	0.48	0.37	0.06
1 / D		1	2	3	4	5	**Avg.**	St. Dev
		0.53	0.57	0.59	0.62	0.53		
		6	7	8	9	10		
		0.58	0.47	0.56	0.53	0.45	0.54	0.05
2 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.00	1.10	1.06	1.26	1.16		
		6	7	8	9	10		
		1.22	0.94	0.96	0.83	1.16	1.07	0.14
3 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.19	1.23	1.34	0.95	1.12		
		6	7	8	9	10		
		0.92	0.82	0.88	0.80	1.32	1.05	0.20
4 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.40	0.35	0.45	0.41	0.55		
		6	7	8	9	10		
		0.41	0.41	0.47	0.52	0.40	0.44	0.06

Notes: None

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TAS 117 (B) Fastener Pull-Through Resistance

Sample	Test Method	Results Maximum Load (lbf)								
Fastener Pull-Through Resistance (lbf) 14 specimens; 18" by 18"; Test Rate @ 2in/min	TAS 117 Appendix B									
A		1	2	3	4	5	6	7	Avg.	St. Dev
		61.7	59.0	64.7	64.4	64.3	55.5	56.4		
		8	9	10	11	12	13	14		
		62.4	66.8	61.1	56.3	56.2	57.8	60.5	60.5	3.7
B		1	2	3	4	5	6	7	Avg.	St. Dev
		41.0	51.0	56.0	49.1	49.6	46.8	53.7		
		8	9	10	11	12	13	14		
		40.9	52.6	36.2	44.8	44.5	45.9	44.7	46.9	5.5
C		1	2	3	4	5	6	7	Avg.	St. Dev
		42.4	41.2	52.0	48.0	45.8	52.5	48.4		
		8	9	10	11	12	13	14		
		49.3	47.6	52.0	43.2	44.7	50.2	44.3	47.2	3.7
D		1	2	3	4	5	6	7	Avg.	St. Dev
		81.9	84.9	91.9	86.8	83.9	83.7	80.9		
		8	9	10	11	12	13	14		
		82.9	78.6	83.5	82.4	89.7	86.8	83.9	84.4	3.5

Notes: None

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TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Test Protocols

17

R10238

Date Submitted	02/14/2022	**Section**	130	**Proponent**	Michael Silvers (FRSA)
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

10175, 10176, 10179 and 10180

Summary of Modification

Aligns the language for wood shakes and shingle installed over solid sheathing with other proposed HVHZ fastened underlayment changes and with the more stringent secondary water barrier requirements used in the rest of Florida. Adds ASTM D8257 synthetic underlayment.

Rationale

Aligns the language for wood shakes and shingle installed over solid sheathing with other proposed HVHZ fastened underlayment changes and with the more stringent secondary water barrier requirements used in the rest of Florida. Adds ASTM D8257 synthetic underlayment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

R10238-A2

Proponent Michael Silvers (FRSA) **Submitted** 8/25/2022 3:28:35 PM **Attachments** Yes

Rationale:

This alternate language addresses two concerns voiced during the June TAC meetings. The deletion of ASTM D8257 excludes the use of synthetic underlayment with cedar shakes and shingles. The changed language in option 4.1 changes the overlap method to conform to manufacturers existing ply lines and concerns about the need to use chalk lines.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

2nd Comment Period

R10238-A1

Proponent Michael Silvers (FRSA) **Submitted** 8/18/2022 2:01:05 PM **Attachments** Yes

Rationale:

Language as submitted was redundant. It should be: approved roof cement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Does not degrade

Alternate Language for Modification R10238-A1

RAS 130 INSTALLATION CRITERIA FOR WOOD ROOF SHINGLES AND SHAKES APPLICATION

4.1 Underlayment

Solid Sheathing: ~~Two plies of ASTM D226, Type 1 felt overlapped. 19 in., or a single layer of ASTM D226 Type II felt overlapped a minimum of 4 in. on side laps, and 6 in. on the end laps.~~ Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, ~~or ASTM D8257~~ underlayment shall be installed as follows: Apply a strip of underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheet~~s~~ of ~~reinforced~~ underlayment, for the second course. Apply the third course of underlayment overlapping the second course ~~successive sheets~~ half the width of a full sheet plus 2 inches. Overlap all successive courses half the width of a full sheet plus inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment Fastener~~s~~ ~~d with~~ shall be corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c., and one row at the laps fastened 6 in. o.c.~~

Note: Tables remain unchanged

INSTALLATION CRITERIA FOR WOOD ROOF SHINGLES AND SHAKES APPLICATION

1. Scope

1.1 This application standard provides the minimum installation criteria for wood shingles and shakes application.

2. Definitions

2.1 For definitions of terms used in this application standard, refer to ASTM D1079 and the *Florida Building Code, Building*.

3. General

3.1 Maximum exposure for wood shingles and shakes shall comply with Table 1 herein, unless specifically specified in the roof assemblies Product Approval.

3.2 Wood shingles and shakes may be applied over solid or spaced sheathing. In spaced sheathing applications, the first 36 in. above the eave line shall be solidly sheathed. All wood decks shall comply with the provisions set forth in Chapters 15 and 23 (High-Velocity Hurricane Zones) of the *Florida Building Code, Building*.

3.3 Wood shingles and shakes shall not be installed on roof mean heights greater than 33 feet, unless specifically specified in the roof assemblies Product Approval.

4. Wood Shingles

4.1 Underlayment

Solid Sheathing: ~~Two plies of ASTM D226, Type 1 felt overlapped. 19 in., or a single layer of ASTM D226 Type II felt overlapped a minimum of 4 in. on side laps, and 6 in. on the end laps.~~ Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment Fasteners ~~d with~~ shall be corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c., and one row at the laps fastened 6 in. o.c.~~

Spaced Sheathing: Underlayment shall be installed at Aa minimum of 36 in. at the eave line, fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.

Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than $^{3}/_{16}$ in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

4.2 Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building*, and RAS 111.

4.3 Valleys may be installed open or closed. A 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D1970 self-adhering polymer-modified underlayment shall be installed centered in the

valley., ASTM D226 Type II felt shall be fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved flashing cement.

4.4 Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 1 1/4 in. annular ring shank roofing nails at every clip (see Detail A).

4.5 Metal laps shall be a minimum of 12 in. and shall be sealed with approved flashing cement. For open valley installations, the wood shingles are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shingles are to be miter cut along the center water diverter. Wood shingle fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shingles and the positioning of the fasteners higher at the valley may be required.

4.6 The maximum exposure to the weather for wood shingle applications shall comply with Table 1 herein.

4.7 Reserved.

4.8 The beginning or starter course of wood shingles at the eave line shall be doubled as a minimum. The wood shingles shall be project a minimum 3/4 in. to a maximum of 2 in. beyond the drip edge at both eaves and rakes. Spacing between shingles (joints or keyways) shall be a minimum of 1/4 in. and a maximum of 3/8 in. Shingles shall be positioned so that they cover the joints in the preceding course and adjacent courses shall be offset a minimum of 1 1/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail B).

4.9 Each shingle shall be fastened with a minimum of two (2) 5d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shingle, and 1/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.10 Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer's shingles. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shingles. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.11 Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shingles. The step-flashing unit shall be installed just up slope from the exposed area of the wood shingle, in such a manner as to be covered by the next wood shingle, while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shingle. Nail each step-flashing unit near the upper corner. Location of the shingle fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shingles shall be installed up to the vertical head wall and out over the top course of wood shingles a minimum of 5 in. Wall treatment or flashing or headwall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shingles. Metal counter flashing shall be installed in compliance with Roofing Application Standard RAS 111.

4.12 Roof penetration that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer's recommendations, unless otherwise indicated in roof assembly's Product Approval.

5. Wood Shakes

5.1 Underlayments:

Solid Sheathing: Underlayment shall be installed ~~at a minimum of 36 in. at the eave line~~. with two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be fastened with corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.~~

Spaced Sheathing: Underlayment shall be installed at Aa minimum of 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be Ffastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.

Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than $^{3}/_{16}$ in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

5.2 Interlayment shall be a minimum of ASTM D226 Type I felt or an Approved ASTM D8257 synthetic underlayment with a minimum width of 18 in. and shall be applied between each succeeding course of shakes. Interlayment shall be fastened on the upper edge of the sheet. The bottom edge of the interlayment shall be positioned above the butt edge of each course of shakes, a distance equal to twice the weather exposure of the wood shakes. Extend interlayment up vertical surfaces a minimum of 4 in. No felt underlayment shall be exposed.

5.3 Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building* and RAS 111.

5.4 Valleys may be installed open or closed. A minimum 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D8257 synthetic underlayment shall be installed over the underlayment and centered in the valley, fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved ~~flashing Approved~~ roof cement.

5.5 Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved $1^{1}/_{4}$ in. annular ring shank roofing nails at every clip (see Detail A).

5.6 Metal laps shall be a minimum of 12 in., and shall be sealed with approved flashing cement. For open valley installations, the wood shakes are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shakes are to be miter cut along the center water diverter. Wood shake fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shakes and the positioning of the fasteners higher at the valley may be required.

5.7 The maximum exposure to the weather for wood shakes shall comply with Table 1 herein. An interlayment sheet shall be installed between each shake. The beginning or starter course of wood shakes at the eave line shall be

doubled as a minimum. The wood shakes shall project a minimum $^{3}/_{4}$ in. to a maximum 2 in. beyond the drip edge at both eaves and rakes.

5.8 Spacing between shakes (joints or keyways) shall be a minimum $^{3}/_{8}$ in. and a maximum of $^{5}/_{8}$ in. Shakes shall be positioned so that they cover the joints in the preceding course. Adjacent courses shall be offset a minimum of $1\,^{1}/_{2}$ in. In any three courses (adjacent), no two joints should be directly aligned (see Detail D).

5.9 Each shake shall be fastened with a minimum of two (2) 6d hot-dipped, galvanized box nails. Fastened $^{3}/_{4}$ in. to 1 in. from the edge of the shake, and $1\,^{1}/_{2}$ in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than $^{3}/_{16}$ in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

5.10 Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer's shakes. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shakes. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than $^{3}/_{16}$ in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven. (see Detail C).

5.11 Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shakes. The step-flashing unit shall be installed just up slope from the exposed area of the wood shake, in such a manner as to be covered by the next wood shake while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shake. Nail each step-flashing unit near the upper corner. Location of the shake fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shake shall be installed up to the vertical head wall. The head wall flashing shall then be installed to extend up the vertical surface 5 in., and out over the top course of wood shake a minimum of 5 in. Wall treatment or metal counterflashing shall be brought down over all vertical flanges of the step flashing or head wall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shake. Metal counterflashing shall be installed in compliance with RAS 111.

