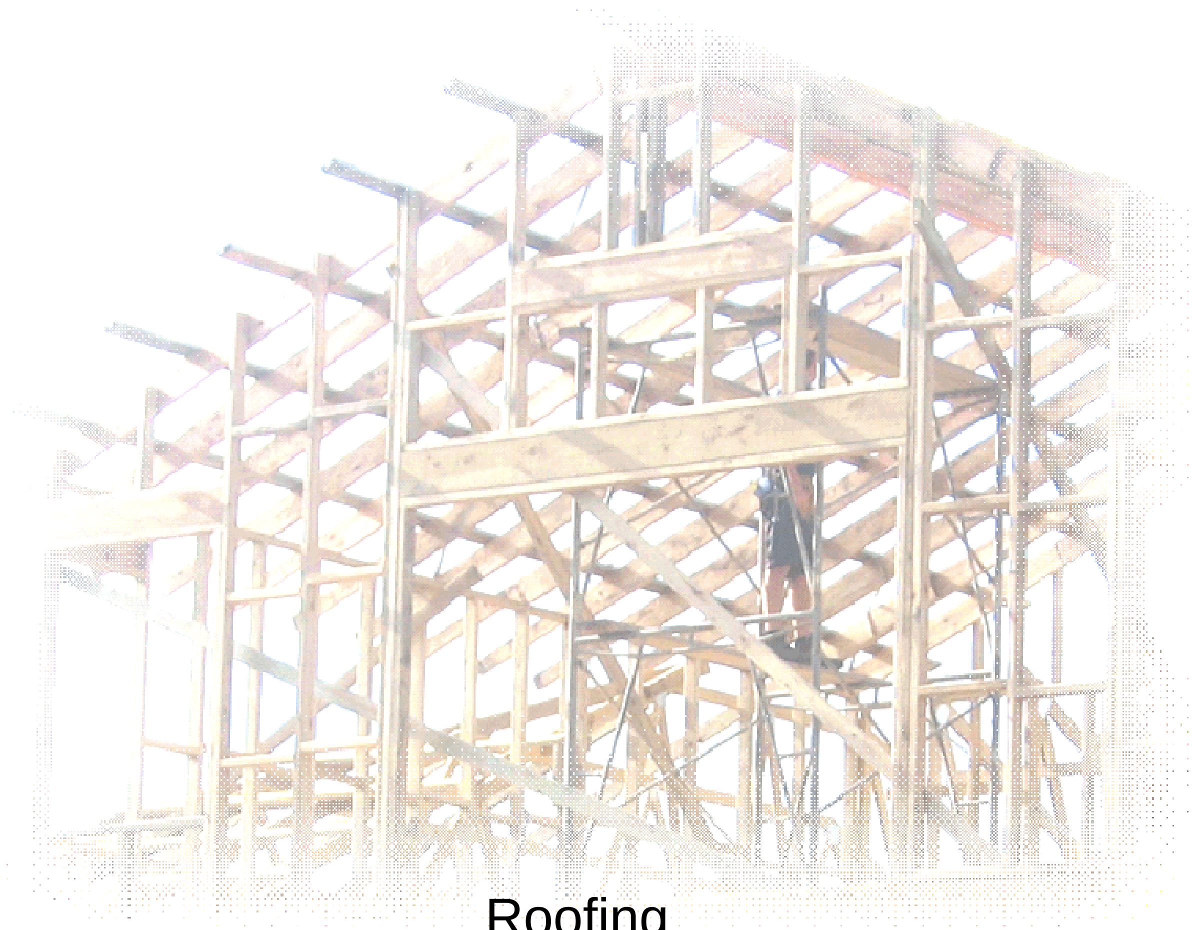

Roofing

PART 1 OF 1

WITH COMMENTS

Proposed Code Modifications

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

TAC: Roofing

Total Mods for **Roofing** in **Approved as Submitted: 18**

Total Mods for report: 80

Sub Code: Building

R5360

Date Submitted	7/19/2012	**Section**	1507.2.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria. Provide correct Types for previously approved ASTM D 4869.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. Provide correct Types for previously Commission approved ASTM D 4869.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5360-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact to local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This proposal will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

Unless otherwise noted, required underlayment shall conform to ASTM D 226, Type I <u>or Type</u> <u>II</u>, or ASTM D 4869 Type~~I~~ <u>II or Type IV</u> or ASTM D 6757.

Unless otherwise noted, required underlayment shall conform to ASTM D 226~~, Type I or~~ Type II, ~~or~~ ASTM D 4869 Type ~~II or~~ Type IV or ASTM D 6757.

R5562

Date Submitted	7/21/2012	**Section**	1507.2.8 Underlayment applicatio	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5562-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**1507.2.8 Underlayment application.**~~

~~For roof slopes from two units vertical in 12 units horizontal (17-percent slope) and up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a minimum 19-inch-wide (483 mm) strip of underlayment felt parallel with 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), by fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

1507.2.8 Underlayment application.

Underlayment shall be installed using one of the following methods:

1. For roof slopes from two units vertical in 12 units horizontal (17-percent slope), and less than four units vertical in 12 units horizontal (33-percent slope). Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757 and shall be two layers applied in the following manner. 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater. Underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757 and shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.2.8 Underlayment application.

Underlayment shall be installed using one of the following methods:

1. For roof slopes from two units vertical in 12 units horizontal (17-percent slope), and less than four units vertical in 12 units horizontal (33-percent slope). Underlayment shall comply with ASTM D 226, ~~Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757 and shall be two layers applied in the following manner. 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater. Underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757 and shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch round plastic cap, meta cap nails or nails and tin tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations. End laps shall be offset by 6 feet.

R5563

Date Submitted	7/21/2012	**Section**	1507.4.5 Underlayment and high w	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5563-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

1507.4.5 Underlayment and high wind.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~ Reserved.

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

1507.4.5.1 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

1507.4.5.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.4.5.1 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

1507.4.5.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5564

Date Submitted	7/21/2012	**Section**	1507.5.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5564-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**1507.5.3 Underlayment**~~

~~Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 1970 or ASTM D 4869.~~

1507.5.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

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1507.5.3.1 Underlayment and high wind.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.5.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer’s recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.5.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

1507.5.3.1 Underlayment and high wind. Reserved.

1507.5.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5565

Date Submitted	7/21/2012	**Section**	1507.6.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments **No** | **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5565-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**1507.6.3**~~

~~Underlayment shall comply with ASTM D 226, Type I or Type II orASTM D 1970 or ASTM D 4869.~~

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1507.6.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

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1507.6.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.6.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.6.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

1507.6.3.1 Underlayment and high wind. Reserved.

1507.6.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5566

Date Submitted	7/21/2012	**Section**	1507.7.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5566-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**1507.7.3 Underlayment.**~~

~~**Underlayment shall comply with ASTM D 226, Type I II or ASTM D 4869 Type II.**~~

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1507.7.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

-

1507.7.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.7.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

1507.7.3.1 Underlayment and high wind. Reserved.

1507.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5567

Date Submitted	7/21/2012	**Section**	1507.8.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5567-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**1507.8.3 Underlayment.**~~

~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869 Type II.~~

-

1507.8.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

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1507.8.3.1 Underlayment and high wind.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

1507.8.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV.

1507.8.3.1 Underlayment and high wind. Reserved.

1507.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

R5568

Date Submitted	7/21/2012	**Section**	1507.9.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5568-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

R5568-G1

Proponent siegrist joe **Submitted** 12/5/2012 **Attachments** No

Comment:

I oppose the expansion of wind zone 4 beyond that intended by ASTM E 1996.

Thank you

~~**1507.9.3 Underlayment.**~~

~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869 Type II.~~

-

1507.9.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

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1507.9.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.9.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

1507.9.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV.

1507.9.3.1 Underlayment and high wind. Reserved.

1507.9.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). <u>The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped <u>4</u> 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm). <u>The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u>

R5937

Date Submitted	8/1/2012	**Section**	202	**Proponent**	Ken Cureton
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Modify SECTION 202 (Roofing TAC)

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Existing Building Code (IEBC) base code with Florida specific requirements in accordance with the Commission's approved code change process for the update to the 2013 Florida Building Code. The proposed modification is necessary in order to maintain compliance with Florida Statutes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

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

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Requirements

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

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

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

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

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

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

The proposed code change was submitted in accordance with the Commission's update process for the 2013 FBC in order to maintain compliance with Florida Statutes.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5937-G3

Proponent Ken Cureton **Submitted** 12/12/2012 **Attachments** No

Comment:

If Mod R5554 is supported by the TAC, the Terms / Definitions included in this Mod must also be included in Chapter 2 of the Florida Building Code, Residential

2nd Comment Period 10/31/2012 - 12/14/2012

R5937-G4

Proponent Mark Zehnal **Submitted** 12/12/2012 **Attachments** No

Comment:

Move these two definitions to the Florida Residential Code Section R202 Definitions to correlate with the mitigation requirements which are to be moved to the Florida Residential Code as per approved code modification 5554.

1st Comment Period History 08/09/2012 - 09/23/2012

R5937-G1

Proponent Ken Cureton **Submitted** 9/21/2012 **Attachments** No

Comment:

The proposal provides for provisions with regard to wind mitigation as per 553.844 FS.

1st Comment Period History 08/09/2012 - 09/23/2012

R5937-G2

Proponent BOAF CDC **Submitted** 9/23/2012 **Attachments** No

Comment:

1. The definition of Roof Section is unnecessary.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

2. The definition of Site built single- family residential structures. This is part of the “Wind Mitigation”. However the amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

No Statute or data was supplied.

Modify **SECTION 202** as follows:

ROOF SECTION. A separating or division of a roof area by existing expansion joints, parapet walls, flashing (excluding valley), difference of elevation (excluding hips and ridges), roof type or legal description; not including the roof area required for a proper tie-off with an existing system.

Site built single- family residential structures. This term shall mean site built single family detached residential structures.

R5940

Date Submitted	8/1/2012	**Section**	412	**Proponent**	Ken Cureton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

None

Summary of Modification

Add SECTION 412

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Existing Building Code (IEBC) base code with Florida specific requirements in accordance with the Commission's approved code change process for the update to the 2013 Florida Building Code. The proposed modification is necessary in order to provide correlations with other Sub-Codes and / or other chapters of the Florida Building Code – Existing Building

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

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

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Requirements

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

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

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

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

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

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

The proposed code change was submitted in accordance with the Commission's update process for the 2013 FBC in order to provide correlations with other Sub-Codes and / or other chapters of the Florida Building Code – Existing Building

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5940-G2

Proponent	Ken Cureton	**Submitted**	12/12/2012	**Attachments**	No

Comment:

If Mod R5554 is supported by the TAC, the Reference Section 711 of this Mod should be changed to Section 708.

2nd Comment Period 10/31/2012 - 12/14/2012

R5940-G3

Proponent	Mark Zehnal	**Submitted**	12/12/2012	**Attachments**	No

Comment:

Correct Section from 412 to 411 and change code section reference found in 411.1 from 711 to 708 to correlate with mitigation requirements which are to be moved to the Florida Residential Code as per approved code modification 5554 and 5239 Alternate Language.

1st Comment Period History 08/09/2012 - 09/23/2012

R5940-G1

Proponent	BOAF CDC	**Submitted**	9/23/2012	**Attachments**	No

Comment:

The provision this is based upon has sunset with the other Florida Changes to the 2010 FBC.

The section numbering is inconsistent.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

ADD - **SECTION 412 - RE-ROOFING** as follows:

SECTION 412

REROOFING

411.1 General. The provisions of Section 711 – Reroofing of this code, shall govern requirements of all reroofing work performed under this code.

R5239

Date Submitted	7/17/2012	**Section**	711	**Proponent**	Mark Zehnal
Chapter	7	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Move current Florida-specific criteria to Residential Code.

Rationale

Currently the only Foundation Code references that provide guidance specific to residential reroofing are found in the Foundation Residential Code. Chapter 6 of the Florida Existing Building Code contains supplementary regulatory requirements exclusive to residential reroofing not contained within in the Foundation Code. However, these supplementary regulatory requirements must be combined with the materials and installation procedures of the Residential Code “611.1- Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential”.
The purpose of this code modification is to create uniformity by following the Foundation Code model through the consolidation of all the associated roofing/reroofing code sections into one volume providing a single location for contractors, design professionals and code officials to find all code information related to the evaluation and installation of residential reroofing including the mitigation requirements specific to site-built single family residential structures in the Residential Code volume.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5239-A1

Proponent Mark Zehnal **Submitted** 12/12/2012 **Attachments** Yes

Rationale

Currently the only Foundation Code references that provide guidance specific to residential reroofing are found in the Foundation Residential Code. Chapter 6 of the Florida Existing Building Code contains supplementary regulatory requirements exclusive to residential reroofing not contained within in the Foundation Code. However, these supplementary regulatory requirements must be combined with the materials and installation procedures of the Residential Code “611.1- Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential”. The purpose of this code modification is to create uniformity by following the Foundation Code model through the consolidation of all the associated roofing/reroofing code sections into one volume providing a single location for contractors, design professionals and code officials to find all code information related to the evaluation and installation of residential reroofing including the mitigation requirements specific to site-built single family residential structures in the Residential Code volume.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5239-G1

Proponent BOAF CDC **Submitted** 9/23/2012 **Attachments** No

Comment:

The provision this is based upon has sunset with the other Florida Changes to the 2010 FBC

Because a code provision was in the 2010 FBC does not make it Florida specific.
The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

SECTION 711 REROOFING

711.1 General.

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential. Roof repairs to existing roofs and roof coverings shall comply with the provisions of ~~this code~~ Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential.

~~Exception: Reroofing shall not be required to meet the minimum design slope requirement of 1/4:12 in Section 1507 of the Florida Building Code, Building for roofs that provide positive roof drainage (high-velocity hurricane zones shall comply with Sections 1515.2.2.1 and 1515.2.2.2 of the Florida Building Code, Building).~~

-

~~711.1.1~~

-

~~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 entire roofing system or roof section conforms to requirements of this code.~~

-

~~711.2 Structural and construction loads.~~

-

~~The structural roof components shall be capable of supporting the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.~~

-

~~711.3 Recovering versus replacement.~~

-

~~New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions occur:~~

~~1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~

~~2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.~~

~~3. Where the existing roof has two or more applications of any type of roof covering.~~

~~4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining materials secured down before applying additional roofing.~~

~~5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section 1504.1 can not be met.~~

-

~~Exceptions:~~

~~1. Building and structures located within the High-Velocity Hurricane Zone shall comply with the provisions of Sections 1512 through 1525 of the Florida Building Code, Building.~~

~~2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.~~

~~3. Reserved.~~

~~4. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.~~

~~5. Roof Coating. Application of elastomeric and or maintenance coating systems over existing asphalt shingles shall be in accordance with the shingle manufacturer's approved installation instructions.~~

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~~711.4 Roof recovering.~~

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

-

~~711.5 Reinstallation of materials.~~

-

~~Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counter flashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled (high-velocity hurricane zones shall comply with Sections 1512 through 1525 of the Florida Building Code, Building).~~

-

~~711.6 Flashings.~~

-

~~Flashings shall be reconstructed in accordance with roof covering manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation (high-velocity hurricane zones shall comply with Sections 1512 through 1525 of the Florida Building Code, Building).~~

~~711.7~~

-

~~When a roof covering on an existing site-built single- family residential structure is removed and replaced, the following procedures shall be permitted to be performed by the roofing contractor:~~

~~(a) Roof-decking attachment shall be as required by Section 711.7.1.~~

~~(b) A secondary water barrier shall be provided as required by Section 711.7.2.~~

-

~~Exception: Single family residential structures permitted subject to the Florida Building Code are not required to comply with this section.~~

-

~~711.7.1 Roof decking attachment for site-built single- family residential structures.~~

-

~~For site-built single-family residential structures the fastening shall be in accordance with Section 711.7.1.1 or 711.7.1.2 as appropriate for the existing construction. 8d nails shall be a minimum of 0.113 inch (2.9 mm) in diameter and shall be a minimum of 21/4 inch (57 mm) long to qualify for the provisions of this section for existing nails regardless of head shape or head diameter.~~

-

~~711.7.1.1~~

-

~~Roof decking consisting of sawn lumber or wood planks up to 12" wide and secured with at least two nails (minimum size 8d) to each roof framing member it crosses shall be deemed to be sufficiently connected. Sawn lumber or wood plank decking secured with smaller fasteners than 8d nails or with fewer than two nails (minimum size 8d) to each framing member it crosses shall be deemed sufficiently connected if fasteners are added such that two clipped head, round head, or ring shank nails (minimum size 8d) are in place on each framing member it crosses.~~

-

~~711.7.1.2~~

-

~~For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table 711.7.1.2 are deemed to comply with the requirements of Section 706.3, Florida Building Code, Existing Building for the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to comply with the requirements of Section 706.3, Florida Building Code, Existing Building, provided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.~~