5.12 Roof penetrations that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer's recommendations, unless otherwise indicated in roof assembly's Product Approval.

Note: Tables remain unchanged

INSTALLATION CRITERIA FOR WOOD ROOF SHINGLES AND SHAKES APPLICATION

1. Scope

1.1 This application standard provides the minimum installation criteria for wood shingles and shakes application.

2. Definitions

2.1 For definitions of terms used in this application standard, refer to ASTM D1079 and the *Florida Building Code, Building*.

3. General

3.1 Maximum exposure for wood shingles and shakes shall comply with Table 1 herein, unless specifically specified in the roof assemblies Product Approval.

3.2 Wood shingles and shakes may be applied over solid or spaced sheathing. In spaced sheathing applications, the first 36 in. above the eave line shall be solidly sheathed. All wood decks shall comply with the provisions set forth in Chapters 15 and 23 (High-Velocity Hurricane Zones) of the *Florida Building Code, Building*.

3.3 Wood shingles and shakes shall not be installed on roof mean heights greater than 33 feet, unless specifically specified in the roof assemblies Product Approval.

4. Wood Shingles

4.1 Underlayment

Solid Sheathing: ~~Two plies of ASTM D226, Type 1 felt overlapped 19 in., or a single layer of ASTM D226 Type II felt overlapped a minimum of 4 in. on side laps, and 6 in. on the end laps.~~ Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment Fasteners ~~d with~~ shall be corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c., and one row at the laps fastened 6 in. o.c.~~

Spaced Sheathing: Underlayment shall be installed at Aa minimum of 36 in. at the eave line, fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.

Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than $^{3}/_{16}$ in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

4.2 Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building*, and RAS 111.

4.3 Valleys may be installed open or closed. A 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D1970 self-adhering polymer-modified underlayment shall be installed centered in the

valley., ASTM D226 Type II felt shall be fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved flashing cement.

4.4 Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 1 1/4 in. annular ring shank roofing nails at every clip (see Detail A).

4.5 Metal laps shall be a minimum of 12 in. and shall be sealed with approved flashing cement. For open valley installations, the wood shingles are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shingles are to be miter cut along the center water diverter. Wood shingle fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shingles and the positioning of the fasteners higher at the valley may be required.

4.6 The maximum exposure to the weather for wood shingle applications shall comply with Table 1 herein.

4.7 Reserved.

4.8 The beginning or starter course of wood shingles at the eave line shall be doubled as a minimum. The wood shingles shall be project a minimum 3/4 in. to a maximum of 2 in. beyond the drip edge at both eaves and rakes. Spacing between shingles (joints or keyways) shall be a minimum of 1/4 in. and a maximum of 3/8 in. Shingles shall be positioned so that they cover the joints in the preceding course and adjacent courses shall be offset a minimum of 1 1/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail B).

4.9 Each shingle shall be fastened with a minimum of two (2) 5d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shingle, and 1/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.10 Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer's shingles. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shingles. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.11 Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shingles. The step-flashing unit shall be installed just up slope from the exposed area of the wood shingle, in such a manner as to be covered by the next wood shingle, while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shingle. Nail each step-flashing unit near the upper corner. Location of the shingle fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shingles shall be installed up to the vertical head wall and out over the top course of wood shingles a minimum of 5 in. Wall treatment or flashing or headwall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shingles. Metal counter flashing shall be installed in compliance with Roofing Application Standard RAS 111.

4.12 Roof penetration that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer's recommendations, unless otherwise indicated in roof assembly's Product Approval.

5. Wood Shakes

5.1 Underlayments:

Solid Sheathing: Underlayment shall be installed ~~at a minimum of 36 in. at the eave line~~. with two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be fastened with corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.~~

Spaced Sheathing: Underlayment shall be installed at Aa minimum of 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be Ffastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.

Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than $^{3}/_{16}$ in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

5.2 Interlayment shall be a minimum of ASTM D226 Type I felt or an Approved ASTM D8257 synthetic underlayment with a minimum width of 18 in. and shall be applied between each succeeding course of shakes. Interlayment shall be fastened on the upper edge of the sheet. The bottom edge of the interlayment shall be positioned above the butt edge of each course of shakes, a distance equal to twice the weather exposure of the wood shakes. Extend interlayment up vertical surfaces a minimum of 4 in. No felt underlayment shall be exposed.

5.3 Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building* and RAS 111.

5.4 Valleys may be installed open or closed. A minimum 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D8257 synthetic underlayment shall be installed over the underlayment and centered in the valley, fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved flashing Approved roof cement.

5.5 Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved $1^{1}/_{4}$ in. annular ring shank roofing nails at every clip (see Detail A).

5.6 Metal laps shall be a minimum of 12 in., and shall be sealed with approved flashing cement. For open valley installations, the wood shakes are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shakes are to be miter cut along the center water diverter. Wood shake fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shakes and the positioning of the fasteners higher at the valley may be required.

5.7 The maximum exposure to the weather for wood shakes shall comply with Table 1 herein. An interlayment sheet shall be installed between each shake. The beginning or starter course of wood shakes at the eave line shall be

doubled as a minimum. The wood shakes shall project a minimum 3/4 in. to a maximum 2 in. beyond the drip edge at both eaves and rakes.

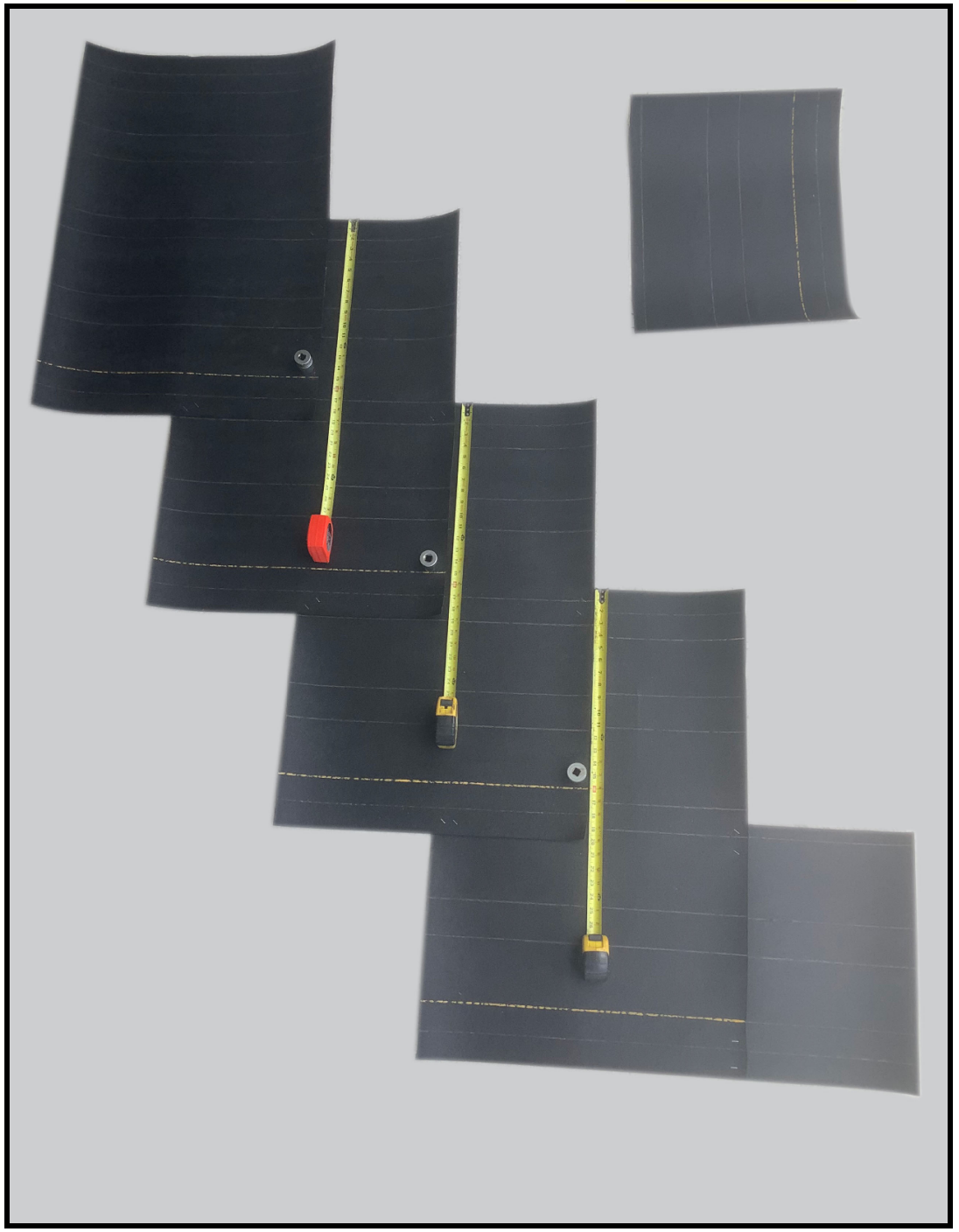
5.8 Spacing between shakes (joints or keyways) shall be a minimum 3/8 in. and a maximum of 5/8 in. Shakes shall be positioned so that they cover the joints in the preceding course. Adjacent courses shall be offset a minimum of 1 1/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail D).

5.9 Each shake shall be fastened with a minimum of two (2) 6d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shake, and 1 1/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

5.10 Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer's shakes. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shakes. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven. (see Detail C).

5.11 Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shakes. The step-flashing unit shall be installed just up slope from the exposed area of the wood shake, in such a manner as to be covered by the next wood shake while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shake. Nail each step-flashing unit near the upper corner. Location of the shake fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shake shall be installed up to the vertical head wall. The head wall flashing shall then be installed to extend up the vertical surface 5 in., and out over the top course of wood shake a minimum of 5 in. Wall treatment or metal counterflashing shall be brought down over all vertical flanges of the step flashing or head wall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shake. Metal counterflashing shall be installed in compliance with RAS 111.

5.12 Roof penetrations that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer's recommendations, unless otherwise indicated in roof assembly's Product Approval.



TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Test Protocols

18

R10175

Date Submitted	02/14/2022	**Section**	103	**Proponent**	Michael Silvers (FRSA)
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

10176, 10179, 10180 and 10238

Summary of Modification

Changes the test methods used to establish resistance to uplift pressure for tile underlayments to methods described in the code. The underlayment is part of the load path for most tile roof systems and product approval should demonstrate an expected resistance to negative pressure.