-

~~Supplemental fasteners as required by Table 711.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:~~

~~1. 0.113-inch nominal shank diameter.~~

~~2. Ring diameter a minimum of 0.012-inch greater than shank diameter.~~

~~3. 16 to 20 rings per inch.~~

~~4. A minimum 0.280-inch full round head diameter.~~

~~5. Ring shank to extend a minimum of 11/2 inches from the tip of the nail.~~

~~6. Minimum 2-1/4 inch nail length.~~

-

~~TABLE 711.7.1.2 SUPPLEMENT FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING~~

~~EXISTING FASTENERS~~	~~EXISTING SPACING~~	~~V_{asd} 110 MPH OR LESS SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN~~	~~V_{asd} GREATER THAN 110 MPH SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN~~
~~Staples or 6d~~	~~Any~~	~~6" o.c.[b]~~	~~6" o.c.[b]~~
~~8d clipped head, round head, smooth or ring shank~~	~~6? o.c. or less~~	~~None necessary~~	~~None necessary~~
~~8d clipped head, round head, smooth or ring shank~~	~~Greater than 6? o.c.~~	~~6" o.c.[a]~~	~~6" o.c.[a]~~

-

~~For SI: 1 inch = 25.4 mm.~~

~~a. Maximum spacing determined based on existing fasteners and supplemental fasteners.~~

~~b. Maximum spacing determined based on supplemental fasteners only.~~

~~c. Vasd shall be determined in accordance with Section 1609.3.1 of the Florida Building Code, Building or Section R301.2.1.3 of the Florida Building Code, Residential.~~

-

~~711.7.2 Roof secondary water barrier for site-built single family residential structures.~~

-

~~A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:~~

-

~~1. In either HVHZ or Non-HVHZ regions:~~

~~a) All joints in structural panel roof sheathing or decking shall be covered with a minimum 4 inch (102 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The deck and self adhering 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 Sections R4402.7.2, R4402.7.3, or R4402.7.4 of the Florida Building Code, Residential. (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) The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions. No additional underlayment shall be required on top of this sheet for new installations.~~

~~b) An underlayment system approved for the particular roof covering shall be applied with the following modification:~~

~~(1) For roof slopes that require one layer of underlayment, a layer of approved asphalt impregnated ASTM D 226 Type I or Type II underlayment or approved synthetic underlayment shall be installed. The felt is to be fastened with 1 inch (25 mm) round plastic cap or metal cap nails, attached to a nailable deck in a grid pattern of 12 inches (305 mm) staggered between the overlaps, with 6-inch (152 mm) spacing at the overlaps. The synthetic underlayment shall be fastened in accordance with the manufacturer's recommendations.~~

~~(2) For roof slopes that require two layers of underlayment, an approved asphalt impregnated ASTM D 226 Type I or Type II underlayment shall be installed in a shingle–fashion and lapped 19 inch (483 mm) and fastened as~~

~~described above. An approved synthetic underlayment shall be installed in accordance with the manufacturer's installation instruction. (No additional underlayment shall be required over the top of this sheet.)~~

-

~~Exceptions:~~

~~1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section 711.7.2 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 711.7.2 for Secondary Water Barriers.~~

-

~~711.8~~

-

~~When a roof covering on an existing site-built single-family residential structure is removed and replaced on a building that is located in the wind-borne debris region as defined in the Florida Building Code, Building and that has an insured value of $300,000 or more or, if the building is uninsured or for which documentation of insured value is not presented, has a just valuation for the structure for purposes of ad valorem taxation of $300,000 or more:~~

~~(a) Roof to wall connections shall be improved as required by Section 711.8.1~~

~~(b) Mandated retrofits of the roof-to-wall connection shall not be required beyond a 15 percent increase in the cost of re-roofing.~~

-

~~Exception: Single-family residential structures permitted subject to the Florida Building Code are not required to comply with this section.~~

~~711.8.1 Roof-to-wall connections for site-built single-family residential structures.~~

-

~~Where required by Section 711.8, the intersection of roof framing with the wall below shall provide sufficient resistance to meet the uplift loads specified in Table 711.8.1 either because of existing conditions or through retrofit measures. As an alternative to an engineered design, the prescriptive retrofit solutions provided in Sections 711.8.1.1 through 711.8.1.7 shall be accepted as meeting the mandated roof-to-wall retrofit requirements.~~

-

~~Exceptions:~~

~~1. Where it can be demonstrated (by code adoption date documentation and permit issuance date) that roof-to-wall connections and/or roof-to-foundation continuous load path requirements were required at the time of original construction.~~

~~2. Roof-to-wall connections shall not be required unless evaluation and installation of connections at gable ends or all corners can be completed for 15 percent of the cost of roof replacement.~~

-

~~TABLE 711.8.1 REQUIRED UPLIFT CAPACITIES FOR ROOF-TO-WALL CONNECTIONSa, b (POUNDS PER LINEAR FOOT)~~

-

~~ULTIMATE DESIGN WIND SPEED, V_{ult}~~	~~ROOF SPAN (feet)~~								
	~~12~~	~~20~~	~~24~~	~~28~~	~~32~~	~~36~~	~~40~~	~~OVERHANGS~~	
~~Within 6 feet of building corner~~	~~85~~	~~-69.85~~	~~-116.42~~	~~-139.70~~	~~-162.99~~	~~-186.27~~	~~-209.55~~	~~-232.84~~	~~-27~~
	~~90~~	~~-82.67~~	~~-137.78~~	~~-165.34~~	~~-192.90~~	~~-220.45~~	~~-248.01~~	~~-275.57~~	~~-30.3~~
	~~100~~	~~-110.51~~	~~-184.18~~	~~-221.01~~	~~-257.85~~	~~-294.68~~	~~-331.52~~	~~-368.36~~	~~-37.4~~
	~~110~~	~~-141.27~~	~~-235.45~~	~~-282.55~~	~~-329.64~~	~~-376.73~~	~~-423.82~~	~~-470.91~~	~~-45.3~~
	~~120~~	~~-174.97~~	~~-291.62~~	~~-349.94~~	~~-408.26~~	~~-466.59~~	~~-524.91~~	~~-583.23~~	~~-53.9~~
	~~130~~	~~-211.60~~	~~-352.66~~	~~-423.19~~	~~-493.72~~	~~-564.26~~	~~-634.79~~	~~-705.32~~	~~-63.2~~
	~~140~~	~~-251.15~~	~~-418.59~~	~~-502.31~~	~~-586.02~~	~~-669.74~~	~~-753.46~~	~~-837.18~~	~~-73.3~~
	~~150~~	293.64	489.40	~~-587.28~~	685.16	783.04	880.92	978.80	~~-84.2~~
	~~170~~	~~-387.40~~	~~-645.67~~	~~-774.81~~	~~-903.94~~	~~-1033.08~~	~~-1162.21~~	~~-1291.35~~	~~-108~~
~~Greater than 6 feet from building corner~~	~~85~~	~~-39.10~~	~~-65.17~~	~~-78.20~~	~~-91.24~~	~~-104.27~~	~~-117.30~~	~~-130.34~~	~~-27~~
	~~90~~	~~-48.20~~	~~-80.33~~	~~-96.39~~	~~-112.46~~	~~-128.52~~	~~-144.59~~	~~-160.66~~	~~-30.3~~
	~~100~~	~~-67.95~~	~~-113.24~~	~~-135.89~~	~~-158.54~~	~~-181.19~~	~~-203.84~~	~~-226.49~~	~~-37.4~~
	~~110~~	~~-89.78~~	~~-149.63~~	~~-179.55~~	~~-209.48~~	~~-239.40~~	~~-269.33~~	~~-299.25~~	~~-45.3~~
	~~120~~	~~-113.68~~	~~-189.47~~	~~-227.37~~	~~-265.26~~	~~-303.16~~	~~-341.05~~	~~-378.94~~	~~-53.9~~
	~~130~~	~~-139.67~~	~~-232.78~~	~~-279.34~~	~~-325.90~~	~~-372.45~~	~~-419.01~~	~~-465.57~~	~~-63.2~~
	~~140~~	~~-167.74~~	~~-279.56~~	~~-335.47~~	~~-391.38~~	~~-447.29~~	~~-503.21~~	~~-559.12~~	~~-73.3~~
	~~150~~	~~-197.88~~	~~-329.80~~	~~-395.76~~	~~-461.72~~	~~-527.68~~	~~-593.64~~	~~-659.60~~	~~-84.2~~
	~~170~~	~~-264.41~~	~~-440.68~~	~~-528.81~~	~~-616.95~~	~~-705.08~~	~~-793.22~~	~~-881.35~~	~~-108~~

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~~For SI: 1 foot = 304.8 mm; 1 pound per linear foot = 1.488 kg/m; 1 mile per hour = 0.305 m/s.~~

~~a. The uplift loads are pounds per lineal foot of building length. For roof uplift connections multiply by 1.33 for framing spaced 16 inches on center and multiply by 2 for framing spaced 24 inches on center.~~

~~b. The uplift loads do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 12 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.~~

~~c. For Ultimate design wind speeds, Vult, greater than 170 mph, wind uplift forces shall be determined in accordance with Florida Building Code, Residential, Section R802.3 or ASCE 7.~~

~~d. Ultimate Design Wind Speeds determined from Figure 1609A in the Florida Building Code,Building or Figure R301.2(4) in the Florida Building Code, Residential.~~

-

~~711.8.1.1 Access for Retrofitting Roof to Wall Connections.~~

-

~~These provisions are not intended to limit the means for gaining access to the structural elements of the roof and wall for the purposes of retrofitting the connection. The retrofit of roof to wall connections can be made by access through the area under the eave, from above through the roof, or from the interior of the house. Methods for above access include removal of roof panels or sections thereof or removal of portions of roof paneling at selected locations large enough for access, viewing, and installing the retrofit connectors and fasteners.~~

-

~~Where panels or sections are removed, the removed portions shall not be reused. New paneling shall be used and fastened as in new construction.~~

-

~~Holes shall be deemed adequately repaired if a patch of paneling is installed with no gap greater than 1/2 inch (13 mm) between the patch and the existing sheathing and if the patch is supported using one of the following methods.~~

~~a) Solid 11/2 inch lumber shall fully support the patch and shall be secured to the existing sheathing with #8 by 11/4 inch screws spaced a minimum of 3 inches (76 mm) around the perimeter with screws a minimum of 3/4 inch from the near edge of the hole. The patch shall be secured to the lumber with #8 × 1-1/4 inch screws spaced on a grid no greater than 6 inches by 6 inches (152 mm × 152 mm) with no fewer than 2 screws.~~

~~b) Holes that extend horizontally from roof framing member to adjacent roofing framing member that are less than or equal to 7 inches (178 mm) wide along the slope of the roof shall be supported by minimum of 2 × 4 lumber whose face is attached to each roofing framing members using a minimum of 2 each 3-inch (76 mm) long fasteners (#8 screws or 10d common nails) connecting the two. The patch shall have attached to its bottom, running horizontally, a minimum 2 × 4 either flat wise or on edge secured with #8 × 11/4 inch screws a maximum of 4 inches (102 mm) on center and no more distant from the end of the added lumber than 3 inches (76 mm). The patch shall be secured with two #8 × 1-11/4 inch screws to each support member.~~

-

~~711.8.1.2 Partially inaccessible straps.~~

-

~~Where part of a strap is inaccessible, if the portion of the strap that is observed is fastened in compliance with these requirements, the inaccessible portion of the strap shall be presumed to comply with these requirements.~~

-

~~711.8.1.3 Prescriptive method for gable roofs on a wood frame wall.~~

-

~~The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below. Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the rafter or truss to the wall stud below shall be allowed as an alternate provided the two members align with no more than 11/2 inches (38 mm) offset.~~

-

~~711.8.1.4 Prescriptive method for gable roofs on a masonry wall.~~

-

~~The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least a 21/2 inch (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch diameter masonry screws, each with supplementary 1/4-inch washer, having sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.~~

-

~~711.8.1.5 Prescriptive method for hip roofs on a wood frame wall.~~

-

~~Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the top plate below using a strap or a right angle gusset bracket having a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the hip rafter, hip girder or adjacent rafters/trusses to the wall stud below shall be allowed as an alternate provided the two members align with no more than 11/2 inch (38 mm) offset.~~

-

~~711.8.1.6 Prescriptive method for hip roofs on a masonry wall.~~

-

~~Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least 21/2 inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch (6 mm) diameter masonry screws, each with supplementary 1/4-inch (6 mm) washer, with sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.~~

-

~~711.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.~~

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~~Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.~~

~~611.8.1.6 Prescriptive method for hip roofs on a masonry wall.~~

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~~Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least 21/2 inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch (6 mm) diameter masonry screws, each with supplementary 1/4-inch (6 mm) washer, with sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.~~

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~~611.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.~~

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~~Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.~~

SECTION 708 REROOFING

708.1 General.

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential. Roof repairs to existing roofs and roof coverings shall comply with the provisions of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential.

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R5561

Date Submitted	7/21/2012	**Section**	R905.10.5 Underlayment and high	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5561-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**R905.10.5 Underlayment.**~~
~~Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

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R905.10.5 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

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~~**R905.10.5.1 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.10.5.1 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.10.5 Underlayment

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

R905.10.5.1 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5485

Date Submitted	7/21/2012	**Section**	R905.2.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria for shingle underlayment. Provide correct Types for previously approved ASTM D 4869.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. Provide correct Types for previously approved ASTM D 4869 found in foundation code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5485-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

R905.2.3 Underlayment.

Unless otherwise noted, required underlayment shall conform ~~to~~ with ASTM D 226 Type I or Type II, ASTM D 4869, Type ~~I~~ II or Type IV, or ASTM D 6757.

Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.

R905.2.3 Underlayment.

Unless otherwise noted, required underlayment shall conform with ASTM D 226 ~~Type I or~~ Type II, ASTM D 4869~~,~~ ~~Type II or~~ Type IV, or ASTM D 6757.

Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.

R5555

Date Submitted	7/21/2012	**Section**	R905.2.7 Underlayment Applicatio	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5555-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~R905.2.7 Underlayment application.~~

~~For roof slopes from two units vertical in 12 units horizontal (17 percent slope), up to and less than four units vertical in 12 units horizontal (33-percent slope), two layers of underlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be two layers applied in the following manner.~~

~~1. Apply a 19-inch (483 mm) strip of underlayment felt parallel to with and starting at the eaves, fastened sufficiently to hold in place.~~

~~2. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

~~3. End laps shall be offset by 6 feet (1829 mm).~~

~~4. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.~~

-

~~For roof slopes of four units vertical in 12 units horizontal (33 percent slope) or greater, one layer ofunderlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be one layer applied in the following manner.~~

~~1. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm) fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

~~2. End laps shall be offset by 6 feet (1829 mm).~~

~~3. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.~~

-

R905.2.7 Underlayment application.

Underlayment shall be installed using one of the following methods:

1. For roof slopes from two units vertical in 12 units horizontal (17-percent slope), and less than four units vertical in 12 units horizontal (33-percent slope). Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757 and shall be two layers applied in the following manner. 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-

tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater. Underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757 and shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.2.7 Underlayment application.

Underlayment shall be installed using one of the following methods:

1. For roof slopes from two units vertical in 12 units horizontal (17-percent slope), and less than four units vertical in 12 units horizontal (33-percent slope). Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757 and shall be two layers applied in the following manner. 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater. Underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757 and shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5556

Date Submitted	7/21/2012	**Section**	R905.4.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5556-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**R905.4.3 Underlayment.**~~

~~Underlayment shall comply conform with ASTM D 226 Type I or Type II, ASTM D 1970 or ASTM D 4869.~~

R905.4.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

R905.4.3.1 Ice barrier.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

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~~**R905.4.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.4.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.4.3 Underlayment

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

R905.4.3.1 Ice barrier. Reserved.

R905.4.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5508

Date Submitted	7/21/2012	**Section**	R905.4.4 Material standards	**Proponent**	Mark Zehnal
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

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5508-G1

Proponent Andy Williams **Submitted** 12/13/2012 **Attachments** No

Comment:

My recommendation is that the minimum thicknesses for aluminum-zinc coated steel and galvanized steel be removed using the following rationale.

International Building Code, 2012 edition, Table 1507.4.3(1) defines metal roof coverings and does not provide a minimum thickness for either aluminum-zinc coated steel or galvanized steel. A similar code change proposal was submitted during the 2012/2013 ICC Code Development Cycle (Group A) to include a minimum thickness for these two metal roof coverings. The International Building Code Structural Committee recommended disapproval of this proposal (S39-12). The committee provided the following reason for disapproval: "The committee believes that the roof covering manufacturer should cover the minimum thickness required for metal roof coverings and the proposed values are not consistent with the source document mentioned in the reason (Table 6-1 of the SMACNA Architectural Sheet Metal Manual)."

The Florida Building Code, 2010 edition, Section 1504.3.2 Metal Panel Roof Systems requires that these metal roof coverings be tested to determine their structural capacity. This testing insures that the metal roof coverings are adequate for their intended use. Inclusion of a prescriptive requirement such as minimum thickness is unnecessary and may also limit the ability of the metal roof covering manufacturer to design economical metal roof coverings. The Florida Building Code should only deviate from the International Building Code where there is a Florida specific need. It does not seem reasonable that the minimum thickness for aluminum-zinc coated steel and galvanized steel metal roof coverings qualifies as a Florida specific need.

R905.4.4 Material standards.

Metal roof shingle roof coverings shall comply with Table ~~R905.10.3(1)~~ R905.4.4. The materials used for metal roof shingle roof coverings shall be naturally corrosion resistant or ~~be made~~ provided with corrosion ~~resistant~~ resistance in accordance with the standards and minimum thicknesses specified in the standards listed in Table R905.4.4.

TABLE 905.4.4 METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024-inch minimum thickness for roll-formed panels and 0.019-inch minimum thickness for press-formed shingles
Aluminum-zinc coated steel	ASTM A 792	0.013-inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013-inch minimum thickness, G-90 zinc-coated[a]
Hard lead	2 lbs./sq. ft.	
Lead-coated copper	ASTM B 101	
Prepainted steel	ASTM A 755	0.0142 inch minimum thickness
Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series alloys
Steel	ASTM A 924/ ASTM A 924M	
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions	
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%)	

For SI: 1 ounce per square foot = 0.0026 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G.

R5513

Date Submitted	7/21/2012	**Section**	R905.5.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.Provide correct Types for previously approved ASTM D 4869.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. Provide correct Types for previously approved ASTM D 4869.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5513-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

R905.5.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II,ASTM D 1970 or ASTM D 4869, Type ~~I~~ II or Type ~~II~~ IV.

R905.5.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II, ASTM D 1970 or ASTM D 4869~~, Type II or~~ Type IV.

R5557

Date Submitted	7/21/2012	**Section**	R905.5.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5557-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

~~**R905.5.3 Underlayment.**~~
~~Underlayment shall comply conform with ASTM D 226 Type I or Type II, ASTM D 1970 or ASTM D 4869.~~

R905.5.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

R905.5.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

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~~**R905.5.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.5.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.5.3 Underlayment

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757.

R905.5.3.1 Ice barrier. <u>**Reserved.**</u>

R905.5.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). <u>The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u> Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped <u>4</u> ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). <u>The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.</u> Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

TAC: Roofing

Total Mods for **Roofing** in **No Affirmative Recommendation with a Second: 62**

Total Mods for report: 80

Sub Code: Building

R5347

Date Submitted	7/19/2012	**Section**	1503.6 Crickets and saddles	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5347-G2

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

Section 1503 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section “R1003.20 Chimney crickets”. Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

2nd Comment Period 10/31/2012 - 12/14/2012

R5347-G3

Proponent Dwight Wilkes **Submitted** 12/13/2012 **Attachments** No

Comment:

This Modification weakens the 2012 ICC Base Codes. This Modification has not been adequately demonstrated by the Proponent to represent a Florida Specific Need.

There has been no evidence presented denying the proven effectiveness of flashing saddles designed and provided by the unit skylight manufacturer as a matched set, and no recognition of skylights that carry warranties against leakage. For products qualifying for this exception requires the installer to attach a cricket or saddle on unit skylights that may damage the skylight's own matched flashing/drainage system and risks unintended consequences.

This Modification is not part of any Proposal submitted during the 2015 IBC code development process. This code language addressing Unit Skylights is currently in the 2012 Base Code and received support from the National Roofing Contractors Association during the 2012 IBC and 2012 IRC Code Hearings.

The proponent also states that this modification "Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities"; however this does discriminate against manufacturers of unit skylights.

Therefore, AAMA requests restoration of the Exception language, for consistency with the Base Codes.

1st Comment Period History 08/09/2012 - 09/23/2012

R5347-G1

Proponent Roger LeBrun **Submitted** 9/20/2012 **Attachments** No

Comment:

This modification is not justified as a Florida-specific need. Also, there has been no evidence presented denying the proven effectiveness of flashing saddles designed and provided by the skylight manufacturer as a matched set, and no recognition of skylights that carry warranties against leakage.
The proposal should be disapproved. Also affects R5260 and R5474.

1503.6 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~**Exception:** Unit skylights installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle~~

Code Modification 5347

1503.6 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~**Exception:** Unit skylights installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle~~

Section 1503 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section "R1003.20 Chimney crickets". Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

Rain map Reference

National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

1. South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota average 55.77 inches per year (18 cities)
2. Central Florida Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia average 51.24 inches per year (8 cities).
3. North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee average 51.26 inches per year (10 cities).
4. Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton average 62.22 inches per year (8 cities).

The exception references section 2405.5 (see below) which requires that "Unit skylights shall be tested and labeled as complying with AAMA/WDMA/CSA 101/ I.S.2/A440."(see below). Compliance with AAMA/WDMA/CSA 101/ I.S.2/A440 does not include roofing system protection or integrity.

2405.5 Unit skylights.

Unit skylights shall be tested and labeled as complying with AAMA/WDMA/CSA 101/ I.S.2/A440. The label shall state the name of the manufacturer, the approved labeling agency, the product designation and the performance grade rating as specified in AAMA/WDMA/CSA 101/I.S.2/A440. If the product manufacturer has chosen to have the performance grade of the skylight rated separately for positive and negative design pressure, then the label shall state both performance grade ratings as specified in AAMA/WDMA/CSA 101/I.S.2/A440 and the skylight shall comply with Section 2405.5.2. If the skylight is not rated separately for positive and negative pressure, then the performance grade rating shown on the label shall be the performance grade rating determined in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 for both positive and negative design pressure and the skylight shall conform to Section 2405.5.1.

AAMA/WDMA/CSA 101/I.S.2/A440-08 - NAFS - North American Fenestration Standard / Specification for Windows, Doors, and Skylights

1. Scope

1.1 General This fenestration Standard/Specification applies to both operating and fixed, prime and replacement windows, doors, TDDs, and unit skylights installed into exterior building envelopes. This fenestration Standard/Specification establishes material-neutral, minimum, and optional performance requirements for windows, doors, TDDs, and unit skylights. This Standard/Specification concerns itself with the determination of performance grade (PG), design pressure (DP), and related performance ratings for windows, doors, TDDs, and unit skylights.

Page 101 of 589

R5363

Date Submitted	7/19/2012	**Section**	1507.2.7.1 Wind Resistance of As	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5363-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

Remove Classification A from TABLE 1507.2.7.1 due to none compliance with minimum 1609 Wind Maps
Designation: D3161/D3161M – 12
4.1 Shingles are of three classes:
4.1.1 Class A—Pass at a test velocity of 97 km/h [60 mph].
4.1.2 Class D—Pass at a test velocity of 145 km/h [90 mph].
4.1.3 Class F—Pass at a test velocity of 177 km/h [110 mph].

1507.2.7.1 Wind Resistance of Asphalt Shingles.

Asphalt Shingles shall be ~~tested~~ classified in accordance with ASTM D 3161, TAS 107 or ASTM D 7158 ~~in accordance with Table 1507.2.7.1. Asphalt shingles shall meet the classification requirements of Table 1507.2.7.1(1) for the appropriate maximum basic wind speed.~~ Shingles classified as ASTM D 3161 Class D or ASTM D 7158 Class G are acceptable for use in the 100-mph wind zone. Shingles classified as ASTM D 3161 Class F, TAS107 or ASTM D 7158 Class H are acceptable for use in all wind zones. Asphalt shingle ~~packaging~~ wrappers shall ~~bear a label to~~ indicate compliance ~~with ASTM D 7158 and the~~ with one of the required classifications as shown in Table 1507.2.7.(1).

~~Exception: Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table 1507.2.7.1(2).~~

TABLE 1507.2.7.1~~(1)~~ CLASSIFICATION OF ASPHALT ~~ROOF~~ SHINGLES ~~PER ASTM D 7158[a]~~

~~NOMINAL DESIGN WIND SPEED, V_{asd}[b] (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~D, G or H~~
~~90~~	~~D, G or H~~
~~100~~	~~G or H~~
~~110~~	~~G or H~~
~~120~~	~~G or H~~
~~130~~	~~H~~
~~140~~	~~H~~
~~150~~	~~H~~

-

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

~~a. The standard calculations contained in ASTM D 7158 assume exposure category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

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

-

MAXIMUM BASIC WIND SPEED FROM FIGURE 1609A, B, C or ASCE-7	V_{asd}	ASTM D 7158	ASTM D 3161
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

TABLE 1507.2.7.1(2) CLASSIFICATION OF ASPHALT SHINGLES PER ASTM D 3161

~~NOMINAL DESIGN WIND SPEED, V_{asd}[a] (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~A, D or F~~
~~90~~	~~A, D or F~~
~~100~~	~~A, D or F~~
~~110~~	~~F~~
~~120~~	~~F~~
~~130~~	~~F~~
~~140~~	~~F~~
~~150~~	~~F~~

-

~~For SI: 1 mph = 0.447 m/s.~~
~~a. V_{asd} shall be determined in accordance with Section 1609.3.1.~~

Reserved.

R5587

Date Submitted	7/23/2012	**Section**	1507.3 Clay and concrete tile.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1507.3.2, 1507.3.3, 1507.3.3.1, 1507.3.6, 1507.3.7, 1507.3.8, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5587-A1

Proponent Mark Zehnal **Submitted** 11/1/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.3 Clay and concrete tile.

The installation of clay and concrete tile shall comply with the provisions of this section.

1507.3.1 Deck requirements.
Concrete and clay tile shall be installed only over solid sheathing ~~or~~ except where the roof covering is specifically designed and tested in accordance with Section 1609.5.2 to be applied over ~~spaced~~ structural spaced sheathing boards.

1507.3.2 Deck slope.
Clay and concrete roof tile shall be installed ~~on roof slopes of $2^1/_2$ units vertical in 12 units horizontal (21-percent slope) or greater. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (21-percent slope) to four units vertical in 12 units horizontal (33-percent slope), double underlayment application is required in accordance with Section 1507.3.3.~~ in accordance with the recommendations of FRSA/TRI ~~07320~~ 04-12 where the V_{asd} as determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

1507.3.3 Underlayment.
Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II; ASTM D 2626, ASTM D 1970 or ASTM D 6380, Class M mineral-surfaced roll roofing. Underlayment shall be applied according to the tile manufacturer's installation instructions or the recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

1507.3.3.1 ~~Low-slope roofs~~ Slope and underlayment requirements.
~~For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (21-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be a minimum of two layers applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied overlapping successive sheets 19 inches (483 mm) and fastened sufficiently in place.~~ Refer to FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 for underlayment and slope requirements for specific roof tile systems or the recommendations of RAS 118, 119 or 120.

1507.3.3.2 High-slope roofs.
~~For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to, and starting from the eaves and lapped 2 inches (51 mm), fastened only as necessary to hold in place.~~ Reserved.

1507.3.3.3 High wind attachment.
~~Underlayment applied in areas subject to high wind [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.3.4 Clay tile.
Clay roof tile shall comply with ASTM C 1167.

1507.3.5 Concrete tile.
Concrete roof tile shall comply with ASTM C 1492.

1507.3.6 Fasteners.
Tile fasteners shall be corrosion resistant and not less than 11 gage, $^5/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck a minimum of ~~¾~~ 0.75 inch (19.1 mm) or through the thickness of the deck, whichever is less or in accordance with the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or in accordance with RAS 118, 119 or 120. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

1507.3.7 Attachment.
Clay and concrete roof tiles shall be fastened in accordance with ~~Table 1507.3.7~~Section 1609 or in accordance with FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1. .

TABLE 1507.3.7 CLAY AND CONCRETE TILE ATTACHMENT[a, b, c]

~~GENERAL - CLAY OR CONCRETE ROOF TILE~~			
~~Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)~~	~~Mean roof height (feet)~~	~~Roof slope < 3:12~~	~~Roof slope 3:12 and over~~
~~85~~	~~0-60~~	~~One fastener per~~	~~Two fasteners per tile. Only one fastener~~

~~100~~	~~0-40~~	~~tile. Flat tile without vertical laps, two fasteners per tile.~~	~~on slopes of 7:12 and less for tiles with installed weight exceeding 7.5 lbs./sq. ft. having a width no greater than 16 inches.~~	
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails. The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~		
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS[d, e]~~ **~~(Installations on spaced/solid sheathing with battens or spaced sheathing)~~**				
~~Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)~~	**~~Mean roof height (feet)~~**	**~~Roof slope < 5:12~~**	**~~Roof slope 5:12 < 12:12~~**	**~~Roof slope 12:12 and over~~**
~~85~~	~~0-60~~	~~Fasteners are not required. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener per tile every other row. All perimeter tiles require one fastener. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener required for every tile. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~
~~100~~	~~0-40~~			
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~		
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS~~ **~~(Installations on solid sheathing without battens)~~**				
~~Maximum Nominal Design Wind~~	**~~Mean roof height~~**	**~~All roof slopes~~**		

~~Speed, V_{asd} f (mph)~~	~~(feet)~~	
~~85~~	~~0-60~~	~~One fastener per tile.~~
~~100~~	~~0-40~~	~~One fastener per tile.~~
~~100~~	~~> 40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~> 60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~

~~For SI: 1 inch =25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 4.882 kg/m².~~

~~a. Minimum fastener size. Corrosion-resistant nails not less than No. 11 gage with 5/16 inch head. Fasteners shall be long enough to penetrate into the sheathing 3/4 inch or through the thickness of the sheathing, whichever is less. Attaching wire for clay and concrete tile shall not be smaller than 0.083 inch.~~

~~b. Snow areas. A minimum of two fasteners per tile are required or battens and one fastener.~~

~~c. Roof slopes greater than 24:12. The nose of all tiles shall be securely fastened.~~

~~d. Horizontal battens. Battens shall be not less than 1 inch by 2 inch nominal. Provisions shall be made for drainage by a minimum of 1/8 inch riser at each nail or by 4-foot-long battens with at least a 1/2 inch separation between battens. Horizontal battens are required for slopes over 7:12.~~

~~e. Perimeter fastening areas include three tile courses but not less than 36 inches from either side of hips or ridges and edges of eaves and gable rakes.~~

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

Reserved.

1507.3.8 Application.
Tile shall be applied according to the manufacturer's installation instructions or recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

~~, based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

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 ~~, and where of metal, shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of either one layer of Type I underlayment running the full length of the valley, or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed~~ or the recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

SECTION 1507 REQUIREMENTS FOR ROOF COVERINGS

1507.3 Clay and concrete tile.
The installation of clay and concrete tile shall comply with the provisions of this section.

1507.3.1 Deck requirements.
Concrete and clay tile shall be installed only over solid sheathing ~~or~~ except where the roof covering is specifically designed and tested in accordance with Section 1609.5.2 to be applied over ~~spaced~~ structural spaced sheathing boards.

1507.3.2 Deck slope.
Clay and concrete roof tile shall be installed ~~on roof slopes of $2^1/_2$ units vertical in 12 units horizontal (21-percent slope) or greater. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (21-percent slope) to four units vertical in 12 units horizontal (33-percent slope), double underlayment application is required in accordance with Section 1507.3.3.~~ in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} as determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

1507.3.3 Underlayment.
Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II; ASTM D 2626, ASTM D 1970 or ASTM D 6380, Class M mineral-surfaced roll roofing. Underlayment shall be applied according to the tile manufacturer's installation instructions or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

1507.3.3.1 ~~Low-slope roofs~~ Slope and underlayment requirements.
~~For roof slopes from $2^1/_2$ units vertical in 12 units horizontal (21-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be a minimum of two layers applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied overlapping successive sheets 19 inches (483 mm) and fastened sufficiently in place.~~ Refer to FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 for underlayment and slope requirements for specific roof tile systems or the recommendations of RAS 118, 119 or 120.

1507.3.3.2 High-slope roofs.
~~For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to, and starting from the eaves and lapped 2 inches (51 mm), fastened only as necessary to hold in place.~~ Reserved.

1507.3.3.3 High wind attachment.
~~Underlayment applied in areas subject to high wind [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Sections 1507.3.3.1 and 1507.3.3.2 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.3.4 Clay tile.
Clay roof tile shall comply with ASTM C 1167.

1507.3.5 Concrete tile.
Concrete roof tile shall comply with ASTM C 1492.

1507.3.6 Fasteners.
Tile fasteners shall be corrosion resistant and not less than 11 gage, $^5/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck a minimum of ~~¾~~ 0.75 inch (19.1 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, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or in accordance with RAS 118, 119 or 120. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

1507.3.7 Attachment.
Clay and concrete roof tiles shall be fastened in accordance with ~~Table 1507.3.7~~Section 1609 or in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1. .