Rationale

The modification changes the test methods used to establish resistance to uplift pressure for tile underlayments to current methods described in the code for the testing of other non-air permeable membrane assemblies. The underlayment is part of the load path for most tile roof systems and product approval should demonstrate an expected resistance to negative pressure. Prescriptive methods described in the tile related RAS and TAS standards have been called into question. Underlayment applications described in the standards when tested using current performance testing standards indicate that some of the underlayment material and the fastener placement and density may not meet the current wind uplift resistance requirements based on ASCE-7. Test results from testing commissioned by FRSA using proposed test standards are attached and indicate very low resistance to uplift pressures for systems described in the RAS and TAS. The numbers shown are before applying the safety factor of two that further reduces the listed resistance of the underlayment. Independent testing by manufacturers of underlayment components produced similar results. The uplift resistance shown in many product approvals also confirms the need for these changes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

No impact.

Impact to industry relative to the cost of compliance with code

No impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

Alternate Language

2nd Comment Period

R10175-A1

Proponent Zachary Priest **Submitted** 8/26/2022 9:47:34 AM **Attachments** Yes

Rationale:

UL 1897 and FM 4474 were added, so I am proposing these should be added to the Referenced Document section as this was not included in the original proposed change. Additionally, the wind uplift section has been clarified further. Neither FM 4474 nor UL 1897 provide details for the construction of a wood test deck, so this has been conserved to ensure uniformity in testing. TAS 103 does not currently address approval of multi-ply underlayment systems. Mulit-ply underlayment systems require additional considerations beyond uplift, so the scope of change has been pared back to only require a direct-to-deck test (this is consistent with the original language in TAS 103). The minimum acceptance and reporting requirements have been conserved. The minimum acceptance should be conserved for the test reporting purposes as the testing lab provides a statement of compliance for the underlayment tested to the standard. Without this, a lab could report a product complies with TAS 103 even though the uplift does not meet a 90psf minimum.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact

Impact to building and property owners relative to cost of compliance with code

No impact

Impact to industry relative to the cost of compliance with code

No impact

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Ensures consistency in testing and proper representation of the results

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Consistent with proposed code change, just further clarifies the details

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Consistent with proposed code change

Does not degrade the effectiveness of the code

Improves the effectiveness (and non-bias between labs) of testing and reporting

1. Scope

1.1 This Protocol covers procedures for testing self-adhering, ~~prefabricated~~, polymer modified bituminous, and solid thermoplastic sheet roofing materials intended for use as underlayment in Tile Roof Systems to assist in the waterproofing to function in combination with a Prepared Roof Covering. These products may employ granular or particulate surfacing materials on one side. The Granule Adhesion test shall be required for all granular surfaced materials used as a bonding surface for mortar or adhesive set tile systems.

1.2 The test procedures outlined in this Protocol cover the determination of the Wind Uplift Resistance; the Thickness; the Dimensional Stability; the Tear Resistance; the Breaking Strength; the Elongation; the Low Temperature Flexibility; the Ultraviolet Resistance; the Accelerated Aging Performance; the Cyclic Elongation Performance; the Water Vapor Transmission; the Compound Stability; the Puncture Resistance; the Tile Slip-page Resistance; the Peel Resistance; the Accelerated Weathering Performance of an underlayment material; the Tensile Adhesion properties of the exposed surface of the underlayment; and Granular Adhesion for granular surfaced underlayment.

Note: 1.3 remains unchanged

2.Referenced Documents

2.1 *ASTM Test Standards:*

D1079	Standard Definitions and Terms Relating to Roofing, Waterproofing and Bituminous Materials
D1623	Standard Test Method For Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
D1970	Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection (Low Temperature Flexibility)
D2523	Testing Load-Strain Properties of Roofing Membranes
D4073	Standard Test Method For Tensile Tear Strength of Bituminous Roofing Membranes
D5147	Sampling and Testing Modified Bituminous Sheet Materials
E96	Water Vapor Transmission of Materials
E380	Excerpts from the Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)

2.2 *ANSI Test Standards:*

FM 4474	American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static

	Positive and/or Negative Differential Pressures, Appendix D: 12x24 Simulated Wind Uplift Pressure Test Procedure
UL 1897	Uplift Tests for Roof Covering Systems

7. Wind Uplift

7. ~~Adhered or mechanically attached t~~The underlayment ~~or underlayment assemblies~~ shall be tested in accordance with ANSI/FM 4474 or UL 1897.

~~7.1 This test covers the determination of the wind uplift resistance of materials specified in Section 1 of this Protocol in accordance with TAS 124 except as noted below.~~

7.1~~.1~~ Test Deck Construction

~~7.1.1.1 Test is being conducted on materials noted in Section 1 of this Protocol; therefore, any reference to "roof membrane" in TAS 124 shall be regarded as 'underlayment.'~~

7.2~~1.1.2 Four (4) 8' × 8' t~~Test decks shall be constructed of minimum 40/20 19~~5~~/32 in. APA Rated Plywood Sheathing attached to wood joists spaced 24 o.c. ~~Each T~~test deck ~~shall consist of four (4) panels of said sheathing, the corners of which shall meet at the center of each test deck~~, leaving a 1/8 in. gap between panels.

7.~~1.1.~~3 Adhere one (1) layer of underlayment to ~~each~~the test deck.

~~7.1.2 Procedure~~

~~7.1.2.1 Test shall be a laboratory test not a field test; therefore, any instruction in TAS 124 which references "building or outdoor conditions" shall be regarded as "laboratory conditions."~~

~~7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft2 and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft2, holding each incremented pressure for one (1) minute, until the~~ 7.4 The specimen shall be considered passing test when the maximum passing ~~negative~~ pressure ~~has been held at~~ is equal to or greater than 90 lbf/ft2 ~~for one (1) minute.~~

7.~~1.3~~5 Report

~~7.1.3.1 Any test specimen which exhibits any significant separation between the membrane and tested substrate shall be considered as failing the wind uplift.~~

1. Scope

1.1 This Protocol covers procedures for testing self-adhering, ~~prefabricated~~, polymer modified bituminous, and solid thermoplastic sheet roofing materials intended for use as underlayment in Tile Roof Systems to assist in the waterproofing to function in combination with a Prepared Roof Covering. These products may employ granular or particulate surfacing materials on one side. The Granule Adhesion test shall be required for all granular surfaced materials used as a bonding surface for mortar or adhesive set tile systems.

1.2 The test procedures outlined in this Protocol cover the determination of the Wind Uplift Resistance; the Thickness; the Dimensional Stability; the Tear Resistance; the Breaking Strength; the Elongation; the Low Temperature Flexibility; the Ultraviolet Resistance; the Accelerated Aging Performance; the Cyclic Elongation Performance; the Water Vapor Transmission; the Compound Stability; the Puncture Resistance; the Tile Slip-page Resistance; the Peel Resistance; the Accelerated Weathering Performance of an underlayment material; the Tensile Adhesion properties of the exposed surface of the underlayment; and Granular Adhesion for granular surfaced underlayment.

Note: 1.3 remains unchanged

2.Referenced Documents

2.1 *ASTM Test Standards:*

D1079	Standard Definitions and Terms Relating to Roofing, Waterproofing and Bituminous Materials
D1623	Standard Test Method For Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
D1970	Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection (Low Temperature Flexibility)
D2523	Testing Load-Strain Properties of Roofing Membranes
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D5147	Sampling and Testing Modified Bituminous Sheet Materials
E96	Water Vapor Transmission of Materials
E380	Excerpts from the Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)

2.3 Reserved

2.4 The Florida Building Code, Building.

2.5 ~~*Application Standards*~~ Reserved

~~TAS 124~~	~~Test Procedure for Field Uplift Testing of Existing Membrane Roof Systems~~

Note: 3., 4., 5., and 6. Remain unchanged.

7. Wind Uplift

7. Adhered or mechanically attached tile underlayment or underlayment assemblies shall be tested in accordance with FM 4474 or UL 1897.

-

~~7.1 This test covers the determination of the wind uplift resistance of materials specified in Section 1 of this Protocol in accordance with TAS 124 except as noted below.~~

~~7.1.1 Test Deck Construction~~

~~7.1.1.1 Test is being conducted on materials noted in Section 1 of this Protocol; therefore, any reference to "roof membrane" in TAS 124 shall be regarded as 'underlayment.'~~

~~7.1.1.2 Four (4) 8' × 8' test decks shall be constructed of 40/20 19/32 in. APA Rated Plywood Sheathing attached to wood joists spaced 24 o.c. Each test deck shall consist of four (4) panels of said sheathing, the corners of which shall meet at the center of each test deck, leaving a 1/8 in. gap between panels.~~

~~7.1.1.3 Adhere one (1) layer of underlayment to each test deck.~~

~~7.1.2 Procedure~~

~~7.1.2.1 Test shall be a laboratory test not a field test; therefore, any instruction in TAS 124 which references "building or outdoor conditions" shall be regarded as "laboratory conditions."~~

~~7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft2 and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft2, holding each incremented pressure for one (1) minute, until the negative pressure has been held at 90 lbf/ft2 for one (1) minute.~~

~~7.1.3 Report~~

~~7.1.3.1 Any test specimen which exhibits any significant separation between the membrane and tested substrate shall be considered as failing the wind uplift.~~

PRI Construction Materials Technologies LLC
6412 Badger Drive
Tampa, FL 33610
813.621.5777
https://www.pri-group.com/

Laboratory Test Report

Report for:	Mike Silvers FRSA 3855 N. Econlockhatchee Trail Orlando, FL 32817
Product Name:	Self-adhered underlayment applied to ASTM D226 anchor sheet
Project No.:	2368T0002
Dates Tested:	May 10, 2021
Test Methods:	UL 1897-12

Purpose: Determine uplift resistance in accordance with **UL 1897-12 *Uplift Tests for Roof Covering* Systems.**

Test Methods: Testing was completed as described in UL 1897-12 *Uplift Tests for Roof Covering* Systems. Specimens were incrementally loaded in accordance with UL 1897 until failure.

Deck Description:	Framing:	2x10 No. 2 SYP lumber installed 24" o.c.
	Deck:	15/32 APA rated plywood sheathing installed over No. 2 lumber supports spaced 24" on center. Decking was attached with 2-3/8 inch x 0.113 inch ring shank nails spaced 6" o.c. along the perimeter and intermediate supports.
	Underlayment:	An anchor sheet of ASTM D226 type II material was mechanically attached to sheathed specimen with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps (see Results Table for spacing details). A self-adhering underlayment was applied atop the mechanically attached anchor sheet in accordance with manufacturer's installation instructions. The laps of the self-adhered underlayment were backnailed with 12ga, 1-1/4 inch long, galvanized, ring shank, roofing nails placed through 32ga, 1-5/8 inch diameter tin caps and spaced 12 inches on center along the lap.