TABLE 1507.3.7 CLAY AND CONCRETE TILE ATTACHMENT[a, b, c]

~~GENERAL - CLAY OR CONCRETE ROOF TILE~~			
~~Maximum Nominal Design Wind Speed, V_{asd}~~[f] ~~(mph)~~	~~Mean roof height (feet)~~	~~Roof slope < 3:12~~	~~Roof slope 3:12 and over~~
~~85~~	~~0-60~~	~~One fastener per~~	~~Two fasteners per tile. Only one fastener~~

~~100~~	~~0-40~~	~~tile. Flat tile without vertical laps, two fasteners per tile.~~	~~on slopes of 7:12 and less for tiles with installed weight exceeding 7.5 lbs./sq. ft. having a width no greater than 16 inches.~~	
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails. The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~		
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS~~[d, e] **~~(Installations on spaced/solid sheathing with battens or spaced sheathing)~~**				
~~Maximum Nominal Design Wind Speed, V_{asd}~~[f] **~~(mph)~~**	**~~Mean roof height (feet)~~**	**~~Roof slope < 5:12~~**	**~~Roof slope 5:12 < 12:12~~**	**~~Roof slope 12:12 and over~~**
~~85~~	~~0-60~~	~~Fasteners are not required. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener per tile every other row. All perimeter tiles require one fastener. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener required for every tile. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~
~~100~~	~~0-40~~			
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~		
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS~~ **~~(Installations on solid sheathing without battens)~~**				
~~Maximum Nominal Design Wind~~	**~~Mean roof height~~**	**~~All roof slopes~~**		

~~Speed, V_{asd}~~[f] ~~(mph)~~	~~(feet)~~	
~~85~~	~~0-60~~	~~One fastener per tile.~~
~~100~~	~~0-40~~	~~One fastener per tile.~~
~~100~~	~~> 40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~> 60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~

~~For SI: 1 inch =25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 4.882 kg/m^2.~~
~~a. Minimum fastener size. Corrosion-resistant nails not less than No. 11 gage with $^5/_{16}$-inch head. Fasteners shall be long enough to penetrate into the sheathing $^3/_4$ inch or through the thickness of the sheathing, whichever is less. Attaching wire for clay and concrete tile shall not be smaller than 0.083 inch.~~
~~b. Snow areas. A minimum of two fasteners per tile are required or battens and one fastener.~~
~~c. Roof slopes greater than 24:12. The nose of all tiles shall be securely fastened.~~
~~d. Horizontal battens. Battens shall be not less than 1 inch by 2 inch nominal. Provisions shall be made for drainage by a minimum of $^1/_8$-inch riser at each nail or by 4-foot-long battens with at least a $^1/_2$-inch separation between battens. Horizontal battens are required for slopes over 7:12.~~
~~e. Perimeter fastening areas include three tile courses but not less than 36 inches from either side of hips or ridges and edges of eaves and gable rakes.~~
~~f. V_{asd} shall be determined in accordance with Section 1609.3.1.~~

Reserved.

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, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

~~, based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

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 ~~, and where of metal, shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of either one layer of Type I underlayment running the full length of the valley, or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed~~ or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

R5590

Date Submitted	7/23/2012	**Section**	1507.3.3.1	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1507.3.2, 1507.3.3, 1507.3.6, 1507.3.7, 1507.3.8, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5590-A1

Proponent Mark Zehnal **Submitted** 11/1/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.3.3.1 ~~Low-slope roofs~~ Slope and underlayment requirements.

~~For roof slopes from 2½ units vertical in 12 units horizontal (21-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be a minimum of two layers applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied overlapping successive sheets 19 inches (483 mm) and fastened sufficiently in place.~~ Refer to FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 for underlayment and slope requirements for specific roof tile systems or the recommendations of RAS 118, 119 or 120.

1507.3.3.1 ~~Low-slope roofs~~ Slope and underlayment requirements.
~~For roof slopes from 2½ units vertical in 12 units horizontal (21-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be a minimum of two layers applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied overlapping successive sheets 19 inches (483 mm) and fastened sufficiently in place.~~ Refer to FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 for underlayment and slope requirements for specific roof tile systems or the recommendations of RAS 118, 119 or 120.

R5589

Date Submitted	7/23/2012	**Section**	1507.3.3	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

1507.3.2, 1507.3.3.1, 1507.3.6, 1507.3.7, 1507.3.8, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5589-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.3.3 Underlayment.

Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II; ASTM D 2626, ASTM D 1970 or ASTM D 6380, Class M mineral-surfaced roll roofing. Underlayment shall be applied according to the tile manufacturer's installation instructions or the recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

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1507.3.3 Underlayment.

Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II; ASTM D 2626, ASTM D 1970 or ASTM D 6380, Class M mineral-surfaced roll roofing. Underlayment shall be applied according to the tile manufacturer's installation instructions or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendations of RAS 118, 119 or 120.

R5591

Date Submitted	7/23/2012	**Section**	1507.3.6	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1507.3.2, 1507.3.3, 1507.3.3.1, 1507.3.7, 1507.3.8, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5591-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.3.6 Fasteners.
Tile fasteners shall be corrosion resistant and not less than 11 gage, $^{5}/_{16}$-inch (8.0 mm) head, and of sufficient length to penetrate the deck a minimum of ~~¾~~ 0.75 inch (19.1 mm) or through the thickness of the deck, whichever is less or in accordance with the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or in accordance with RAS 118, 119 or 120. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2.1 mm). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

1507.3.6 Fasteners.

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R5592

Date Submitted	7/23/2012	**Section**	1507.3.7	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1507.3.2, 1507.3.3, 1507.3.3.1, 1507.3.6, 1507.3.8, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5592-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.3.7 Attachment.

Clay and concrete roof tiles shall be fastened in accordance with ~~Table 1507.3.7~~Section 1609 or in accordance with FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1. .

TABLE 1507.3.7 CLAY AND CONCRETE TILE ATTACHMENT[a, b, c]

~~GENERAL - CLAY OR CONCRETE ROOF TILE~~				
~~Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)~~	~~Mean roof height (feet)~~	~~Roof slope < 3:12~~	~~Roof slope 3:12 and over~~	
~~85~~	~~0-60~~	~~One fastener per tile. Flat tile without vertical laps, two fasteners per tile.~~	~~Two fasteners per tile. Only one fastener on slopes of 7:12 and less for tiles with installed weight exceeding 7.5 lbs./sq. ft. having a width no greater than 16 inches.~~	
~~100~~	~~0-40~~			
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails. The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~		
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~		
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS[d, e] (Installations on spaced/solid sheathing with battens or spaced sheathing)~~				
~~Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)~~	~~Mean roof height (feet)~~	~~Roof slope < 5:12~~	~~Roof slope 5:12 < 12:12~~	~~Roof slope 12:12 and over~~
~~85~~	~~0-60~~	~~Fasteners are not required. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener per tile every other row. All perimeter tiles require one fastener. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener required for every tile. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~
~~100~~	~~0-40~~			
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip~~		

		~~and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~**INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS (Installations on solid sheathing without battens)**~~		
~~**Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)**~~	~~**Mean roof height (feet)**~~	~~**All roof slopes**~~
~~85~~	~~0-60~~	~~One fastener per tile.~~
~~100~~	~~0-40~~	~~One fastener per tile.~~
~~100~~	~~> 40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~> 60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~

~~For SI: 1 inch =25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 4.882 kg/m^2.~~
~~a. Minimum fastener size. Corrosion-resistant nails not less than No. 11 gage with $^5/_{16}$-inch head. Fasteners shall be long enough to penetrate into the sheathing $^3/_4$ inch or through the thickness of the sheathing, whichever is less. Attaching wire for clay and concrete tile shall not be smaller than 0.083 inch.~~

~~b. Snow areas. A minimum of two fasteners per tile are required or battens and one fastener.~~

~~c. Roof slopes greater than 24:12. The nose of all tiles shall be securely fastened.~~

~~d. Horizontal battens. Battens shall be not less than 1 inch by 2 inch nominal. Provisions shall be made for drainage by a minimum of $^1/_8$-inch riser at each nail or by 4-foot long battens with at least a $^1/_2$-inch separation between battens. Horizontal battens are required for slopes over 7:12.~~

~~e. Perimeter fastening areas include three tile courses but not less than 36 inches from either side of hips or ridges and edges of eaves and gable rakes.~~

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

Reserved.

1507.3.7 Attachment.
Clay and concrete roof tiles shall be fastened in accordance with ~~Table 1507.3.7~~ Section 1609 or in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1.

TABLE 1507.3.7 CLAY AND CONCRETE TILE ATTACHMENT [~~a, b, c~~]

~~**GENERAL - CLAY OR CONCRETE ROOF TILE**~~			
~~**Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)**~~	~~**Mean roof height (feet)**~~	~~**Roof slope < 3:12**~~	~~**Roof slope 3:12 and over**~~
~~85~~	~~0-60~~	~~One fastener per tile. Flat tile without vertical laps, two fasteners per tile.~~	~~Two fasteners per tile. Only one fastener on slopes of 7:12 and less for tiles with installed weight exceeding 7.5 lbs./sq. ft. having a width no greater than 16 inches.~~
~~100~~	~~0-40~~		
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails. The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~	
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~	
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~	
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~	
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~	

~~**INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS**~~[~~d, e~~] ~~**(Installations on spaced/solid sheathing with battens or spaced sheathing)**~~				
~~**Maximum Nominal Design Wind Speed, V_{asd}[f] (mph)**~~	~~**Mean roof height (feet)**~~	~~**Roof slope < 5:12**~~	~~**Roof slope 5:12 < 12:12**~~	~~**Roof slope 12:12 and over**~~
~~85~~	~~0-60~~	~~Fasteners are not required. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener per tile every other row. All perimeter tiles require one fastener. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~	~~One fastener required for every tile. Tiles with installed weight less than 9 lbs./sq. ft. require a minimum of one fastener per tile.~~
~~100~~	~~0-40~~			
~~100~~	~~>40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip~~		

		~~and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~INTERLOCKING CLAY OR CONCRETE ROOF TILE WITH PROJECTING ANCHOR LUGS~~ **~~(Installations on solid sheathing without battens)~~**		
~~Maximum Nominal Design Wind Speed, V_{asd}~~[f] **~~(mph)~~**	**~~Mean roof height (feet)~~**	**~~All roof slopes~~**
~~85~~	~~0-60~~	~~One fastener per tile.~~
~~100~~	~~0-40~~	~~One fastener per tile.~~
~~100~~	~~> 40-60~~	~~The head of all tiles shall be nailed. The nose of all eave tiles shall be fastened with approved clips. All rake tiles shall be nailed with two nails The nose of all ridge, hip and rake tiles shall be set in a bead of roofer's mastic.~~
~~110~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~120~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~130~~	~~0-60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~
~~All~~	~~>60~~	~~The fastening system shall resist the wind forces in Section 1609.5.3.~~

-

~~For SI: 1 inch =25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 4.882 kg/m^2.~~
~~a. Minimum fastener size. Corrosion-resistant nails not less than No. 11 gage with $^5/_{16}$-inch head. Fasteners shall be long enough to penetrate into the sheathing $^3/_4$ inch or through the thickness of the sheathing, whichever is less. Attaching wire for clay and concrete tile shall not be smaller than 0.083 inch.~~
~~b. Snow areas. A minimum of two fasteners per tile are required or battens and one fastener.~~
~~c. Roof slopes greater than 24:12. The nose of all tiles shall be securely fastened.~~
~~d. Horizontal battens. Battens shall be not less than 1 inch by 2 inch nominal. Provisions shall be made for drainage by a minimum of $^1/_8$-inch riser at each nail or by 4-foot-long battens with at least a $^1/_2$-inch separation between battens. Horizontal battens are required for slopes over 7:12.~~
~~e. Perimeter fastening areas include three tile courses but not less than 36 inches from either side of hips or ridges and edges of eaves and gable rakes.~~
~~f. V_{asd} shall be determined in accordance with Section 1609.3.1.~~

Reserved.

R5593

Date Submitted	7/23/2012	**Section**	1507.3.8	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** Yes

Related Modifications

1507.3.2, 1507.3.3, 1507.3.3.1, 1507.3.6, 1507.3.7, 1507.3.9

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5593-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

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YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5593-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

Removing "Tile shall be applied according to the manufacturer's installation instructions" will not allow for any new and innovative tile systems and exclude roof tile manufactures that have proprietary installation instructions such as Luduwici to sell there products even though the systems are in complaince with code requirements.

1507.3.8 Application.

Tile shall be applied according to the manufacturer's installation instructions or recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

~~, based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

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, Fifth Edition

where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

~~, based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

R5594

Date Submitted	7/23/2012	**Section**	1507.3.9	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1507.3.2, 1507.3.3, 1507.3.3.1, 1507.3.6, 1507.3.7, 1507.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5594-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

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 ~~, and where of metal, shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of either one layer of Type I underlayment running the full length of the valley, or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed~~ or the recommendations of the FRSA/TRI ~~07320~~ 04-12 where the basic wind speed, V_{asd}, 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~~, and where of metal, shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of either one layer of Type I underlayment running the full length of the valley, or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed~~ or the recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the basic wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 or the recommendation of RAS 118, 119 or 120.

R5275

Date Submitted	7/18/2012	**Section**	1507.4 Metal roof panels.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5275-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5275-G1

Proponent Andy Williams **Submitted** 12/13/2012 **Attachments** No

Comment:

My recommendation is that the minimum thicknesses for aluminum-zinc coated steel and galvanized steel be removed using the following rationale.

International Building Code, 2012 edition, Table 1507.4.3(1) defines metal roof coverings and does not provide a minimum thickness for either aluminum-zinc coated steel or galvanized steel. A similar code change proposal was submitted during the 2012/2013 ICC Code Development Cycle (Group A) to include a minimum thickness for these two metal roof coverings. The International Building Code Structural Committee recommended disapproval of this proposal (S39-12). The committee provided the following reason for disapproval: “The committee believes that the roof covering manufacturer should cover the minimum thickness required for metal roof coverings and the proposed values are not consistent with the source document mentioned in the reason (Table 6-1 of the SMACNA Architectural Sheet Metal Manual).”

The Florida Building Code, 2010 edition, Section 1504.3.2 Metal Panel Roof Systems requires that these metal roof coverings be tested to determine their structural capacity. This testing insures that the metal roof coverings are adequate for their intended use. Inclusion of a prescriptive requirement such as minimum thickness is unnecessary and may also limit the ability of the metal roof covering manufacturer to design economical metal roof coverings. The Florida Building Code should only deviate from the International Building Code where there is a Florida specific need. It does not seem reasonable that the minimum thickness for aluminum-zinc coated steel and galvanized steel metal roof coverings qualifies as a Florida specific need.

1507.4 Metal roof panels.
The installation of metal roof panels shall comply with the provisions of this section.

1507.4.1 Deck requirements.
Metal roof panel roof coverings shall be applied to a solid or closely fitted deck, except where the roof covering is specifically designed to be applied to spaced supports.

1507.4.2 Deck slope.
Minimum slopes for metal roof panels shall comply with the following:

1. The minimum slope for lapped, nonsoldered seam metal roofs without applied lap sealant shall be three units vertical in 12 units horizontal (25-percent slope).

2. The minimum slope for lapped, nonsoldered seam metal roofs with applied lap sealant shall be one-half unit vertical in 12 units horizontal (4-percent slope). Lap sealants shall be applied in accordance with the approved manufacturer's installation instructions.

3. The minimum slope for standing seam of roof systems shall be one-quarter unit vertical in 12 units horizontal (2-percent slope).

1507.4.3 Material standards.
Metal-sheet roof covering systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet roof coverings installed over structural decking shall comply with Table 1507.4.3(1). The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).

.TABLE 1507.4.3(1) METAL ROOF COVERINGS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Aluminum~~	~~ASTM B 209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.~~
~~Aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Copper~~	~~16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Galvanized steel~~	~~ASTM A 653 G-90 zinc-coated[a].~~
~~Hard lead~~	~~2 lbs./sq. ft.~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Prepainted steel~~	~~ASTM A 755~~
~~Soft lead~~	~~3 lbs./sq. ft.~~
~~Stainless steel~~	~~ASTM A 240, 300 Series Alloys~~
~~Steel~~	~~ASTM A 924~~
~~Terne and terne-coated stainless~~	~~Terne coating of 40 lbs. per double base box, field painted where~~

	~~applicable in accordance with manufacturer's installation instructions.~~
~~Zinc~~	~~0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-zinc coated steel	ASTM A 792	0.013 inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz/sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz/sq. ft. for preformed metal shingle systems.
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013 inch minimum thickness, G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.	
Lead-coated copper	ASTM B 101	
Prepainted steel	ASTM A 755	
Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series Alloys
Steel	ASTM A 924/ ASTM A 924M	
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.	
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).	