Results:

Table 1. Summary of Test Results

Specimen No.	Underlayment	Attachment	Passing Uplift Pressure (psf)	Failure Mode
1	2 / A	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
2	2 / A	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	45	Fastener Pull-through
3	2 / A	Plywood joints taped[1] Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through
4	2 / D	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
5	2 / D	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through

Notes: 1 - Specimen #3 construction details included taping of the plywood joints with AAMA 711 compliant seam tape.

Statement of Attestation:

Testing was conducted in accordance with **UL 1897-12** ***Uplift Tests for Roof Covering*** **Systems.** The test results and interpretations presented herein are representative of the materials supplied by the client.

Signed: _____

Jason Simmons
Director

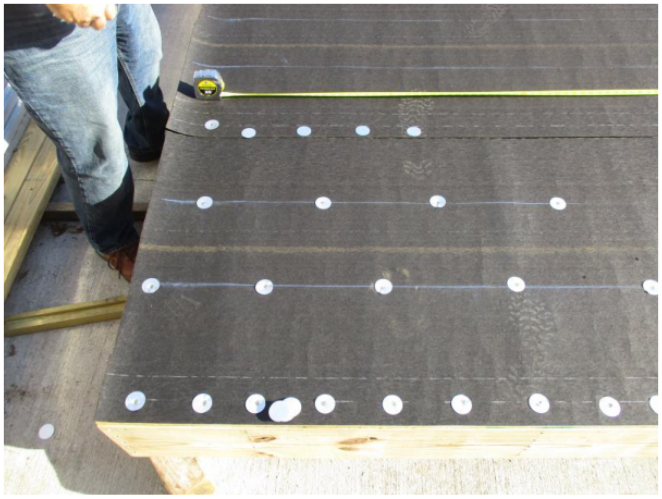
Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	07/07/2021	8	NA
Revision	07/14/2021	7	Remove product identification

APPENDIX ATTACHED

Appendix A: Representative Photographs

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



Specimen #1 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field

Specimen #1 failure – fastener pull-through

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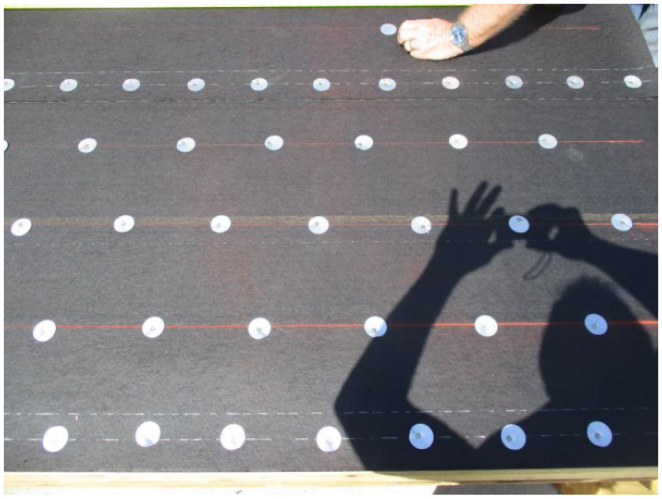
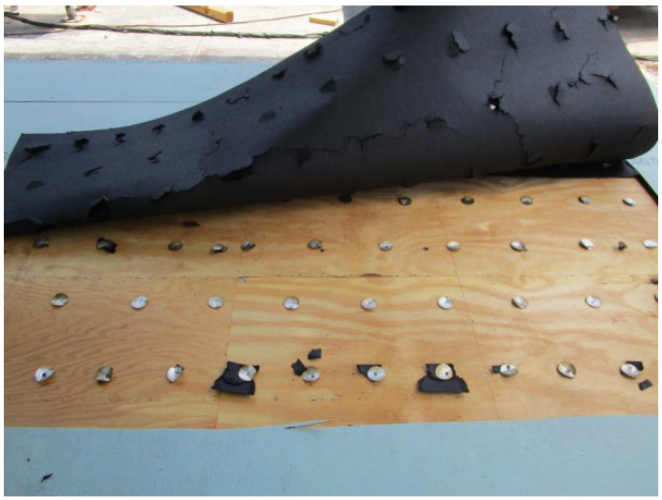
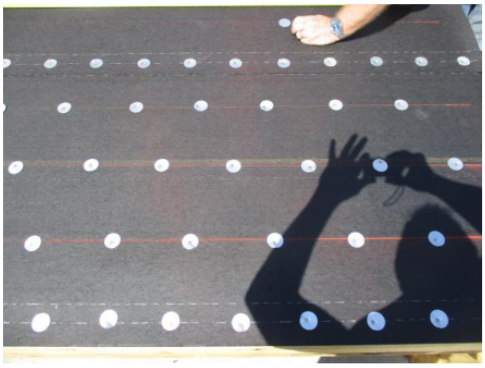


Specimen #2 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field

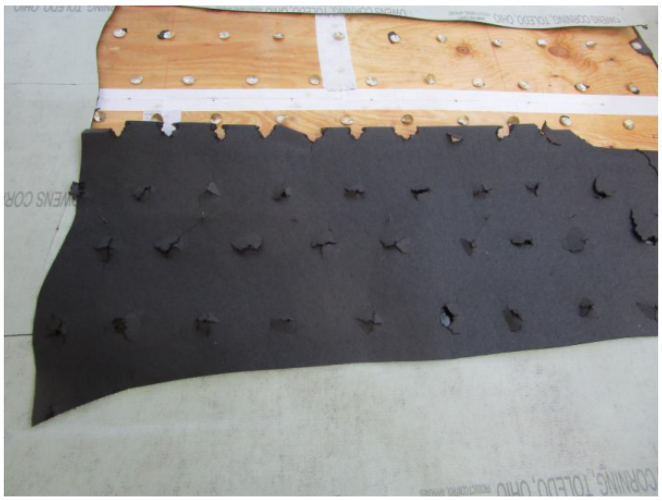


Specimen #2 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com

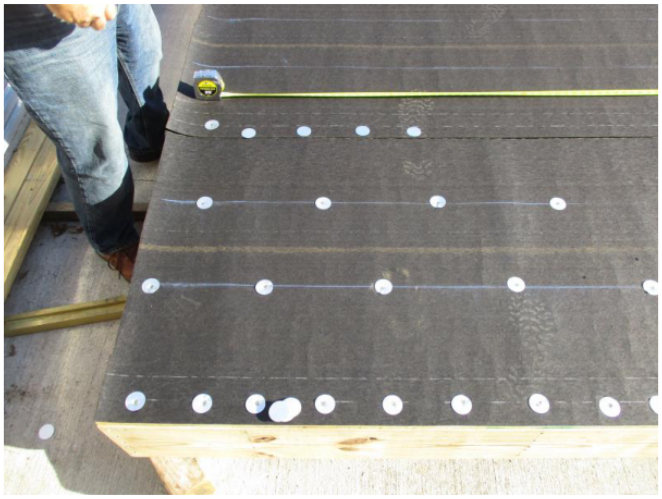


Specimen #3 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field over taped plywood joints

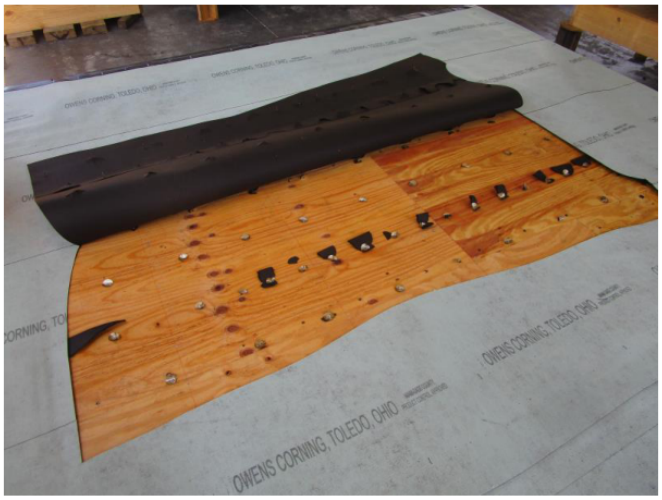


Specimen #3 failure – fastener pull-through

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pri-group.com



Specimen #4 (typ.): Layout 6" OC in Lap and 2 rows at 12" OC in the field



Specimen #4 failure – fastener pull-through

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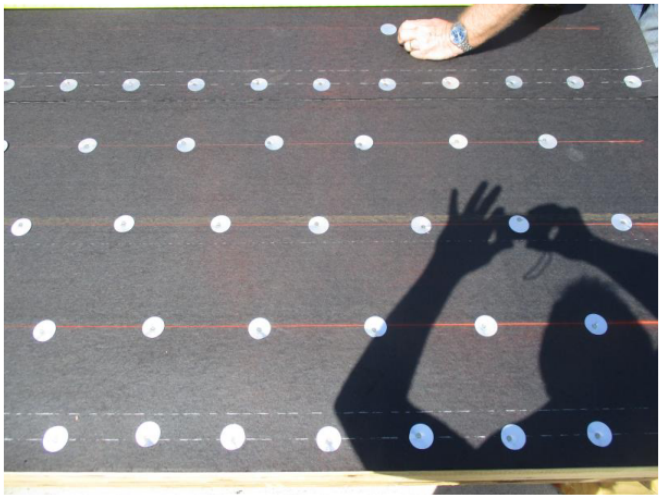
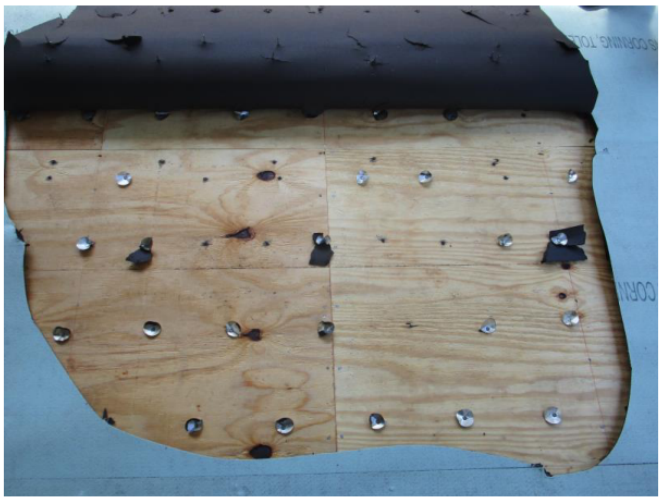


Specimen #5 (typ.): Layout 6" OC in Lap and 3 rows at 8" OC in the field



Specimen #5 failure – fastener pull-through

END OF REPORT

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Test Status Email

Report for:	Mike Sivers FRSA 3855 N. Econlockhatchee Trail Orlando, FL
Product Name:	Various D226 30# underlayments and various self-adhering underlayments
Project No.:	2368T0001
Dates Tested:	April 1, 2021 – April 2, 2021
Test Methods:	ASTM D1876 T-peel TAS 117 (B) fastener pull-through
Results Summary:	*See Results table herein*

Mike,

Per your request, PRI completed resistance to T-peel between PSU30 and four (4) different ASTM D226, 30# underlayments. Identifying the 30# with which the PSU30 adhered the best, we completed testing for adhesion between that underlayment and the other three (3) self adhered products.