For SI: 1 ounce per square foot = 0.0026 kg/m^2,
1 pound per square foot = 4.882 kg/m^2,
1 inch = 25.4 mm, 1 pound = 0.454 kg.
a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G-60.

-

TABLE 1507.4.3(2) MINIMUM CORROSION RESISTANCE

55% Aluminum-zinc alloy coated steel	ASTM A 792 AZ 50
5% Aluminum alloy-coated steel	ASTM A 875 GF60
Aluminum-coated steel	ASTM A 463 T2 65
Galvanized steel	ASTM A 653 G-90
Prepainted steel	ASTM A 755[a]

a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM A 875, ASTM A 463 or ASTM A 653.

1507.4.4 Attachment.

Metal roof panels shall be secured to the supports in accordance with the approved manufacturer's fasteners. In the absence of manufacturer recommendations, the following fasteners shall be used:

1. Galvanized fasteners shall be used for steel roofs.

2. Copper, brass, bronze, copper alloy or 300 series stainless-steel fasteners shall be used for copper roofs.

3. Aluminum-zinc coated fasteners are acceptable for aluminum-zinc coated roofs.

4. Stainless-steel fasteners are acceptable for all types of metal roofs.

1507.4.5 Underlayment ~~and high wind~~.
~~**Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.**~~

~~**Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67**~~

~~mm)] with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Underlayment shall be installed as per manufacturer's installation guidelines

1507.4 Metal roof panels.
The installation of metal roof panels shall comply with the provisions of this section.

1507.4.1 Deck requirements.
Metal roof panel roof coverings shall be applied to a solid or closely fitted deck, except where the roof covering is specifically designed to be applied to spaced supports.

1507.4.2 Deck slope.
Minimum slopes for metal roof panels shall comply with the following:

1. The minimum slope for lapped, nonsoldered seam metal roofs without applied lap sealant shall be three units vertical in 12 units horizontal (25-percent slope).

2. The minimum slope for lapped, nonsoldered seam metal roofs with applied lap sealant shall be one-half unit vertical in 12 units horizontal (4-percent slope). Lap sealants shall be applied in accordance with the *approved* manufacturer's installation instructions.

3. The minimum slope for standing seam of roof systems shall be one-quarter unit vertical in 12 units horizontal (2-percent slope).

1507.4.3 Material standards.
Metal-sheet roof covering systems that incorporate supporting structural members shall be designed in accordance with Chapter 22. Metal-sheet roof coverings installed over structural decking shall comply with Table 1507.4.3(1). The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table 1507.4.3(2).

.TABLE 1507.4.3(1) METAL ROOF COVERINGS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Aluminum~~	~~ASTM B 209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.~~
~~Aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Copper~~	~~16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Galvanized steel~~	~~ASTM A 653 G-90 zinc-coated[a].~~
~~Hard lead~~	~~2 lbs./sq. ft.~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Prepainted steel~~	~~ASTM A 755~~
~~Soft lead~~	~~3 lbs./sq. ft.~~
~~Stainless steel~~	~~ASTM A 240, 300 Series Alloys~~
~~Steel~~	~~ASTM A 924~~
~~Terne and terne-coated stainless~~	~~Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.~~

~~Zinc~~	~~0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-zinc coated steel	ASTM A 792	0.013 inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz/sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz/sq. ft. for preformed metal shingle systems.
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013 inch minimum thickness, G-90 zinc-coated[a].
Hard lead	-	2 lbs./sq. ft.
Lead-coated copper	ASTM B 101	-
Prepainted steel	ASTM A 755	-
Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series Alloys
Steel	ASTM A 924/ ASTM A 924M	-
Terne and terne-coated stainless	-	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	-	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.0026 kg/m^2,
1 pound per square foot = 4.882 kg/m^2,
1 inch = 25.4 mm, 1 pound = 0.454 kg.
a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G-60.

TABLE 1507.4.3(2) MINIMUM CORROSION RESISTANCE

55% Aluminum-zinc alloy coated steel	ASTM A 792 AZ 50
5% Aluminum alloy-coated steel	ASTM A 875 GF60
Aluminum-coated steel	ASTM A 463 T2 65
Galvanized steel	ASTM A 653 G-90
Prepainted steel	ASTM A 755[a]

a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM A 875, ASTM A 463 or ASTM A 653.

1507.4.4 Attachment.

Metal roof panels shall be secured to the supports in accordance with the *approved* manufacturer's fasteners. In the absence of manufacturer recommendations, the following fasteners shall be used:

1. Galvanized fasteners shall be used for steel roofs.

2. Copper, brass, bronze, copper alloy or 300 series stainless-steel fasteners shall be used for copper roofs.

3. Aluminum-zinc coated fasteners are acceptable for aluminum-zinc coated roofs.

4. Stainless-steel fasteners are acceptable for all types of metal roofs.

1507.4.5 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12-gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

Reserved.

1507.4.5.1 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

1507.4.5.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5386

Date Submitted	7/19/2012	**Section**	1507.4.5 Underlayment	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5386-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn with the approval of Modification 5275

1507.4.5 Underlayment ~~and high wind~~.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap-nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Underlayment shall be installed as per manufacturer's installation guidelines

R5278

Date Submitted	7/18/2012	**Section**	1507.6 Mineral-surfaced roll roofing	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5278-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.6 Mineral-surfaced roll roofing.
The installation of mineral-surfaced roll roofing shall comply with this section.

1507.6.1 Deck requirements.
Mineral-surfaced roll roofing shall be fastened to solidly sheathed roofs.

1507.6.2 Deck slope.
Mineral-surfaced roll roofing shall not be applied on roof slopes below one unit vertical in 12 units horizontal (8-percent slope).

1507.6.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer'sinstallation instructions

1507.6.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap-nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.6.4 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ Reserved.

1507.6.5 Material standards.
Mineral-surfaced roll roofing shall conform to ASTM D 3909 or ASTM D 6380 Class M or Class WS.

1507.6 Mineral-surfaced roll roofing.
The installation of mineral-surfaced roll roofing shall comply with this section.

1507.6.1 Deck requirements.
Mineral-surfaced roll roofing shall be fastened to solidly sheathed roofs.

1507.6.2 Deck slope.
Mineral-surfaced roll roofing shall not be applied on roof slopes below one unit vertical in 12 units horizontal (8-percent slope).

1507.6.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

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1507.6.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.6.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.6.4 Ice barrier.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ Reserved.

1507.6.5 Material standards.

Mineral-surfaced roll roofing shall conform to ASTM D 3909 or ASTM D 6380 Class M or Class WS.

R5281

Date Submitted	7/18/2012	**Section**	1507.7 Slate shingles.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5281-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.7 Slate shingles.
The installation of slate shingles shall comply with the provisions of this section.

1507.7.1 Deck requirements.
Slate shingles shall be fastened to solidly sheathed roofs.

1507.7.2 Deck slope.
Slate shingles shall only be used on slopes of four units vertical in 12 units horizontal (4:12) or greater.

1507.7.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II. Underlayment shall be installed in accordance with the manufacturer's installation instructions

1507.7.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved.

1507.7.4 Ice barrier.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

1507.7.5 Material standards.
Slate shingles shall comply with ASTM C 406.

1507.7.6 Application.
Minimum headlap for slate shingles shall be in accordance with Table 1507.7.6. Slate shingles shall be secured to the roof with two fasteners per slate.

TABLE 1507.7.6 SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 < slope < 8:12	4
8:12 < slope < 20:12	3
slope = 20:12	2

For SI: 1 inch = 25.4 mm.

1507.7.7 Flashing.
Flashing and counterflashing shall be made with sheet metal. Valley flashing shall be a minimum of ~~15~~ 16 inches (381 mm) wide. Valley and flashing metal shall be a minimum ~~uncoated thickness of 0.0179-inch (0.455 mm) zinc-coated G90~~ thickness provided in Table 1503.2 nonferrous metal or stainless steel.~~Chimneys, stucco or brick walls shall have a minimum of two plies of felt for a cap flashing consisting of a 4-inch-wide (102 mm) strip of felt set in plastic cement and extending 1 inch (25 mm) above the first felt and a top coating of plastic cement. The felt shall extend over the base flashing 2 inches (51 mm).~~

1507.7 Slate shingles.
The installation of slate shingles shall comply with the provisions of this section.

1507.7.1 Deck requirements.
Slate shingles shall be fastened to solidly sheathed roofs.

1507.7.2 Deck slope.
Slate shingles shall only be used on slopes of four units vertical in 12 units horizontal (4:12) or greater.

1507.7.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

-

1507.7.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener

spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

1507.7.4 Ice barrier.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ Reserved.

1507.7.5 Material standards.
Slate shingles shall comply with ASTM C 406.

1507.7.6 Application.
Minimum headlap for slate shingles shall be in accordance with Table 1507.7.6. Slate shingles shall be secured to the roof with two fasteners per slate.

TABLE 1507.7.6 SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 < slope < 8:12	4
8:12 < slope < 20:12	3
slope = 20:12	2

For SI: 1 inch = 25.4 mm.

1507.7.7 Flashing.
Flashing and counterflashing shall be made with sheet metal. Valley flashing shall be a minimum of ~~15~~ 16 inches (381 mm) wide. Valley and flashing metal shall be a minimum ~~uncoated thickness of 0.0179-inch (0.455 mm) zinc-~~

~~coated G90~~ thickness provided in Table 1503.2 nonferrous metal or stainless steel.~~Chimneys, stucco or brick walls shall have a minimum of two plies of felt for a cap flashing consisting of a 4-inch-wide (102 mm) strip of felt set in plastic cement and extending 1 inch (25 mm) above the first felt and a top coating of plastic cement. The felt shall extend over the base flashing 2 inches (51 mm).~~

R5286

Date Submitted	7/18/2012	**Section**	1507.8 Wood shingles.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5286-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1507.8 Wood shingles.
The installation of wood shingles shall comply with the provisions of this section and Table 1507.8.

TABLE 1507.8 WOOD SHINGLE AND SHAKE INSTALLATION

ROOF ITEM	WOOD SHINGLES	WOOD SHAKES
1. Roof slope	Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (3:12) or greater.	Wood shakes shall be installed on slopes of four units vertical in 12 units horizontal (4:12) or greater.
2. Deck requirement		
Temperate climate	Shingles shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners.	Shakes shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners. When 1? × 4? spaced sheathing is installed at 10 inches, boards must be installed between the sheathing boards.
In areas where the average daily temperature in January is 25°F or less or where there is a possibility of ice forming along the eaves causing a backup of water.	Solid sheathing required.	Solid sheathing is required.
3. Interlayment	No requirements.	Interlayment shall comply with ASTM D 226, Type 1.
4. Underlayment		
Temperate climate	Underlayment shall comply with ASTM D 226, Type 1.	Underlayment shall comply with ASTM D 226, Type 1.
In areas where there is a possibility of ice forming along the eaves causing a backup of water.	An ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the eave's edge to a point at least 24 inches inside the exterior wall line of the building.	An ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the lowest edges of all roof surfaces to a point at least 24 inches inside the exterior wall line of the building.
5. Application		
Attachment	Fasteners for wood shingles shall be hot-dipped	Fasteners for wood shakes shall be hot-dipped galvanized

	galvanized or Type 304 (Type 316 for coastal areas) stainless steel with a minimum penetration of 0.75 inch into the sheathing. For sheathing less than 0.5 inch thick, the fasteners shall extend through the sheathing.	or Type 304 (Type 316 for coastal areas) with a minimum penetration of 0.75 inch into the sheathing. For sheathing less than 0.5 inch thick, the fasteners shall extend through the sheathing.
No. of fasteners	Two per shingle.	Two per shake.
Exposure	Weather exposures shall not exceed those set forth in Table 1507.8.7.	Weather exposures shall not exceed those set forth in Table 1507.9.8.
Method	Shingles shall be laid with a side lap of not less than 1.5 inches between joints in courses, and no two joints in any three adjacent courses shall be in direct alignment. Spacing between shingles shall be 0.25 to 0.375 inch.	Shakes shall be laid with a side lap of not less than 1.5 inches between joints in adjacent courses. Spacing between shakes shall not be less than 0.375 inch or more than 0.625 inch for shakes and taper sawn shakes of naturally durable wood and shall be 0.25 to 0.375 inch for preservative-treated taper sawn shakes.
Flashing	In accordance with Section 1507.8.8.	In accordance with Section 1507.9.9.

For SI: 1 inch = 25.4 mm, °C = [(°F) - 32]/1.8.

1507.8.1 Deck requirements.
Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

1507.8.1.1 Solid sheathing required.
~~Solid sheathing is required in areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water.~~ Reserved.

1507.8.2 Deck slope.
Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (25-percent slope) or greater.

1507.8.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869 Type I or II.

1507.8.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved

1507.8.4 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved

1507.8.5 Material standards.
Wood shingles shall be of naturally durable wood and comply with the requirements of Table 1507.8.5.

TABLE 1507.8.5 WOOD SHINGLE MATERIAL REQUIREMENTS

MATERIAL	APPLICABLE MINIMUM GRADES	GRADING RULES
Wood shingles of naturally durable wood	1, 2 or 3	CSSB

CSSB = Cedar Shake and Shingle Bureau

1507.8.6 Attachment.
Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of $^3/_4$ inch (19.1 mm) into the sheathing. For sheathing less than $^1/_2$ inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shingle shall be attached with a minimum of two fasteners.

1507.8.7 Application.
Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses, and not be in direct alignment in alternate courses. Spacing between shingles shall be $^1/_4$ to $^3/_8$ inches (6.4 to 9.5 mm). Weather exposure for wood shingles shall not exceed that set in Table 1507.8.7.

TABLE 1507.8.7 WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	3.75	5
		No. 2	3.5	4
		No. 3	3	3.5
	18	No. 1	4.25	5.5
		No. 2	4	4.5
		No. 3	3.5	4
	24	No. 1	5.75	7.5
		No. 2	5.5	6.5
		No. 3	5	5.5

For SI: 1 inch = 25.4 mm.

1507.8.8 Flashing.
At the juncture of the roof and vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, ~~shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal~~ comply with Table 1503.2. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) layer of underlayment of either one layer of Type I underlayment running the full length of the valley or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment~~. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solidly cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed.~~

1507.8 Wood shingles.
The installation of wood shingles shall comply with the provisions of this section and Table 1507.8.

TABLE 1507.8 WOOD SHINGLE AND SHAKE INSTALLATION

ROOF ITEM	WOOD SHINGLES	WOOD SHAKES
1. Roof slope	Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (3:12) or greater.	Wood shakes shall be installed on slopes of four units vertical in 12 units horizontal (4:12) or greater.
2. Deck requirement		
Temperate climate	Shingles shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners.	Shakes shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners. When 1? × 4? spaced sheathing is installed at 10 inches, boards must be installed between the sheathing boards.
In areas where the average daily temperature in January is 25°F or less or where there is a possibility of ice forming along the eaves causing a backup of water.	Solid sheathing required.	Solid sheathing is required.
3. Interlayment	No requirements.	Interlayment shall comply with ASTM D 226, Type 1.
4. Underlayment		
Temperate climate	Underlayment shall comply with ASTM D 226, Type 1.	Underlayment shall comply with ASTM D 226, Type 1.
In areas where there is a possibility of ice forming along the eaves causing a backup of water.	An ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the eave's edge to a point at least 24 inches inside the exterior wall line of the building.	An ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall extend from the lowest edges of all roof surfaces to a point at least 24 inches inside the exterior wall line of the building.
5. Application		
Attachment	Fasteners for wood shingles shall be hot-dipped	Fasteners for wood shakes shall be hot-dipped galvanized

	galvanized or Type 304 (Type 316 for coastal areas) stainless steel with a minimum penetration of 0.75 inch into the sheathing. For sheathing less than 0.5 inch thick, the fasteners shall extend through the sheathing.	or Type 304 (Type 316 for coastal areas) with a minimum penetration of 0.75 inch into the sheathing. For sheathing less than 0.5 inch thick, the fasteners shall extend through the sheathing.
No. of fasteners	Two per shingle.	Two per shake.
Exposure	Weather exposures shall not exceed those set forth in Table 1507.8.7.	Weather exposures shall not exceed those set forth in Table 1507.9.8.
Method	Shingles shall be laid with a side lap of not less than 1.5 inches between joints in courses, and no two joints in any three adjacent courses shall be in direct alignment. Spacing between shingles shall be 0.25 to 0.375 inch.	Shakes shall be laid with a side lap of not less than 1.5 inches between joints in adjacent courses. Spacing between shakes shall not be less than 0.375 inch or more than 0.625 inch for shakes and taper sawn shakes of naturally durable wood and shall be 0.25 to 0.375 inch for preservative-treated taper sawn shakes.
Flashing	In accordance with Section 1507.8.8.	In accordance with Section 1507.9.9.

For SI: 1 inch = 25.4 mm, °C = [(°F) - 32]/1.8.

1507.8.1 Deck requirements.
Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

1507.8.1.1 Solid sheathing required.
~~Solid sheathing is required in areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water.~~ Reserved.

1507.8.2 Deck slope.
Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (25-percent slope) or greater.

1507.8.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869 Type II or IV.

-

1507.8.3.1 Underlayment and high wind.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

1507.8.4 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ Reserved

1507.8.5 Material standards.
Wood shingles shall be of naturally durable wood and comply with the requirements of Table 1507.8.5.

TABLE 1507.8.5 WOOD SHINGLE MATERIAL REQUIREMENTS

MATERIAL	APPLICABLE MINIMUM GRADES	GRADING RULES
Wood shingles of naturally durable wood	1, 2 or 3	CSSB

CSSB = Cedar Shake and Shingle Bureau

1507.8.6 Attachment.
Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of $^3/_4$ inch (19.1 mm) into the sheathing. For sheathing less than $^1/_2$ inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shingle shall be attached with a minimum of two fasteners.

1507.8.7 Application.
Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses, and not be in direct alignment in alternate courses. Spacing between shingles shall be $^1/_4$ to $^3/_8$ inches (6.4 to 9.5 mm). Weather exposure for wood shingles shall not exceed that set in Table 1507.8.7.

TABLE 1507.8.7 WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	3.75	5
		No. 2	3.5	4
		No. 3	3	3.5

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		No. 2	4	4.5
		No. 3	3.5	4
	24	No. 1	5.75	7.5
		No. 2	5.5	6.5
		No. 3	5	5.5

For SI: 1 inch = 25.4 mm.

1507.8.8 Flashing.
At the juncture of the roof and vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, ~~shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal~~ comply with Table 1503.2. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) layer of underlayment of either one layer of Type I underlayment running the full length of the valley or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment~~. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solidly cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed.~~

R5284

Date Submitted	7/18/2012	**Section**	1507.9 Wood shakes.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5284-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5284-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

Comment made at TAC meeting that ASTM D1970 should be allowed as underlayment is not in compliance with the technical bulletin issued by the Cedar Shake & Shingle Bureau (attached)

1507.9 Wood shakes.

The installation of wood shakes shall comply with the provisions of this section and Table 1507.8.

1507.9.1 Deck requirements.

Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) o.c., additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

1507.9.1.1 Solid sheathing required.

~~Solid sheathing is required in areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water.~~ Reserved.

1507.9.2 Deck slope.

Wood shakes shall only be used on slopes of four units vertical in 12 units horizontal (33-percent slope) or greater.

1507.9.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II

1507.9.3.1 Underlayment and high wind.

~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.9.4 Ice barrier.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ **Reserved.**

1507.9.5 Interlayment.
Interlayment shall comply with ASTM D 226, Type I.

1507.9.6 Material standards.
Wood shakes shall comply with the requirements of Table 1507.9.6.

TABLE 1507.9.6 WOOD SHAKE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shakes of naturally durable wood	1	CSSB
Taper sawn shakes of naturally durable wood	1 or 2	CSSB
Preservative-treated shakes and shingles of naturally durable wood	1	CSSB
Fire-retardant-treated shakes and shingles of naturally durable wood	1	CSSB
Preservative-treated taper sawn shakes of Southern pine treated in accordance with AWPA U1 (Commodity Specification A, Use Category 3B and Section 5.6)	1 or 2	TFS

CSSB = Cedar Shake and Shingle Bureau.
TFS = Forest Products Laboratory of the Texas Forest Services.

1507.9.7 Attachment.

Fasteners for wood shakes shall be corrosion resistant with a minimum penetration of $^3/_4$ inch (19.1 mm) into the sheathing. For sheathing less than $^1/_2$ inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shake shall be attached with a minimum of two fasteners.

1507.9.8 Application.

Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ to $^5/_8$ inches (9.5 to 15.9 mm) for shakes and taper sawn shakes of naturally durable wood and shall be $^1/_4$ to $^3/_8$ inch (6.4 to 9.5 mm) for preservative taper sawn shakes. Weather exposure for wood shakes shall not exceed those set in Table 1507.9.8.

1507.9.9 Flashing.

At the juncture of the roof and vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, ~~shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal~~ comply with Table 1503.2. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) layer of underlayment of either one layer of Type I underlayment running the full length of the valley or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment~~. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing underlayment shall be solidly cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed.~~

1507.9 Wood shakes.
The installation of wood shakes shall comply with the provisions of this section and Table 1507.8.

1507.9.1 Deck requirements.
Wood shakes shall only be used on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) o.c., additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

1507.9.1.1 Solid sheathing required.
~~Solid sheathing is required in areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water.~~ Reserved.

1507.9.2 Deck slope.
Wood shakes shall only be used on slopes of four units vertical in 12 units horizontal (33-percent slope) or greater.

1507.9.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or IV.

-

1507.9.3.1 Underlayment and high wind.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch spacing (152 mm) at the side laps. Underlayment shall be applied in accordance with the manufacturer's installation instructions except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

1507.9.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

1507.9.4 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ **Reserved.**

1507.9.5 Interlayment.
Interlayment shall comply with ASTM D 226, Type I.

1507.9.6 Material standards.
Wood shakes shall comply with the requirements of Table 1507.9.6.

TABLE 1507.9.6 WOOD SHAKE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shakes of naturally durable wood	1	CSSB
Taper sawn shakes of naturally durable wood	1 or 2	CSSB
Preservative-treated shakes and shingles of naturally durable wood	1	CSSB

Fire-retardant-treated shakes and shingles of naturally durable wood	1	CSSB
Preservative-treated taper sawn shakes of Southern pine treated in accordance with AWPA U1 (Commodity Specification A, Use Category 3B and Section 5.6)	1 or 2	TFS

CSSB = Cedar Shake and Shingle Bureau.
TFS = Forest Products Laboratory of the Texas Forest Services.

1507.9.7 Attachment.
Fasteners for wood shakes shall be corrosion resistant with a minimum penetration of $^3/_4$ inch (19.1 mm) into the sheathing. For sheathing less than $^1/_2$ inch (12.7 mm) in thickness, the fasteners shall extend through the sheathing. Each shake shall be attached with a minimum of two fasteners.

1507.9.8 Application.
Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ to $^5/_8$ inches (9.5 to 15.9 mm) for shakes and taper sawn shakes of naturally durable wood and shall be $^1/_4$ to $^3/_8$ inch (6.4 to 9.5 mm) for preservative taper sawn shakes. Weather exposure for wood shakes shall not exceed those set in Table 1507.9.8.

1507.9.9 Flashing.

At the juncture of the roof and vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, ~~shall not be less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal~~ comply with Table 1503.2. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) layer of underlayment of either one layer of Type I underlayment running the full length of the valley or a self-adhering polymer-modified bitumen sheet complying with ASTM D 1970, in addition to other required underlayment~~. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley~~

~~flashing underlayment shall be solidly cemented to the roofing underlayment for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed.~~

Cedar Shake & Shingle Bureau

TECHNICAL BULLETIN

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Overview

This product is used as part of cedar roofing and wall systems. It enhances a system's water shedding ability and helps prevent the intrusion of wind driven snow which can cause ice damming. Sheathing and roofing systems are separate systems; both systems are required by building code and need to be properly designed and installed. Three main types of products need to be considered:
1) underlayment 2) interlayment and 3) eave production.

Correct Specifications

The CSSB's **New Roof Construction Manual** shows how to install these products:

Underlayment/Interlayment

Many of the segments in the market use a general term when ordering or specifying a particular type of product. Asphalt-Saturated Organic Felt Underlayment ("felt") is most commonly stated as '30 pound felt' or 'Type 30 felt'. These 'terms' may allow for inappropriate or substandard products to be used; further definitions are becoming necessary to follow current industry developments. Ensure the most detailed specifications are used to maintain the integrity of a project and compliance with local building codes.

The American Society for Testing Materials Standards ("ASTM") for Asphalt-Saturated Organic Felt Definitions:

ASTM Designation 226 (ASTM D 226) is the "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing"

ASTM Designation 4869 (ASTM D 4869) is the "Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing"

ASTM notes that:

1) Type 30 felt is more of a name today than a weight reference.

2) The specification in jobs would be ASTM Designation 226 ("ASTM" D 226) or ASTM Designation 4869 ("ASTM" D 4869). Check www.astm.org for the most current information.

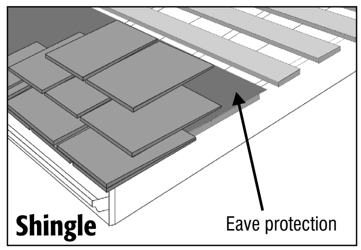
There are differences in the asphalt content and composition of the felt within ASTM Designations. It is important to check with local building code requirements when specifying the ASTM Designation number as some codes require the use of a specific ASTM Designation for roof and sidewall application.

Manufacturers of these products still use a "Type 15" or "Type 30" identifier on the product identification bands but also will state ASTM Designation 226 or ASTM Designation 4869 when the product meets ASTM standards. The CSSB recommends specifiers always state a **No.30 ASTM D 226** or **No.30 ASTM D 4869** felt in addition to the "Type 30" referred to in the CSSB's New Roof Construction Manual and the CSSB's Exterior and Interior Wall Manual.

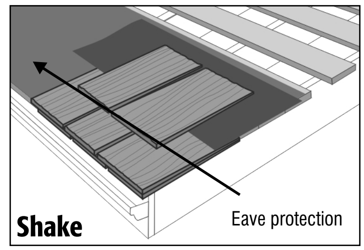
Self-Adhesive Eave Protection

Self adhesive eave protection is a rubberized type of asphalt material used at the bottom of the roof near the gutter area. It is in place to prevent ice damming and water intrusion from the eaves.

It may be used at the eaves and valleys in geographical areas prone to ice damming, on both cedar shake and cedar shingle roofs (consult local building codes for more details).



Underlayment



Interlaid/Interwoven Felt

Caution Areas

- There is a trend where some installers are putting rubberized eave protection over the entire roofing deck. Contact the rubberized eave manufacturer for complete installation instructions and information on how to prevent condensation and moisture issues.
- Current CSSB policy is to only apply this rubberized eave protection at the eaves and valleys.
- Interlay shakes with 18" wide felt and ensure to check with local building code for ASTM Designation 226 requirements
- Never interlay shingles with felt (it is already a 3-ply system) UNLESS absolutely required by local building code
- Do not position felt lower than double the exposure of the product. If the felt does extend below this line it is commonly referred to as 'rot felting' since the felt is susceptible to deterioration from the sun's UV rays. Rot felting can also prevent proper drying of shakes and shingles, thus shortening their life.

Type 30 ASTM Felt

Self-adhesive eave protection (do not confuse with Type 30 ASTM felt)

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Cedar Shake & Shingle Bureau

TECHNICAL BULLETIN PAGE 2

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Frequently Asked Questions:

Current Industry Trends

- Vapor permeable banner wrap type products have made inroads in house design and construction in the recent past. Use of this type of product should only be considered if the local building official approves of this variation from the installation methods recommended by the CSSB. Also consider the data at www.umass.edu/bmatwt/publications, Housewraps/Felt and Weather Penetration Barriers - author Paul Fisette
- Modern homes are built more air tight, and this means that proper ventilation of the structure is even more crucial. The CSSB recommends venting no less than 1:150 with compensation made for screens over vent apperatures. In the case of a balanced system 1 square foot per 300 square feet of floor area may be adequate ventilation. Check with the local building official for more information.

Do I have to use a continuous ventilation product on my installation?
Not necessarily. The continuous ventilation product is an option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

Can I use a continuous ventilation product instead of felt?
No. Felt is a must. The continuous ventilation product is an additional option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options. Remember: do not interlay shingles with felt unless required by local code.

Can I use a continuous ventilation product immediately on top of felt?
No. If you elect to use a continuous ventilation product, it should be installed between the sheathing (deck) and the felt. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

When I hear "30 pound felt" does it mean the same thing as "Type 30 felt"?
In the construction and roofing trades, it is common for people to use the terms interchangeably. Type 30 felt comes in many varieties. Ensure you also write in the correct ASTM Designation in your detailed specification to guarantee that you are obtaining quality materials.

The information in this bulletin is not intended to supercede local building codes. Check with your local building official for final approval. The CSSB assumes no liability for any application non-conformance.

This bulletin only provides a short overview of this technical topic. For additional details consult:
1) CSSB's New Roof Construction Manual &
2) CSSB's Exterior and Interior Wall Manual; these are recommended reading materials.

For additional industry information:

Cedar Shake & Shingle Bureau	www.cedarbureau.org
American Forest and Paper Association	www.afandpa.org
American Society for Testing and Materials	www.astm.org
American Wood Council	www.awc.org
Canadian Wood Council	www.cwc.ca
Federation of Societies for Coatings Technology	www.coatingstech.org
Forintek Canada	www.forintek.ca
International Staple, Nail & Tool Association	www.isanta.org
University of Massachusetts	www.umass.edu/bmatwt/publications
USDA Forest Products Laboratory	www.fpl.fs.fed.us

Known as the recognized industry authority since 1915, the Cedar Shake and Shingle Bureau ("CSSB") is a successful, integrated and global trade association, offering a full range of services including technical assistance, building code updates, and weather resistant product details. Contact the CSSB for more information.

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R5405

Date Submitted	7/19/2012	**Section**	1507.9.2 Deck slope.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5405-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

1507.9.2 Deck slope.

Wood shakes shall only be used on slopes of ~~four~~ three units vertical in 12 units horizontal (33-percent slope) or greater.

R5268

Date Submitted	7/18/2012	**Section**	1507	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5268-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

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.

1507.2 Asphalt shingles.
The installation of asphalt shingles shall comply with the provisions of this section.

1507.2.1 Deck requirements.
Asphalt shingles shall be fastened to solidly sheathed decks.

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.

1507.2.3 Underlayment.

Unless otherwise noted, required underlayment shall conform to ASTM D 226, Type I <u>or Type</u> II, or ASTM D 4869 Type I <u>or Type II</u> or ASTM D 6757.

1507.2.4 Self-adhering polymer modified bitumen sheet.
Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.

1507.2.5 Asphalt shingles.
Asphalt shingles shall <u>have self-seal strips or be interlocking and</u> comply with ASTM D 225 or ASTM D 3462. <u>Shingles shall also comply with Table 1507.2.7.1. Asphalt shingle packaging shall bear labeling indicating compliance with one of the required classifications as shown in Table 1507.2.7.1.</u>

1507.2.6 Fasteners.
Fasteners for asphalt shingles shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12 gage [0.105 inch (2.67 mm)] shank with a minimum $^3/_8$ inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and a minimum of $^3/_4$ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than $^3/_4$ inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F 1667.

<u>**1507.2.6.1**</u>
<u>The nail component of plastic cap nails shall meet the corrosion resistance requirements of Section 1507.5.</u>

R5268 Text Modification

Page: 2

1507.2.7 Attachment.

Asphalt shingles shall have the minimum number of fasteners required by the manufacturer~~, but~~ and Section 1504.1. Asphalt shingles shall be secured to the roof with not less than four fasteners per strip shingle or two fasteners per ~~individual~~ strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 21 units vertical in 12 units horizontal (21:12), asphalt shingles shall be installed ~~as required by~~ in accordance with the manufacturer's printed installation instructions for steep-slope roof applications.

1507.2.7.1 Wind Resistance of Asphalt Shingles.

Asphalt Shingles shall be ~~tested~~ classified in accordance with ASTM D 3161, TAS 107 or ASTM D 7158 ~~in accordance with Table 1507.2.7.1. Asphalt shingles shall meet the classification requirements of Table 1507.2.7.1(1) for the appropriate maximum basic wind speed.~~ Shingles classified as ASTM D 3161 Class D or ASTM D 7158 Class G are acceptable for use in the 100-mph wind zone. Shingles classified as ASTM D 3161 Class F, TAS107 or ASTM D 7158 Class H are acceptable for use in all wind zones. Asphalt shingle ~~packaging~~ wrappers shall ~~bear a label to~~ indicate compliance ~~with ASTM D 7158 and the~~ with one of the required classifications as shown in Table 1507.2.7.(1).