Additionally, we completed fastener pull-through testing in accordance with TAS 117 (B) for the four 30# underlayments.

The results of testing can be found herein in the following two results tables.

Please pass this on to your counterparts in preparation for the assembly work next week.

Feel free to call or email with any questions:

-Jason

ASTM D1876 T-Peel

Sample	Test Method	Results						
T-Peel Strength (lbf/in); 10 specimens; 1in x 12in; Test Rate @ 10in/min; Self adhered to anchor sheet	ASTM D1876							
1 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.18	1.01	1.01	1.46	0.88		
		6	7	8	9	10		
		0.93	0.86	0.70	0.83	0.74	0.96	0.22
1 / B		1	2	3	4	5	**Avg.**	St. Dev
		0.54	0.42	0.49	0.39	0.46		
		6	7	8	9	10		
		0.73	0.40	0.41	0.49	0.50	0.48	0.10
1 / C		1	2	3	4	5	**Avg.**	St. Dev
		0.36	0.26	0.37	0.35	0.35		
		6	7	8	9	10		
		0.36	0.32	0.45	0.35	0.48	0.37	0.06
1 / D		1	2	3	4	5	**Avg.**	St. Dev
		0.53	0.57	0.59	0.62	0.53		
		6	7	8	9	10		
		0.58	0.47	0.56	0.53	0.45	0.54	0.05
2 / A		1	2	3	4	5	**Avg.**	St. Dev
		1.00	1.10	1.06	1.26	1.16		
		6	7	8	9	10		
		1.22	0.94	0.96	0.83	1.16	1.07	0.14
3 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.19	1.23	1.34	0.95	1.12		
		6	7	8	9	10		
		0.92	0.82	0.88	0.80	1.32	1.05	0.20
4 / A		1	2	3	4	5	**Avg.**	St. Dev
		0.40	0.35	0.45	0.41	0.55		
		6	7	8	9	10		
		0.41	0.41	0.47	0.52	0.40	0.44	0.06

Notes: None

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TAS 117 (B) Fastener Pull-Through Resistance

Sample	Test Method	Results Maximum Load (lbf)								
Fastener Pull-Through Resistance (lbf) 14 specimens; 18" by 18"; Test Rate @ 2in/min	TAS 117 Appendix B									
A		1	2	3	4	5	6	7	Avg.	St. Dev
		61.7	59.0	64.7	64.4	64.3	55.5	56.4		
		8	9	10	11	12	13	14		
		62.4	66.8	61.1	56.3	56.2	57.8	60.5	60.5	3.7
B		1	2	3	4	5	6	7	Avg.	St. Dev
		41.0	51.0	56.0	49.1	49.6	46.8	53.7		
		8	9	10	11	12	13	14		
		40.9	52.6	36.2	44.8	44.5	45.9	44.7	46.9	5.5
C		1	2	3	4	5	6	7	Avg.	St. Dev
		42.4	41.2	52.0	48.0	45.8	52.5	48.4		
		8	9	10	11	12	13	14		
		49.3	47.6	52.0	43.2	44.7	50.2	44.3	47.2	3.7
D		1	2	3	4	5	6	7	Avg.	St. Dev
		81.9	84.9	91.9	86.8	83.9	83.7	80.9		
		8	9	10	11	12	13	14		
		82.9	78.6	83.5	82.4	89.7	86.8	83.9	84.4	3.5

Notes: None

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FRSA Tile Underlayment Testing Confirms Concerns

Mike Silvers, CPRC, Silvers Systems Inc. and FRSA Director of Technical Services

In the May 2021 edition of Florida Roofing magazine, I wrote an article titled *Florida May Have a Flaw in Our Roofing Code Armor*. The article went into some detail about a possible problem with tile underlayment consisting of a nailed D226 #30 with a self-adhering underlayment applied to it. Self-adhering manufacturer's product approvals showed relatively low uplift resistance for these underlayment systems. The highest of those we found provided resistance of 45 psf with the safety factor of 2 accounted for. This means the product should have resistance of 90 psf during testing. The resistance stated in these product approvals would not meet the American Society of Civil Engineers (ASCE) 7-16 requirements in many areas of Florida.

FRSA was concerned that this prescriptive application was being used to circumvent the more restrictive ASCE 7-16 compliant requirements of the 6th Edition FRSA-TRI Florida High Wind Concrete and Clay Tile Installation Manual. The manual has prescriptive methods for two ply hot mopped systems that include greatly enhanced fastening for the #30. For all other underlayments you need a product approval that meets the resistance values for your specific job based on the tables in the manual or engineering calculations that are based on ASCE 7-16.

In order to validate our concerns, the FRSA Education and Research Foundation provided funding, donated through an endowment by Bob Ferrante, that allowed us to conduct testing to verify the actual uplift resistance of this system. We began testing at the PRI facility in Tampa in April. Four different Miami-Dade approved ASTM D226 felts and four different self-adhering membranes were tested using TAS 117B

Table 1 – TAS 117 (B) Fastener Pull-Through Resistance

Sample	Test Method	Results – Maximum Load (lbf)								
Fastener Pull-Through Resistance (lbf) 14 Specimens; 18" by 18" Test Rate @ 2in/min	TAS 117 Appendix B									
A		1	2	3	4	5	6	7	Avg.	St. Dev.
		61.7	59.0	64.7	64.4	64.3	55.5	56.4		
		8	9	10	11	12	13	14		
		62.4	66.8	61.1	56.3	56.2	57.8	60.5	60.5	3.7
B		1	2	3	4	5	6	7	Avg.	St. Dev.
		41.0	51.0	56.0	49.1	49.6	46.8	53.7		
		8	9	10	11	12	13	14		
		40.9	52.6	36.2	44.8	44.5	45.9	44.7	46.9	5.5
C		1	2	3	4	5	6	7	Avg.	St. Dev.
		42.4	41.2	52.0	48.0	45.8	52.5	48.4		
		8	9	10	11	12	13	14		
		49.3	47.6	52.0	43.2	44.7	50.2	44.3	47.2	3.7
D		1	2	3	4	5	6	7	Avg.	St. Dev.
		81.9	84.9	91.9	86.8	83.9	83.7	80.9		
		8	9	10	11	12	13	14		
		82.9	78.6	83.5	82.4	89.7	86.8	83.9	84.4	3.5

for pull-through and ASTM D1876 adhesion peel test. The best performing of each were installed on five test decks. The #30 with best pull-through resistance (Product D in Table 1) and the one offering the best surface for adhesion (Product A in Table 1) were nailed using tin tabs/caps and ring shank nails into two decks using the standard pattern of 6" o.c. at the laps and two rows at 12" o.c. staggered in the field (per RAS), with three others using 6" o.c. at the laps and three rows at 8" o.c. staggered in the field. The best performing self-adhering membrane for adhesion (Product 2 in Table 2) was then applied to the two different #30 on all five decks. Approximately thirty days later, we tested them to failure in a bell chamber. The results were even lower than we had anticipated and very concerning. Tables 1-3 will show the test results.

You can see in Table 3 (page 18), that the Passing Uplift Pressure (psf) column in yellow shows for Specimen No. 1 and 4, which have the prescriptive nailing patterns, the passing pressures are 30 psf. When you apply the required safety factor of 2, it results in a final resistance pressure of 15 psf. This is very low and confirmed our previous concerns. You can also see that with minimally enhanced fastening and, in one specimen, by taping the joints of the plywood, it doubled the resistance. But when the safety factor of 2 is applied, the 60 psf becomes 30 psf. This is still very low. These values were much lower than known values for two-ply hot mopped systems, so the next question is why?

Table 2 – ASTM D1876 T-Peel

Sample	Test Method	Results						
T-Peel Strength (lbf/in); 10 specimens; 1in x 12in; Test Rate @ 10in/min; Self adhered to anchor sheet	ASTM D1876							
1 / A		1	2	3	4	5	Avg.	St. Dev
		1.18	1.01	1.01	1.46	0.88		
		6	7	8	9	10		
		0.93	0.86	0.70	0.83	0.74	0.96	0.22
1 / B		1	2	3	4	5	Avg.	St. Dev
		0.54	0.42	0.49	0.39	0.46		
		6	7	8	9	10		
		0.73	0.40	0.41	0.49	0.50	0.48	0.10
1 / C		1	2	3	4	5	Avg.	St. Dev
		0.36	0.26	0.37	0.35	0.35		
		6	7	8	9	10		
		0.36	0.32	0.45	0.35	0.48	0.37	0.06
1 / D		1	2	3	4	5	Avg.	St. Dev.
		0.53	0.57	0.59	0.62	0.53		
		6	7	8	9	10		
		0.58	0.47	0.56	0.53	0.45	0.54	0.05
2 / A		1	2	3	4	5	Avg.	St. Dev.
		1.00	1.10	1.06	1.26	1.16		
		6	7	8	9	10		
		1.22	0.94	0.96	0.83	1.16	1.07	0.14
3 / A		1	2	3	4	5	Avg.	St. Dev.
		0.19	1.23	1.34	0.95	1.12		
		6	7	8	9	10		
		0.92	0.82	0.88	0.80	1.32	1.05	0.20
4 / A		1	2	3	4	5	Avg.	St. Dev.
		0.40	0.35	0.45	0.41	0.55		
		6	7	8	9	10		
		0.41	0.41	0.47	0.52	0.40	0.44	0.06

The failure mode shown in the green column in Table 3 were fastener pull-through. The only place we experienced fastener pull out was in the backnailing where the self-adhering membrane being nailed

Table 3 – Summary of Test Results (UL 1897-12)

Specimen No.	Underlayment	Attachment	Passing Uplift Pressure	Failure Mode
1	2/A	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
2	2/A	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	45	Fastener Pull-through
3	2/A	Plywood joints taped[1] Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through
4	2/D	Fastened in lap 6 in o.c. 2 rows in the field @ 12 in o.c.	30	Fastener Pull-through
5	2/D	Fastened in lap 6 in o.c. 3 rows in the field @ 8 in o.c.	60	Fastener Pull-through

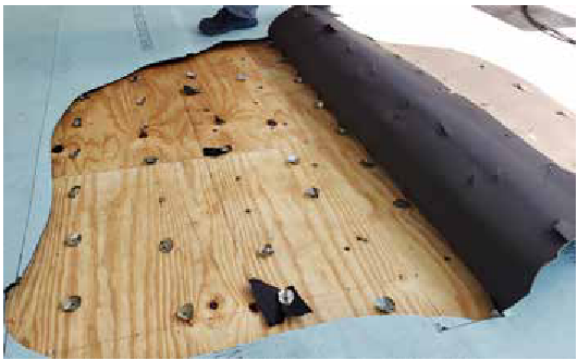
Note: 1 – Specimen #3 construction details including taping of the plywood joints with AAMA 711 compliant seam tape.

through added to the pull-through resistance. The pictures below show the bottom or underside of a tested underlayment and the fasteners that remain in the deck. Notice how the #30 felt is ripped and the tin tabs are deformed. Previously tested two-ply hot mopped underlayment failures were typically fastener pull out. So, there is clearly a difference in how the felt and tin tab interact with self-adhered versus hot mopped systems.

After a great deal of contemplation and discussion, we formed a hypothesis which I will attempt to explain. A mop is used to apply hot asphalt over a #30 and a nail/tin tag combination asphalt runs under and is applied over the tin tag. Then a second layer of compatible asphalt membrane is immediately applied. When the asphalt cools, the tin tag is sandwiched between these two asphaltic membranes creating a surrounding bond and, due to the rigidity achieved, helps to spread the fastener loading into the membranes. This bond locks the tin tag in and reinforces its resistance to tin tag deformation, as well as adding pull-through resistance to the interface. When using a self-adhering membrane, the adhesive does not solidify like asphalt, thereby leaving the tin tag #30 interface much weaker and, due to the flexible nature of the completed membranes, susceptible to single fastener loading and pull-through failure mode (see photos below).

Having a better understanding of the low resistance to uplift pressure that these prescriptive #30 and self-adhering membrane underlayments provide and why, we noted that almost all testing was done exclusively with nail/tin tag fastening. This may be one area where a stiffer cap nail may increase performance. Base sheets with better pull-through resistance and surface for better adhesion is another possibility. The vacuum chamber testing performed did not achieve high enough pressures to evaluate the adhesion properties of the self-adhering membranes. The information available leads one to believe that a D226 #30 will not achieve adequate uplift resistance to be used as the base sheet in a two-ply self-adhered system. There is evidence that with the right base sheet and fastening – a two-ply system that includes a self-adhering top layer – a compliant underlayment system can be achieved. One important concern is the relatively high cost that will come with this option.

Regardless of why these underlayments don't provide better overall resistance values, it is clear that we need to rectify the problem so that future editions of



the Florida Building Code can address the issue. The 6th Edition FRSA-TRI tile manual deals with this issue but unfortunately the Miami-Dade Roofing Application Standards (RAS) do not. The RAS are referenced in the code for use outside of the High Velocity Hurricane Zone (HVHZ Miami-Dade and Broward counties). If we can address the prescriptive underlayment methods included in the RAS, we can rectify this problem. Many contractors, when working outside of the HVHZ, use underlayment applied direct to deck. These systems provide the highest uplift resistance at a cost that is less than the prescriptive option and even more cost effective when compared to conforming two-ply systems. As many of you know, direct to deck applications and fasteners without tin caps are not permitted for use in the HVHZ. The stance on the direct to deck application exists in conflict with *RAS No. 118-20, 119-20 and 120-20 Underlayment Applications, E. Self-Adhered Underlayment (Single Ply). A single-ply underlayment system utilizing any Product approved self-adhered underlayment. The roof cover is terminated at approved metal flashings. Apply one layer of any self-adhered underlayment in compliance with the underlayment manufacturers approved/requirements.* As stated earlier, this is a cost effective way to meet the uplift resistance required by the code and should be acceptable in the HVHZ as well.

With all of this in mind, the FRSA Codes Subcommittee allowed the research project task group, which includes Manny Oyola, Eagle Roofing Products, Greg Keeler, Owens Corning and me to arrange a meeting with officials at Miami-Dade to discuss our test results and look for ways to deal with the problem. I am very happy to report that our task group met with Jorge Acebo, Jamie Gascon, Alex Tigera and Gaspar Rodriquez of Miami-Dade County in early September. FRSA appreciates their willingness to openly exchange points of view, concerns and possible solutions. It was a very productive meeting. The Miami-Dade group are currently discussing their options and we agreed to try and work together to find a good resolution. I will report on our progress in future articles. Keeping the dialogue open, building consensus and forming coalitions with other industry groups is of the upmost importance when proposing and making code changes. We will attempt to do so whenever our interests align.

FRM

Mike Silvers, CPRC is owner of Silvers Systems Inc. and is consulting with FRSA as Director of Technical Services. Mike is an FRSA Past President, Life Member and Campanella Award recipient and brings over 45 years of industry knowledge and experience to FRSA's team.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Test Protocols

19

R10273

Date Submitted	02/12/2022	**Section**	15	**Proponent**	Gaspar Rodriguez
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Summary of Modification

On Table 15, replace FM 4471 with TAS 114, as an alternate test standard.

Rationale

Replace discontinued FM 4471 standard with equivalent TAS 114 standard.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
None.
Impact to building and property owners relative to cost of compliance with code
None.
Impact to industry relative to the cost of compliance with code
Allows manufacturers to continue to use recently performed testing.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Maintains current code.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Maintains current code.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate.
Does not degrade the effectiveness of the code
Maintains current code.

2nd Comment Period

10273-G1

Proponent Gaspar Rodriguez Submitted 8/23/2022 8:31:19 AM Attachments No

Comment:

I would like to withdraw this mod, the proposed TAS substitute is hardly ever used. Therefore, to not clutter up the code we would ask it be withdrawn.

TABLE 15

TABLE 15

Product	Test	Test Standard
Structural, Nonstructural Metal Panels and Metal Shingle Roof Assemblies	Uplift Resistance	TAS 125
Structural, Nonstructural Metal Panels and Metal Shingle Roof Assemblies	Wind and Wind Driven Rain Resistance	TAS 100
Structural, Nonstructural Metal Panels and Metal Shingle Roof Assemblies	Fire Resistance	E108 (min. Class "B")
Structural, Nonstructural Metal Panels and Metal Shingle Roof Assemblies	Accelerated Weathering	G152 or G155 (2000 hours)
Structural, Nonstructural Metal Panels and Metal Shingle Roof Assemblies	Salt Spray	B117 (1000 hours)
Insulated Metal Panels	Thermal Value	C518 (report)
Nonstructural Standing SeamMetal Panels	Static Water Leakage Test[1]	~~FM 4471~~ TAS 114 Appendix G or ASTM E2140-01[2]

1.Optional test to allow minimum slope of 1:12.

2.Standing seam metal roof panel systems that pass the requirements of ~~FM 4471~~TAS 114, Appendix G or ASTM E2140-01, shall be permitted to be installed to a minimum slope of 1:12.

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted : 17**

Total Mods for report: 23

Sub Code: Test Protocols

20

R9922

Date Submitted	01/18/2022	**Section**	6	**Proponent**	Aaron Phillips
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Uplift tests clarifications.

Rationale

This MOD offers several clarifications to TAS 124. Section 4.3 is changed to clarify that it provides guidance for dealing with roof replacements, not for new construction. The new subsection added to Section 6.2 clarifies the limitations associated with the Bell Chamber test, in accordance with the Section 6 title—Test Limitations and Precautions. Systems that are Approved by tests per TAS 114 Appendix D should be tested via the bonded pull test, which uses a 2' x 2' sample side (i.e., total of 4 square feet). The Bell Chamber test uses a 25 square foot sample size. There is no correlation in performance between the bonded pull test of TAS 114 Appendix D and the pressure chamber tests of TAS 114 Appendices C and J. The additional information added to Section 6.3.1 clarifies the limitations associated with the bonded pull test, in accordance with the Section 6 title. Specifically, it clarifies that the bonded pull test is used when all components of the roofing system are fully or partially bonded, not when only the roof covering is bonded. The roof covering may be fully adhered, but if the underlying insulation or base sheets are mechanically attached the Bell Chamber test should be used rather than the bonded pull test. Finally, deflection is neither measured nor a condition of failure in TAS 114 Appendices C and J. The addition to Section 10.1.2 and the associated new Table 3 establish specific deflection limits when conducting the Bell Chamber test. These limits are consistent with those of FM Global Property Loss Prevention Data Sheet 1-52, from which TAS 124 was derived.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Improves understanding of uplift test provisions, which should positively affect local enforcement of code.

Impact to building and property owners relative to cost of compliance with code

No cost of compliance impact is expected because the changes are simply to clarify requirements.

Impact to industry relative to the cost of compliance with code

No cost of compliance impact is expected because the changes are simply to clarify requirements.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves understanding and applicability of uplift tests.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves understanding and applicability of uplift tests.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate. Clarifies applicability of tests.

Does not degrade the effectiveness of the code

Improves effectiveness of the code by providing better guidance for uplift tests applicability.

Alternate Language

2nd Comment Period

Proponent Aaron Phillips **Submitted** 7/20/2022 4:53:08 PM **Attachments** Yes

Rationale:

The original MOD did not include the units associated with the column headings in Table 3. This comment corrects that oversight. Changes from the original MOD are shown in underlined red text with yellow highlights.

R9922-A1

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The additional modification in this comment is a clarification with no impact.

Impact to building and property owners relative to cost of compliance with code

The additional modification in this comment is a clarification with no impact.

Impact to industry relative to the cost of compliance with code

The additional modification in this comment is a clarification with no impact.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Clarifying the units will ensure evaluations in accordance with TAS 124 are interpreted correctly.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Clarifying the units will ensure evaluations in accordance with TAS 124 are interpreted correctly.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The addition of units is not discriminatory.

Does not degrade the effectiveness of the code

Associating units with the proposed test pressures and maximum deflections ensures correct interpretation of test results.

R9922-A1Text Modification

[See attached file for Text of Modification]

R9922

Revise TAS 124 as shown below:

Revise 4.3 to clarify it does not address new construction.

4.3 When ~~new construction will require~~ a tear off of the existing roof system assembly is required, areas of existing roofing shall be removed to deck level. Sample assemblies shall be applied including a lifting panel, as detailed in Section 5.2 when the bonded pull test procedure is utilized. Sample panels shall be covered and waterproofed with a membrane roof covering to return the existing assembly to a waterproof condition.