~~Exception: Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table 1507.2.7.1(2).~~

TABLE 1507.2.7.1(1) CLASSIFICATION OF ASPHALT ~~ROOF SHINGLES PER ASTM D 7158[a]~~

~~NOMINAL DESIGN WIND SPEED, V_{asd}[b] (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~D, G or H~~
~~90~~	~~D, G or H~~
~~100~~	~~G or H~~
~~110~~	~~G or H~~
~~120~~	~~G or H~~
~~130~~	~~H~~
~~140~~	~~H~~
~~150~~	~~H~~

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

~~a. The standard calculations contained in ASTM D 7158 assume exposure category B or C and building height of 60 feet or less. Additional calculations are required for conditions outside of these assumptions.~~

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

MAXIMUM BASIC WIND SPEED FROM FIGURE 1609A, B, C or ASCE-7	V_{asd}	ASTM D 7158	ASTM D 3161
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F

155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

TABLE 1507.2.7.1(2) CLASSIFICATION OF ASPHALT SHINGLES PER ASTM D 3161

~~NOMINAL DESIGN WIND SPEED, V_{asd}[a] (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~A, D or F~~
~~90~~	~~A, D or F~~
~~100~~	~~A, D or F~~
~~110~~	~~F~~
~~120~~	~~F~~
~~130~~	~~F~~
~~140~~	~~F~~
~~150~~	~~F~~

~~For SI: 1 mph = 0.447 m/s.~~
~~a. V_{asd} shall be determined in accordance with Section 1609.3.1.~~
Reserved.

1507.2.8 Underlayment application.
For roof slopes from two units vertical in 12 units horizontal (17-percent slope) and up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a minimum 19-inch-wide (483 mm) strip of underlayment felt parallel with 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), by fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

1507.2.8.1 High wind attachment.
~~Underlayment applied in areas subject to high winds [V_{asd} greater than 110 mph (49 m/s) as determined in accordance with Section 1609.3.1] shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.~~

~~Underlayment installed where V_{asd}, in accordance with Section 1609.3.1, equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall~~

~~be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section 1507.2.8 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25 mm) with a thickness of at least 32-gauge [0.0134 inch (0.34 mm)] sheet metal. The cap nail shank shall be a minimum of 12 gauge [0.105 inch (2.67 mm)] with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved

1507.2.8.2 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of at least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~

Reserved.

1507.2.9 Flashings.
Flashing for asphalt shingles shall comply with this section. Flashing shall be applied in accordance with this section and the asphalt shingle manufacturer's printed instructions.

1507.2.9.1 Base and ~~cap~~ counter flashing.
Base and ~~cap~~ counter flashing shall be installed ~~in accordance with the manufacturer's instructions. Base flashing shall be of either corrosion-resistant metal of minimum nominal 0.019-inch (0.483 mm) thickness or mineral-surfaced roll roofing weighing a minimum of 77 pounds per 100 square feet (3.76 kg/m^2). Cap flashing shall be corrosion-resistant metal of minimum nominal 0.019-inch (0.483 mm) thickness.~~ as follows:

Base and counter flashing shall be installed as follows:

1. In accordance with manufacturer's installation instructions, or

2. A continuous metal minimum 4? × 4? "L" flashing shall be set in approved flashing cement and set flush to base of wall and over the underlayment. Both horizontal and vertical metal flanges shall be fastened 6 inches (152 mm) on center with approved fasteners. All laps shall be a minimum of 4 inches (102 mm) fully sealed in approved flashing cement. Flashing shall start at the lower portion of roof to insure water-shedding capabilities of all metal laps. The entire edge of the horizontal flange shall be sealed covering all nail penetrations with approved flashing cement and membrane. Shingles will overlap the horizontal flange and shall be set in approved flashing cement.

Base flashing shall be of either corrosion resistant metal with a minimum thickness provided in Table 1503.2 or mineral surface roll roofing weighing a minimum of 77 pounds per 100 square feet (3.76 kg/m^2). Counter flashing shall be corrosion resistant metal with a minimum thickness provided in Table 1503.2.

1507.2.9.2 Valleys.
Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be at least ~~24~~ 16 inches (~~610~~ 406 mm) wide and of any of the corrosion-resistant metals in Table 150~~7~~3.2~~.9. 2~~.

2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing complying with ASTM D 3909 or ASTM D 6380 Class M shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer a minimum of 36 inches (914 mm) wide.

3. For closed valleys (valleys covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D 6380 Class S , and at least 36 inches (914 mm) wide or types as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 shall be permitted in lieu of the lining material.

TABLE 1507.2.9.2 VALLEY LINING MATERIAL

~~MATERIAL~~	~~MINIMUM THICKNESS~~	~~GAGE~~	~~WEIGHT~~
~~Aluminum~~	~~0.024 in.~~	—	—
~~Cold-rolled copper~~	~~0.0216 in.~~	—	~~ASTM B 370, 16 oz. per square ft.~~
~~Copper~~	—	—	~~16 oz~~
~~Galvanized steel~~	~~0.0179 in.~~	~~26 (zinc-coated G90)~~	—
~~High-yield copper~~	~~0.0162 in.~~	—	~~ASTM B 370, 12 oz. per square ft.~~
~~Lead~~	—	—	~~2.5 pounds~~
~~Lead-coated copper~~	~~0.0216 in.~~	—	~~ASTM B 101, 16 oz. per square ft.~~
~~Lead-coated high-yield copper~~	~~0.0162 in.~~	—	~~ASTM B 101, 12 oz. per square ft.~~
~~Painted terne~~	—	—	~~20 pounds~~
~~Stainless steel~~	—	~~28~~	—
~~Zinc alloy~~	~~0.027 in.~~	—	—

~~For SI: 1 inch = 25.4 mm, 1 pound = 0.454 kg, 1 ounce = 28.35 g, 1 square foot = 0.093 m²~~.

Reserved.

.

1507.2.9.3 Drip edge.

Provide drip edge at eaves and gables of shingle roofs. Overlap to be a minimum of ~~2~~ 3 inches (~~51~~ 76 mm). Eave drip edges shall extend ~~¼~~ 1/2 inch (~~6.4~~ 13 mm) below sheathing and extend back on the roof a minimum of 2 inches (51 mm). Drip edge at eaves shall be permitted to be installed either over or under the underlayment. If installed over the underlayment, there shall be a minimum 4 inches (51 mm) width of roof cement installed over the drip edge flange. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the V_{asd} 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.

R5738

Date Submitted	7/31/2012	**Section**	1508.1 General	**Proponent**	Deborah Lawson
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

#5739 and #5742

Summary of Modification

Use of above-deck thermal insulation -- adds Factory Mutual reference for cellular concrete.

Rationale

This technical modification provides guidance when lightweight insulating concrete is utilized and recognizes that testing procedures that are equivalent to Factory Mutual testing are utilized.

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.

Requirements

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

Improves clarity of code with respect to use of lightweight insulating concrete as a roof insulation material.

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

Improves clarity of code with respect to use of lightweight insulating concrete as a roof insulation material.

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

Proposed modification includes FM reference within existing section of approval references and provides guidance and clarification without discrimination to other materials, products, methods or systems.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5738-A1

Proponent Deborah Lawson **Submitted** 12/14/2012 **Attachments** Yes

Rationale

Based on comments received from the Roofing TAC at their October meeting, The Florida Roof Deck Association proposes this alternative language to section 1508.1 which more clearly references the proper ASTM and UL standards for above-deck thermal insulation. Per the comments of TAC member Lorraine Ross, this language more clearly defines the references for fire and wind resistance. FM 4454 and ANSI/UL 263(ASTM E119) are attached.

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

Requirements

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

Including the proper code standards for above-deck thermal insulation improves and strengthens the code.

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

Brings the code current with updated and complete standards for above-deck thermal insulation.

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

Strengthens the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

R5738-G1

Proponent	Leo Legatski	Submitted	12/14/2012	Attachments	No

Comment:

Elastizell Corporation of America supports this proposed Florida-specific code modification. Inclusion of the appropriate FM and UL references are of substantial benefit to the Florida Code.

1508.1 General.

The use of above-deck thermal insulation shall be permitted provided such insulation is covered with an *approved* roof covering and passes the tests of FM 4450, FM 4454, ~~or~~ UL 1256, or equivalent, when tested as an assembly.

Exceptions:

1. Foam plastic roof insulation shall conform to the material and installation requirements of Chapter 26.

2. Where a concrete roof deck is used and the above-deck thermal insulation is covered with an *approved* roof covering.

1508.1 General

The use of above-deck thermal insulation shall be permitted provided such insulation is covered with an approved roof covering and passes the tests of FM 4450, FM 4454 or UL 1256 (for wind uplift resistance), and ANSI/UL 263 or ASTM E119 (for fire resistance), when tested as an assembly.

ONLINE CERTIFICATIONS DIRECTORY

UL Online Certifications Directory

BXUV.GuideInfo
Fire Resistance Ratings - ANSI/UL 263

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Fire Resistance Ratings - ANSI/UL 263

Guide Information for Fire Resistance Ratings

Design Information Section

The Design Information Section supplements the individual published designs and is organized as follows:

I. INTRODUCTION

II. GENERAL

III. FLOOR-CEILINGS AND ROOF-CEILINGS

IV. BEAMS

V. COLUMNS

VI. WALLS AND PARTITIONS

I. INTRODUCTION

This category covers fire-rating Classifications based upon the test method and acceptance criteria in ANSI/UL 263 (ASTM E119 and NFPA 251), "Fire Tests of Building Construction and Materials." The ratings are expressed in hours and are applicable to floor-ceilings, roof-ceilings, beams, columns, walls and partitions.

The average furnace temperature from which these ratings are derived is 1000°F at 5 min., 1400°F at 15 min., 1550°F at 30 min., 1700°F at 60 min., 1850°F at 120 min., 1925°F at 180 min. and 2000°F at 240 min.

When a test assembly complies with the acceptance criteria, a detailed description of the assembly, its performance in the fire test and other pertinent details such as specification of materials, Classification coverage and alternate assembly details are included in a Report for the test sponsor. Sponsors may provide copies of the complete Test Report upon request. The Report also contains a summary of important features of the rated assembly. These summaries are also published in this Directory. Variations from the published specifications should be considered as not being investigated by UL.

NUMBERING SYSTEM FOR FIRE-RATED ASSEMBLIES

	TYPES OF PROTECTION								
	Membrane Protection						**Direct Applied Protection**		**Unprotected**
Groups of Construction	**000-099**	**100-199**	**200-299**	**300-399**	**400-499**	**500-599**	**600-699**	**700-899**	**900-999**
Floors-Ceilings: A or B* Concrete and Cellular Steel Floor C - Glazing Systems	Concealed Grid Sys.	(Reserved)	Exposed Grid System	(Reserved)	Metal Lath	Gypsum Board	Misc.	SFRM+	Unprotected
D, E* or F* Concrete and Steel Floor Units	Concealed Grid Sys.	(Reserved)	Exposed Grid System	Mineral and Fiber Boards	Metal Lath	Gypsum Board	Mastic and Intumescent Coatings	SFRM+	Unprotected
G, H* or I* Concrete and	Concealed Grid Sys.	(Reserved)	Exposed Grid System	Mineral and Fiber Boards	Metal Lath	Gypsum Board	Misc.	SFRM+	Unprotected

Steel Joists									
J or K Concrete	Concealed Grid Sys.	(Reserved)	Exposed Grid System	Mineral and Fiber Boards	Metal Lath	Gypsum Board	Misc.	SFRM+	Unprotected
L or M Wood Joist or Combination Wood and Steel Assemblies	Concealed Grid Sys.	(Reserved)	Exposed Grid System	(Reserved)	Metal Lath	Gypsum Board	Misc.	SFRM+	Unprotected
Beams: N or O* for Floor-Ceiling	Concealed Grid Sys.	(Reserved)	Exposed Grid System	Batts and Blankets or Mineral and Fiber Boards	Metal Lath	Gypsum Board	Mastic and Intumescent Coatings	SFRM+	Unprotected
Roof-Ceiling: P, Q* or R*	Concealed Grid Sys.	(Reserved)	Exposed Grid System	Mineral and Fiber Boards	Metal Lath	Gypsum Board	Misc.	SFRM+	Unprotected
Beams: S or T* for Roof-Ceiling	Building Units	(Reserved)	Exposed Grid System	Mineral and Fiber Boards	Metal Lath	Gypsum Board	Mastic and Intumescent Coatings	SFRM+	Unprotected
Wall and Partition: U, V or W	Building or Partition Panel Units	(Reserved)	Insulating Concrete	Wood Stud, Gypsum Board, Lath &/or Plaster	Metal Stud, Gypsum Board, Lath &/or Plaster	Misc.	Metal Panels, Gypsum Board, Lath &/or Plaster	SFRM+	Masonry

Columns: X, Y or Z*	Building Units	Prefabricated	Mat Materials	Batts and Blankets or Mineral and Fiber Boards	Metal Lath & Plaster	Gypsum Board	Mastic and Intumescent Coatings	SFRM+	Masonry

The prefix numbers with an asterisk (*) and the design numbers indicated as "Reserved" in the above table are for future expansion and to cater to new types of systems developed in the future.

+ SFRM denotes Spray-applied Fire-resistive Materials

1. Rapid Rise Fire Test

Fire-resistance designs for protecting structural members subject to petrochemical exposure fires are investigated to ANSI/UL 1709, "Rapid Rise Fire Tests of Protection Materials for Structural Steel," and are covered under Fire Resistance Ratings - ANSI/UL 1709 (BYBU). Systems complying with these requirements include an "XR" design prefix.

2. Definitions

Definitions of selected terms used to identify the types of protection referenced in the following Numbering System Table are:

Batts and Blankets — A category for a group of UL Classified products. The complete description of the products in the category and supplementary requirements for Classification are covered under Batts and Blankets (BZJZ).

Building Units — A category for a group of UL Classified products. The complete description of the products in the category and supplementary requirements for Classification are covered under Building Units (BZXX).

Concealed Grid System — Suspension system for acoustical material that is not visible from the occupied space.

Exposed Grid System — Suspension system for acoustical material that is visible from the occupied space.

Fire-resistant Joint System — An assemblage of specific materials or products rated in accordance with ANSI/UL 2079 to resist for a prescribed period of time, the passage of fire through joints between fire-resistance-rated assemblies. See Joint Systems (XHBN).

Insulating Concrete — Nonstructural concrete with a unit weight less than 60 pcf.

Membrane Penetration — An opening made through one side (wall, floor or ceiling membrane) of a fire-resistance-rated assembly.

Mineral and Fiber Boards — A category for a group of UL Classified products. The complete description of the products in the category and supplementary requirements for Classification are covered under Mineral and Fiber Boards (CERZ).

Miscellaneous (Direct-applied Protection) — Various types of fire-resistive coating materials, including intumescent mastic and subliming coatings.

Miscellaneous (Wall and Partitions) — Various types of wall assemblies, including gypsum wallboard shaft walls, log walls, folding assemblies and assemblies with glazing materials.

Partition Panel Units — A category for a group of UL Classified Products. The complete description of the products in the category and supplementary requirements for Classification are covered under Units, Partition Panel (CJMR).

Prefabricated Building Columns — Structural building columns that include a fire-resistive protection system when delivered to the construction site. These products are Classified and identified as Prefabricated Building Columns (CGHT). The complete description of the products and supplementary requirements for Classification are covered under CGHT.

Through Penetration — An item such as a pipe, cable tray or duct that passes through a horizontal or vertical fire-resistive assembly.

Through-penetration Firestop Systems — An assemblage of specific materials rated in accordance with ANSI/UL 1479 (ASTM E814). Firestop systems maintain the fire containment integrity of horizontal or vertical fire-resistive assemblies where through penetrations are located. See Through-penetration Firestop Systems (XHEZ).

Unprotected Fire-resistive Assemblies — Assemblies that do not require direct applied coatings or suspended ceilings to protect the structural elements.

3. Numbering System

The summarized form of the test assembly is identified by an alphanumeric design number. The prefix letter designates the group of construction, the first number designates the type of protection and the other numbers and letters identify the particular assembly.

The prefix letters representing the various groups of constructions are:

Prefix Letters	Group of Construction
A	Floor-Ceiling Designs - Concrete with Cellular Steel Floor Units and Beam Support

D	Floor-Ceiling Designs - Concrete with Steel Floor Units and Beam Support
G	Floor-Ceiling Designs - Concrete and Steel Joists
J or K	Floor-Ceiling Designs - Precast and Field Poured Concrete
L	Floor-Ceiling Designs - Wood or Combination Wood and Steel Joist Assemblies
N	Beam Designs for Floor-Ceiling Assemblies
P	Roof-Ceiling Designs
S	Beam Designs for Roof-Ceiling Assemblies
U or V	Wall and Partition Designs
X or Y	Column Designs

II. GENERAL

The following information is appropriate to all fire-resistive designs described in this Directory. It is recommended that the users review this information in addition to the general guidelines provided for specific materials and construction types.

Authorities Having Jurisdiction should be consulted before construction.

Fire-resistance ratings apply only to assemblies in their entirety. Except for those separately rated structural members supporting tested assemblies, individual components are not assigned a fire-resistance rating and are not intended to be interchanged between assemblies but rather are designated for use in a specific design in order that the ratings of the design may be achieved.

All ratings are based on the assumption that the stability of structural members supporting the assembly are not impaired by the effects of fire. The extent of damage of the test assembly at the rating time is not a criteria for the rating.