Add new subsection within section 6.2 (Bell chamber tests) to clarify when the bell chamber protocol is to be used. Renumber subsequent sections.

6.2.1 The Bell chamber test is appropriate when the selected roofing system has been tested in accordance with TAS 114 Appendix C or Appendix J. The Bell Chamber test is not appropriate for systems tested in accordance with TAS 114 Appendix D.

6.2.~~1~~2

6.2.~~2~~3

6.2.~~3~~4

6.2.~~4~~5

Clarify the limitations for use of the bonded pull test.

6.3.1 Testing shall only be conducted on fully adhered roof coverings and when all other roofing system components are adhered and or partially adhered. This test is not appropriate when any of the roofing system components are mechanically attached.

Provide additional guidance for deflection limits for the Bell Chamber test.

10.1.2 Any roof system assembly which exhibits an upward deflection greater than ~~or equal to~~ 1 inch (25 mm) during any of the tests shall be considered as failing at the point where 1 inch (25 mm) of deflection is recorded. Refer to Table 3 for deflection limitations.

Insert new Table 3.

Table 3 Maximum Recommended Deflection for Adhered Covers on Steel Deck Roofs Before the Sample is Considered Suspect

Test Pressure (PSF)	Maximum Deflection (in.)
60 < P < 120	½ or 0.50
120 < P < 180	¾ or 0.75
180 < P < 225	15/16 or 0.94

Note: For roof assemblies in which thin topping boards or the roof cover are adhered to a substrate immediately below using ribbons of adhesive, use a maximum deflection of 1 in. (25 mm) to determine suspect test samples.

Revise TAS 124 as shown below:

Revise 4.3 to clarify it does not address new construction.

4.3 When ~~new construction will require~~ a tear off of the existing roof system assembly is required, areas of existing roofing shall be removed to deck level. Sample assemblies shall be applied including a lifting panel, as detailed in Section 5.2 when the bonded pull test procedure is utilized. Sample panels shall be covered and waterproofed with a membrane roof covering to return the existing assembly to a waterproof condition.

Add new subsection within section 6.2 (Bell chamber tests) to clarify when the bell chamber protocol is to be used. Renumber subsequent sections.

6.2.1 The Bell chamber test is appropriate when the selected roofing system has been tested in accordance with TAS 114 Appendix C or Appendix J. The Bell Chamber test is not appropriate for systems tested in accordance with TAS 114 Appendix D.

6.2.~~1~~2

6.2.~~2~~3

6.2.~~3~~4

6.2.~~4~~5

Clarify the limitations for use of the bonded pull test.

6.3.1 Testing shall only be conducted on fully adhered roof coverings and when all other roofing system components are adhered and or partially adhered. This test is not appropriate when any of the roofing system components are mechanically attached.

Provide additional guidance for deflection limits for the Bell Chamber test.

10.1.2 Any roof system assembly which exhibits an upward deflection greater than ~~or equal to~~ 1 inch (25 mm) during any of the tests shall be considered as failing at the point where 1 inch (25 mm) of deflection is recorded. Refer to Table 3 for deflection limitations.

Insert new Table 3.

Table 3 Maximum Recommended Deflection for Adhered Covers on Steel Deck Roofs Before the Sample is Considered Suspect

Test Pressure	Maximum Deflection
60 < P < 120	½ or 0.50
120 < P < 180	¾ or 0.75
180 < P < 225	15/16 or 0.94

Note: For roof assemblies in which thin topping boards or the roof cover are adhered to a substrate immediately below using ribbons of adhesive, use a maximum deflection of 1 in. (25 mm) to determine suspect test samples.

TAC: Roofing

Total Mods for **Roofing** in **Denied : 3**

Total Mods for report: 23

Sub Code: Building

21

R9919

Date Submitted	01/18/2022	**Section**	1518	**Proponent**	Aaron Phillips
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

Tile underlayments meet TAS 103 or TAS 104.

Rationale

This modification inserts a new pointer in Florida Building Code – Building Section 1518.4 to clarify that self-adhering and mechanically fastened underlayment for use with tile roof systems must comply with TAS 103 and TAS 104, respectively.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
No impact to local entity enforcement of code.
Impact to building and property owners relative to cost of compliance with code
This clarification should have no cost of compliance impact.
Impact to industry relative to the cost of compliance with code
This clarification should have no cost of compliance impact.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Clarifies existing requirements for underlayments used with tile roof systems to remove ambiguity.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Clarifies existing requirements for underlayments used with tile roof systems to remove ambiguity.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate.

Does not degrade the effectiveness of the code

Improves code effectiveness by reducing ambiguity.

Alternate Language

2nd Comment Period

R9919-A2

Proponent Gaspar Rodriguez **Submitted** 8/25/2022 7:28:32 AM **Attachments** Yes

Rationale:

This language is Miami-Dade's proposed mod for underlayment section.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

More options.

Impact to industry relative to the cost of compliance with code

None.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

2nd Comment Period

R9919-G1

Proponent Aaron Phillips Submitted 8/16/2022 4:45:29 PM Attachments No

Comment:

At the June meeting, R9919 received a preliminary recommendation of "denied." Reasons cited for denial were conflict with R10176 (which deletes section 1518.4) and to encourage interaction among the stakeholders working on the underlayment provisions. This comment respectfully requests the TAC reconsider that recommendation and support this proposal. Interactions among the stakeholders with proposals to change underlayment provisions are ongoing. This proposal provides a minor improvement to existing code language that can be employed if other, more ambitious, modifications do not advance in the process.

~~**1518.2 Underlayments.** Underlayment shall be as defined in Section 1513. Underlayment shall be installed in compliance with the roofing component product approval and shall be in compliance with the following minimum requirements:~~

~~**1518.2.1** Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6 inch (152 mm) spacing at the overlaps.~~

~~**1518.2.2** Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.~~

~~**1518.2.3** Tin caps and nails or cap nails shall be as defined in Section 1517.5.2.~~

~~**1518.2.4** Underlayment nails shall be as defined in Section 1517.5.1.~~

1518.2 Underlayment. Underlayment shall be as defined in Section 1513. Underlayment shall be installed in compliance with the roofing component product approval and shall be in compliance with the following minimum requirements:

1518.2.1 If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor sheet, attached in compliance with this Section.

1518.2.2 Self-adhering underlayment intended for use under tile systems shall be an Approved underlayment in accordance with TAS 103. Mechanically fastened underlayment intended for use under tile systems shall be an Approved underlayment in accordance with TAS 104.

1518.2.3 Underlayment shall be attached in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps, all end laps shall be a minimum of 6 inches (152 mm).

1518.2.4 Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.

1518.2.5 Fasteners shall be as defined in Section 1517.5.

~~**1518.3** If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor sheet, attached in compliance with Section 1518.2.1.~~

1518.3 Underlayment Products. All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following:

1. ASTM D226, Type **II** or ASTM D8257 or ASTM D4869 Type **III**, Type **IV**

2. ASTM D2626 coated base sheet

~~**1518.4** All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following: (1) a double layer of an ASTM D226 Type **I**, with a 19-inch (483 mm) headlap; or (2) a single layer of an ASTM D226, Type **II** with a 4-inch (102 mm) headlap; or (3) a single layer of an ASTM D2626 coated base sheet with a 4-inch (102 mm) headlap, and (4) all endlaps shall be a minimum of 6 inches (152 mm).~~

1518.4 Underlayment Application. Underlayment for asphalt shingles, metal roof shingles, slate and slate-type shingles, and metal roof panels shall comply with one of the following methods:

1. All joints in structural panel roof sheathing or decking shall be covered with a 3 ¾ inch (102 mm) to 6 inch (153 mm) wide strip of self-adhering polymer modified bitumen tape complying with ASTM D1970 or a flexible flashing tape complying with AAMA 711, Level 3 [for exposure up to 176°F (80°C)], applied directly to the sheathing or decking. The entire deck and taped joints shall be covered with one of the underlayment systems indicated in item 2 approved for the roof covering to be applied to the roof.

   Exception:
   Roof slopes 4:12 or greater can have underlayment installed with 4-inch side lap.

2. Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be attached to a nailable deck with corrosion-resistant fasteners as defined in Section 1517.5 with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c.

Revise FBC-Building as shown:

1518.4 All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following: (1) a double layer of an ASTM D226 Type I, with a 19-inch (483 mm) headlap; or (2) a single layer of an ASTM D226, Type II with a 4-inch (102 mm) headlap or (3) a single layer of an ASTM D2626 coated base sheet with a 4-inch (102 mm) headlap, and (4) all endlaps shall be a minimum of 6 inches (152 mm). Self-adhering underlayment intended for use under tile systems shall be an Approved underlayment in accordance with TAS 103. Mechanically fastened underlayment intended for use under tile systems shall be an Approved underlayment in accordance with TAS 104.

TAC: Roofing

Total Mods for **Roofing** in **Denied : 3**

Total Mods for report: 23

Sub Code: Building

22

R10271

Date Submitted	02/12/2022	**Section**	1523.6.5.2.4.1.1	**Proponent**	Gaspar Rodriguez
Chapter	15	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

Replace FM 4471 with TAS 114 as an alternate test standard.

Rationale

FM 4471 has been discontinued by FM, however, TAS 114 has always been an alternative FM 4471.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
None.
Impact to building and property owners relative to cost of compliance with code
None.
Impact to industry relative to the cost of compliance with code
Allows manufacturers to continue to use recently performed FM 4471 test.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Maintains current code.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Maintains current code.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate.
Does not degrade the effectiveness of the code
Maintains current code.

Alternate Language

2nd Comment Period

R10271-A1

Proponent Gaspar Rodriguez **Submitted** 8/19/2022 1:42:50 PM **Attachments** Yes

Rationale:

This mod is to update Section 1525 HVHZ Permit Application.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Corelates ASCE7-22

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Correct

Does not degrade the effectiveness of the code

NO

2nd Comment Period

R10271-G1

Proponent Gaspar Rodriguez Submitted 8/23/2022 8:29:29 AM Attachments No

Comment:

I would like to withdraw this mod, the proposed TAS substitute is hardly ever used. Therefore, to not clutter up the code we would ask it be withdrawn.

SECTION1525
HIGH-VELOCITY HURRICANE ZONES—UNIFORM PERMIT APPLICATION

Florida Building Code 7th Edition (2020)

High-Velocity Hurricane Zone Uniform Permit Application Form

INSTRUCTION PAGE

COMPLETE THE NECESSARY SECTIONS OF THE UNIFORM ROOFING PERMIT APPLICATION FORM AND ATTACH THE REQUIRED DOCUMENTS AS NOTED BELOW:

Roof System	Required Sections of the Permit Application Form	Attachments Required See List Below
Low Slope Application	A, B, C	1,2,3,4,5,6,7
Prescriptive BUR-RAS 150	A, B, C	4,5,6,7
Asphaltic Shingles	A, B, D	1,2,4,5,6,7
Concrete or Clay Tile	A, B, D, E	1,2,3,4,5,6,7
Metal Roofs	A, B, D	1,2,3,4,5,6,7
Wood Shingles and Shakes	A, B, D	1,2,4,5,6,7
Other	As Applicable	1,2,3,4,5,6,7

ATTACHMENTS REQUIRED:

1.	Fire Directory Listing Page
2.	From Product Approval: Front Page Specific System Description Specific System Limitations General Limitations Applicable Detail Drawings
3.	Design Calculations per Chapter 16, or if applicable, RAS 127 or RAS 128
4.	Other Component of Product Approval

5.	Municipal Permit Application
6.	Owners Notification for Roofing Considerations (Reroofing Only)
7.	Any Required Roof Testing/Calculation Documentation

Section D

(Steep Sloped Roof System)

Roof System Manufacturer: _____
Notice of Acceptance Number: _____
Minimum Design Wind Pressures, If Applicable (From RAS 127 or Calculations): Zone 1: ___ Zone 2e: ____ ~~Zone 2n:~~ ____ ~~Zone 2r:~~ ____ Zone 3e: ____ ~~Zone 3r:~~ ____

Section E

(Tile Calculations)

For Moment based tile systems, choose either Method 1 or 2. Compare the values for M_r with the values from M_f. If the M_f values are greater than or equal to the M_r values, for each area of the roof, then the tile attachment method is acceptable.

Method 1 "Moment Based Tile Calculations Per RAS 127"

(Zone 1: _____ × ? =) – Mg: = M_{r1}	Product Approval M_f _____
(Zone 2e: _____ × ? =) – Mg: = M_{r2e}	Product Approval M_f _____
(Zone 2n: _____ × ? =) – Mg: = M_{r2n}	Product Approval M_f _____
(Zone 2r: _____ × ? =) – Mg: = M_{r2r}	Product Approval M_f _____
(Zone 3e: _____ × ? =) – Mg: = M_{r3e}	Product Approval M_f _____
(Zone 3r: _____ × ? =) – Mg: = M_{r3r}	Product Approval M_f _____

Method 2 "Simplified Tile Calculations Per Table Below"

Required Moment of Resistance (M_r) From Table Below _____ Product Approval M_f_____

M_r required Moment Resistance*					
Mean Roof Height Roof Slope	15'	20'	25'	30'	40'
2:12	34.4 -46	36.5 -47.6	38.2 -49.4	39.7 -50.9	42.2 -53.3
3:12	32.2 -47.3	34.4 -48.9	36.0 -50.7	37.4 -52.2	39.8 -54.6
4:12	30.4 -47.2	32.2 -52.0	33.8 -53.8	35.1 -55.3	37.3 -57.9
5:12	28.4 -39.8	30.1 -41.5	31.6 -42.8	32.8 -43.7	34.9 -45.7
6:12	26.4 -39.6	28.0 -40.6	29.4 -41.9	30.5 -42.9	32.4 -44.8
7:12	24.4 -39.4	25.9 -40.3	27.1 -41.6	28.2 -42.6	30.0 -44.6

*Must be used in conjunction with a list of moment based tile systems endorsed by the Broward County Board of Rules and Appeals.

Method 2 may be utilized within Broward County Exposure C only.

-

For Uplift based tile systems use Method 3. Compare the values for F' with the values for F_r. If the F' values are greater than or equal to the F_r values, for each area of the roof, then the tile attachment method is acceptable.

Method 3 “Uplift Based Tile Calculations Per RAS 127”

(Zone 1: ___ × L ___ = ___ × w: = ___) – W: ___ × cos r ___ = F_{r1} ___	Product Approval F' ___
(Zone 2e: ___ × L ___ = ___ × w: = ___) – W: ___ × cos r ___ = F_{r2e} ___	Product Approval F' ___
~~(Zone 2n: ___ × L ___ = ___ × w: = ___) – W: ___ × cos r ___ = F_{r2n}~~	~~Product Approval F'~~ ___
~~(Zone 2r: ___ × L ___ = ___ × w: = ___) – W: ___ × cos r ___ = F_{r2r}~~	~~Product Approval F'~~ ___
(Zone 3e: ___ × L ___ = ___ × w: = ___) – W: ___ × cos r ___ = F_{r3e} ___	Product Approval F' ___
~~(Zone 3r: ___ × L ___ = ___ × w: = ___) W: ___ × cos r ___ = F_{r3r}~~	~~Product Approval F'~~ ___

Where to Obtain Information		
Description	Symbol	Where to find
Design Pressure	Zones 1, 2e, ~~2n, 2r,~~ 3e, ~~3r~~	From applicable table in RAS 127 or by an engineering analysis prepared by PE based on ASCE 7
Mean Roof Height	H	Job Site
Roof Slope	?	Job Site
Aerodynamic Multiplier	?	Product Approval
Restoring Moment due to Gravity	M_g	Product Approval
Attachment Resistance	M_f	Product Approval
Required Moment Resistance	M_g	Calculated
Minimum Attachment Resistance	F'	Product Approval
Required Uplift Resistance	F_r	Calculated

Average Tile Weight	W	Product Approval
Tile Dimensions	L = length W = width	Product Approval
All calculations must be submitted to the building official at the time of permit application.		

1523.6.5.2.4.1.1 Standing seam metal roof panel systems that pass the requirements of the Static Water Leakage Test criteria of ~~FM 4471~~TAS 114, Appendix G or ASTM E2140 shall be permitted to be installed to a minimum slope of 1:12.

TAC: Roofing

Total Mods for **Roofing** in **Denied : 3**

Total Mods for report: 23

Sub Code: Test Protocols

23

R10093

Date Submitted	02/05/2022	**Section**	7	**Proponent**	Gaspar Rodriguez
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises test procedure for self-adhered underlayment used on roof tile installations.

Rationale

This modification provides improved testing procedures that verify self-adhered underlayment installed on mechanically fastened anchor sheet meet the minimum requirements established by code. The changes are intended to more accurately reflect the performance of self-adhered underlayment when used as roof tile underlayment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

Product performance testing is an ongoing cost for product manufacturers, this testing will help manufacturers in verification of their product performance.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, improves the verification of product performance.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, improves the verification of product performance.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade, strengthens verification of product performance.

Alternate Language

2nd Comment Period

Proponent Gaspar Rodriguez **Submitted** 8/25/2022 8:19:07 AM **Attachments** Yes

R10093-A1

Rationale:

This mod provides improved testing procedures to require underlayment test to failure and then receive a Maximum Design Pressure Rating.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

Product performance testing is an ongoing cost for product manufacturers verifying their product's performance.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade.

7.1 This test covers the determination of the wind uplift resistance of materials specified in Section 1 of this Protocol in accordance with TAS 114 Appendix C~~124~~ except as noted below.

7.1.1 Test Deck Construction

7.1.1.1 Test is being conducted on materials noted in Section 1 of this Protocol; therefore, any reference to "roof membrane" in TAS 114 appendix C~~124~~ shall be regarded as 'underlayment.'

7.1.1.2 Three (3) ~~Four (4)~~ 6'~~8"~~ × 10'~~8"~~ test decks shall be constructed of 40/20 19/32 in. APA Rated Plywood Sheathing attached to wood joists spaced 24 o.c. ~~Each test deck shall consist of four (4) panels of said sheathing, the corners of which shall meet at the center of each test deck, leaving a 1/8 in. gap between panels.~~ Plywood Sheathing shall be attached to wood joists with 8d ring shank nails spaced 6" o.c. at the panel edges and at intermediate supports.

7.1.1.3 To each test deck ~~A~~adhere one (1) layer of the proposed TAS 103 self-adhered underlayment onto an approved or prescriptive, mechanically attached anchor sheet, ~~to~~ which will be included within the product approval's scope of use. ~~to each test deck.~~

7.1.2 Procedure

7.1.2.1 Test shall be performed in an approved laboratory. ~~test not a field test; therefore, any instruction in TAS 124 which references "building or outdoor conditions" shall be regarded as "laboratory conditions."~~

7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft$_2$ and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft$_2$, holding each incremented pressure for one (1) minute, until ~~the negative pressure has been held at 90 lbf/ft$_2$ for one (1) minute~~ failure occurs.

7.1.3 Report results in accordance with TAS 114 Appendix C and as specified herein.

7.1.3.1 Any test specimen which exhibits any significant separation between the membrane and tested ~~substrate anchor sheet~~shall be considered as failing ~~the wind uplift test~~. Any test specimen which exhibits fastener pull out of the substrate or fastener pull through of the anchor sheet shall be considered as failing.

7.1 This test covers the determination of the wind uplift resistance of materials specified in Section 1 of this Protocol in accordance with TAS 114 Appendix C~~124~~ except as noted below.

7.1.1 Test Deck Construction

7.1.1.1 Test is being conducted on materials noted in Section 1 of this Protocol; therefore, any reference to "roof membrane" in TAS 114 appendix C~~124~~ shall be regarded as 'underlayment.'

7.1.1.2 Three (3) ~~Four (4)~~ 6'~~8"~~ × 10'~~8"~~ test decks shall be constructed of 40/20 $^{19}/_{32}$ in. APA Rated Plywood Sheathing attached to wood joists spaced 24 o.c. ~~Each test deck shall consist of four (4) panels of said sheathing, the corners of which shall meet at the center of each test deck, leaving a $^{1}/_{8}$ in. gap between panels.~~ Plywood Sheathing shall be attached to wood joists with 8d ring shank nails spaced 6" o.c. at the panel edges and at intermediate supports.

7.1.1.3 To each test deck ~~A~~adhere one (1) layer of the proposed TAS 103 self-adhered underlayment onto a mechanically attached, approved or prescriptive anchor sheet, which will be included within the product approval's scope of use. ~~to each test deck.~~

7.1.2 Procedure

7.1.2.1 Test shall be performed in an approved laboratory. ~~test not a field test; therefore, any instruction in TAS 124 which references "building or outdoor conditions" shall be regarded as "laboratory conditions."~~

7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft$_2$ and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft$_2$, holding each incremented pressure for one (1) minute, until the negative pressure has been held at 90 lbf/ft$_2$ for one (1) minute.

7.1.3 Report

7.1.3.1 Any test specimen which exhibits any significant separation between the membrane and tested substrate shall be considered as failing the wind uplift test.