The specifications for materials in an assembly are important details in the development of fire-resistance ratings. Those materials provided with an "*" in the design text are eligible to be produced under the Follow-Up Service Program of UL. Information identifying such materials and the Classified companies authorized to provide the materials are located in the product category section of this Directory. The appearance of the Classification Mark on the product is the only method provided by UL to identify products that have been produced under its Follow-Up Service.

1. Metric Dimensions

It is recommended that the Metric Guide for Federal Construction published by the National Institute of Building Sciences (NIBS) be consulted for guidance regarding the use of metric dimensioned building materials. The dimensional conversion of building materials from the inch-pound system to metric may either be hard or soft.

Hard conversions are typically applied to manufactured products used in modular construction. These products include suspended ceiling systems, gypsum wallboard, insulation boards, etc. Classified products which are available in metric sizes are identified in the Classification information for the individual product categories located near the end of this Directory.

For soft conversions, inch-pound dimensions are mathematically converted to exact equivalent metric values. Examples of dimensions which may be soft converted include concrete thickness, depth of concealed space above suspended ceilings and coating thicknesses.

It is recommended that dimensions which are identified as minimum or maximum in fire-resistive designs be initially softly converted and, if required, further converted to a hard metric equivalent following the min/max guidance. The spacing of hanger wire and other supports for suspended ceilings would be examples requiring this type of consideration.

2. Loading of Test Specimens

ANSI/UL 263 requires the load applied to test samples to be based upon the limiting conditions of design as determined by nationally recognized structural design criteria. For some applications, the nationally recognized design criteria may be based upon the Working Stress Design Method or the Limit States Design Method. For applications where these two design methods are available, the load applied to the test sample was determined in accordance with the Working Stress Design Method unless the rated assembly specifically references the Limit States Design Method. Also, unless otherwise stated, the load capacity of steel beams assumes the beams are fabricated from A36 steel.

ANSI/UL 263 permits samples to be tested with the applied load being less than the maximum allowable load as determined by the limiting conditions of a nationally recognized structural design criteria. The ratings for assemblies determined from tests where the applied load was less than allowed by the nationally recognized structural design criteria are identified as "Restricted Load Condition." The percent of the maximum load, the percent of the maximum stress, and the nationally recognized design criteria will be identified in text describing the structural element of rated assemblies with a restricted load condition. An example of the text used in an assembly with a Restricted Load Condition and steel joist loaded to 80% of the maximum allowable is:

The design load for the structural member described in this design should not: (1) exceed 80% of the maximum allowable load specified in "Catalog of Standard Specifications and Load Tables for Steel Joists and Steel Girders," published by the Steel Joist Institute, or (2) develop a tensile stress greater than 24 ksi, which is 80% of the maximum allowable tensile stress of 30 ksi. (**Note:** The maximum allowable total load develops a tensile stress of approximately 30 ksi.)

Some restricted-load conditions have resulted from changes in product availability. An example is the substitution of K-Series joists for other series joists as described under **Section III, FLOOR-CEILINGS AND ROOF-CEILINGS, Item 7, Steel Joists**.

3. Penetrations

Penetrations through all or a portion of an assembly can significantly affect the rating. Firestop systems developed to protect openings created by penetration items are covered in Volume 2 of the Fire Resistance Directory.

4. Finish Ratings

A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 250°F or an individual temperature rise of 325°F as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling. The requirements for finish ratings are not included in ANSI/UL 263.

5. Nails and Screws

Nails are specified according to ASTM F547 or ASTM C514. Nails used to attach gypsum board to wood framing should be cement-coated box nails or cement-coated cooler nails unless specified otherwise in the specific designs. Screws meeting ASTM C1002 or ASTM C954 may be substituted for nails, one for one, when the head diameter, length, and spacing equal or exceed the requirements for the specified nails.

6. Interior and Exterior Applications

The fire-resistive designs and UL Classified materials are investigated with the understanding that their use is limited to interior applications unless otherwise specified in the design or Classification information (e.g., structural columns "Investigated for Exterior Use"). Where an exterior application of a UL Classified design is desired, the local building code and Authority Having Jurisdiction should be consulted to ensure compliance with other code requirements applicable to exterior use.

7. Exposed Interior Finishes

The surface flammability and smoke development characteristics of Classified materials that may be used as exposed interior finishes are measured by the test method in ANSI/UL 723 (ASTM E84 and NFPA 255), "Test for Surface Burning Characteristics of Building Materials." The flame spread index of these materials is less than 200 and the smoke development index of these materials is less than 450. Surface Burning Classifications are contained in the Building Materials Directory.

8. Radiant Heating Cable

The effect of the use of electrical radiant heating cable or wire on the fire-resistance performance of assemblies has not been investigated.

9. Coating Materials

Coating materials include products identified as: 1) Spray-applied Fire-resistive Materials and 2) Mastic and Intumescent Coatings.

The type of material is specified in each design. Materials that have been investigated for exterior application are so indicated in the individual designs and in the product category.

Regulations governing the application and use of coating materials have been promulgated by many governmental agencies. Authorities Having Jurisdiction should be consulted for current local requirements.

Unless specifically detailed in a design or in the product certification information, the interaction of dissimilar fireproofing materials on the same structural element or at the intersection of structural members, and the adherence of one product to the other, has not been investigated under fire-test conditions.

Unless specifically detailed in a design or in the product certification information, the impact of galvanization applied to structural steel members has not been investigated under fire-test conditions. Galvanization may impact the adhesion of spray-applied fire-resistive materials or mastic and intumescent coatings.

Spray-applied Fire-resistive Materials

The surfaces on which the material is to be applied must be free of dirt, oil and loose scale. Surfaces may be primed with the primers/paints covered under Primers for Structural Steel (CGJM).

The following method of determining the bond strength of the spray-applied materials only applies to primers or paints that are not covered under Primers for Structural Steel (CGJM). Unless specifically prohibited in a design, materials identified as Spray-applied Fire-resistive Materials (CHPX) may be applied to primed or similarly painted wide-flange steel shapes and pipe and tube-shaped columns provided: (A) the beam flange width does not exceed 12 in.; (B) the column flange width does not exceed 16 in.; (C) the beam or column web depth (defined as inside of top flange to inside of bottom flange) does not exceed 16 in.; (D) the pipe outer diameter or tube width does not exceed 12 in.; (E) bond tests conducted in accordance with ASTM E736, "Standard Test Method for Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members," should indicate a minimum average bond strength of 80% and a minimum individual bond strength of 50% when compared to the bond strength of the fire-resistive coating as applied to clean uncoated 1/8 in. thick steel plate. The average and minimum bond strength values should be determined based upon a minimum of five bond tests conducted in accordance with ASTM E736.

The bond tests need only be conducted when the fire-resistive coating is applied to a primed or similarly painted surface for which acceptable bond strength performance between the primer or other similar material and the fire-resistive coating has not been measured. A bonding agent may be applied to the primed or similarly painted surface to obtain the minimum required bond strength where the bond strengths are found to be below the minimum acceptable values.

As an alternative to the bond test conducted on control samples applied to an uncoated steel plate, the following method may be used for unknown coatings in existing structures. Sections of painted steel are to be coated with a bonding agent compatible with the sprayed material being used on the project. The treated and untreated substrates should be coated with material, cured and subjected to five bond tests each, in accordance with ASTM E736. If the failure mode of the sections treated with the bonding agent is 100% cohesive in nature, it will be acceptable to use this bond test value as the control bond strength. The value obtained on the untreated painted section should be compared to the control value using the minimum 80% average, 50% individual bond strength acceptance criteria established in ASTM E736.

If condition (E) is not met, a mechanical bond may be obtained by wrapping the structural member with expanded metal lath (minimum 1.7 lbs per sq yd).

If any of the conditions specified in (A), (B), (C) or (D) are not met, a mechanical break should be provided. A mechanical break may be provided by mechanically fastening one or more minimum 1.7 lbs per sq yd metal lath strips to the flange, web or tube and pipe surface either by weld, screw, or powder actuated fasteners, on maximum 12 in. centers, on each longitudinal edge of the strip, so that the clear spans do not exceed the limits established in conditions (A), (B), (C) or (D) as appropriate. No less than 25% of the width of the oversize flange or web element should be covered by the metal lath. No strip of metal lath should be less than 3-1/2 in. wide.

As an alternative to metal lath, the mechanical break may be provided by the use of minimum No. 12 gauge steel studs with minimum No. 28 gauge galvanized steel disks if such a system is described in a specific design (usually bottomless trench in an electrified floor design) for the fire-resistive coating being applied. The studs should be welded to the oversize element in rows such that the maximum clear span conforms to conditions (A), (B), (C) or (D) as appropriate. The spacing of studs along each row should not exceed 24 in. and a minimum one stud per 256 sq in. should be provided.

Where metal lath strips or steel studs and disks are used, acceptable bond strength as described in item (E) should also be provided. A bonding agent may be applied to the painted surface to obtain the required minimum bond strength where bond strengths to a painted surface are found to be below minimum acceptable values.

The dry density at which sprayed material should be applied to building elements is specified on the individual designs. Dry-density measurements may be determined by removing at least 6 in. sq sections randomly selected from the building, subjecting the samples to 120°F in an oven until constant weight is obtained, followed by accurate weighing, measuring and calculation of the density in lb per cu ft. Constant weight is usually obtained after 24 to 48 h exposure within a 120°F oven.

The spray-applied fire-resistive material thickness specification in a design should be considered the minimum average thickness of the individual thickness readings measured in accordance with ASTM E605, "Standard Test Methods for Thickness and Density of Sprayed Fire Resistive Material Applied to Structural Members." When spray-applied fire-resistive material is applied to metal lath, the spray-applied fire-resistive material thickness should be measured to the face of the lath unless specified otherwise in the design.

Individual measured thickness, which exceeds the thickness specified in a design by 1/4 in. or more should be recorded as the thickness specified in the design plus 1/4 in. For design thicknesses 1 in. or greater, the minimum allowable individual thickness should be the design thickness minus 1/4 in. For design thicknesses less than 1 in., the minimum allowable individual thickness should be the design thickness minus 25%.

The thickness of the spray-applied fire-resistive material should be corrected by applying additional material at any location where: (1) the calculated average thickness of the material is less than that required by the design or (2) an individual measured thickness reading is more than 1/4 in. less or more than 25% less (for design thicknesses greater than 1 in. and less than 1 in., respectively) than the specified thickness required by the design.

Areas of the structural frame and/or floor area are to be selected to obtain representative average thicknesses. Thickness readings on the floor or wall area are to be taken symmetrically over the selected area. The average of all measurements is to be considered the average thickness of the area. Thickness measurements on beams and/or columns are to be made around the member at sections within 12 in. of each other. The average thickness is to be considered the average of the readings taken at both sections.

Screw tips penetrating the steel roof deck in all P700 and P800 series designs require spray-applied fire-resistive material. The spray-applied fire-resistive material specified in the design should be applied to cover the tips at a minimum thickness of 1/2 in.

Mixing and spraying instructions are included with each container of material.

Mastic and Intumescent Coatings

The surfaces on which the material is to be applied must be free of dirt, oil and loose scale. The Classification information for materials identified as Mastic and Intumescent Coatings (CDWZ) should be consulted for specific recommendations regarding the application of the coating over primed painted surfaces.

The mastic and intumescent coating thickness specification in a design should be considered the minimum average thickness of the individual thickness readings measured in accordance with Technical Manual 12-B, "Standard Practice of the Testing and Inspection of Field Applied Thin-Film Intumescent Fire Resistive Materials; an Annotated Guide," published by the Association of the Wall and Ceiling Industries.

The mastic and intumescent coating average thickness should not exceed the maximum thickness published in the individual designs and no individual thickness measurement should be less than 80% of the thickness specified design.

Mixing and spraying instructions are included with each container of material.

When mastic and intumescent coatings are exposed to fire, they expand and form an insulating char. Unless otherwise detailed in the individual designs, mastic and intumescent coatings are tested without any covering adjacent to the tested member that might interfere with the expansion of the coating. The effect on the fire-resistance rating of steel members (beams, columns, etc.) caused by any covering that would interfere with the expansion of a mastic and intumescent coating during a fire has not been investigated. Contact the manufacturer for their required clearance around structural members protected with mastic and intumescent coatings.

10. Gypsum Board

Vertically applied gypsum board is gypsum board that is applied with the long edges parallel to the framing members to which it is attached. Horizontally applied gypsum board applied is gypsum board applied with the long edges perpendicular to the framing members to which it is attached.

Gypsum board thicknesses specified in specific designs are minimums. Greater thicknesses of gypsum board are permitted as long as the fastener length is increased to provide penetration into framing that is equal to or greater than that achieved with the specified gypsum board thickness and fasteners.

Additional layers of gypsum board are permitted to be added to any design.

For designs containing the statement "See Gypsum Board (CKNX) Category for names of Classified Companies," any product in the category (CKNX) that meets the specifications described in theindividual design may be used. This statement is applicable to any gypsum board manufacturer who produces Classified gypsum board meeting all requirements specified in the individual design. It is not required that these Design Numbers appear in the individual company's Classification found in the (CKNX) category.

11. Gypsum Board Joint Treatment (Fire Taping)

Unless otherwise specified in the specific design all gypsum board systems except those with predecorated or metal covered surfaces have joints taped and joints and fastener heads covered with one coat of joint compound (fire taped). Base layers in multi layer systems are not required to have joints or fastener heads taped or covered with joint compound.

12. Plaster

The proper aggregate and mix proportions are specified on each design. Thicknesses are measured from the outer face of the plaster base. When a finish coat is not specified, it is not included in the thickness dimensions, but it may be added. Materials investigated for exterior application are so indicated on the individual designs.

13. Dampers

Building codes include requirements for four types of dampers: fire dampers, smoke (leakage rated) dampers, ceiling dampers, and corridor dampers. Dampers have been investigated for installation in wall or ceiling constructions in the maximum sizes and orientations (vertical or horizontal) indicated in their Listing. Dampers have been investigated for the following applications:

Fire Dampers are included in Volume 3 of this Directory and are intended for use where air ducts and air transfer openings traverse fire-resistance-rated walls and floors.

Leakage-rated (Smoke) Dampers are included in Volume 3 of this Directory and are intended for use where air ducts and air transfer openings traverse smoke barriers.

Corridor Dampers are included in Volume 3 of this Directory and are intended for use where air ducts penetrate or terminate at horizontal openings in the ceilings of certain corridors, as required by the building code.

Ceiling Dampers are included in this Directory (see CABS) and are intended to function as a heat barrier in air-handling openings penetrating fire-resistive membrane ceilings. Additional details on duct outlet protection methods for membrane ceiling constructions, designated Systems A and B, is included under **Section III FLOOR-CEILINGS AND ROOF-CEILINGS, Item 17, Air Ducts and Protection Systems.**

14. Wood Structural Panel

Wood Structural Panel is a structural panel product composed primarily of wood and meeting the requirements of the U.S. Department of Commerce Voluntary Product Standard PS 1, Construction and Industrial Plywood or the U.S. Department of Commerce Voluntary Product Standard PS 2, Performance Standard for Wood-Based Structural-Use Panels. Wood structural panels include all-veneer plywood, composite panels containing a combination of veneer and wood-based material, and mat-formed panels such as oriented strand board and waferboard. The panels are to bear the label of a code recognized certification organization with a specific reference to the PS 1 or PS 2 standard. The panels are also marked Exposure 1 or Exterior. Some individual designs may limit the type of panel that can be used.

As an alternate, wood structural panels investigated in accordance with APA - The Engineered Wood Association Standard PRP-108, Performance Standards and Policies for Structural-Use Panels, or the PFS Research Foundation Standard PRP-133, Performance Standards and Policies for Wood-Based Structural-Use Panels, and meeting the description for the panel type in the individual designs, may be used.

15. Sound Transmission Class (STC)

In addition to the fire-resistance ratings, where indicated in the individual designs, the Sound Transmission Class (STC) rating is published for those designs where the sound transmission loss (STL) test was also investigated. ASTM E90 (2009), "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements," is the test method used to evaluate the sound transmission loss for the various designs. The STC rating applies to the assembly of materials as indicated in the individual designs.

16. Impact Insulation Class (IIC)

In addition to the fire-resistance ratings, where indicated in the individual designs, the Impact Insulation Class (IIC) rating is published for those designs where the impact noise test was also investigated. ASTM E492 (2009), "Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine," is the test method used to evaluate the impact noise of the design. The IIC rating applies to the assembly of materials as indicated in the individual designs.

17. Curtain Wall/Floor Protection Systems

The category Perimeter Fire Containment Systems (XHDG) includes designs that have been investigated to protect the void created at the intersection of a fire-rated floor assembly and an exterior curtain wall assembly.

18. Fire-resistant Joint Systems

The category Joint Systems (XHBN) includes designs that have been investigated to protect the joints between fire-resistance-rated walls, floors, floor-ceiling assemblies and roof-ceiling assemblies.

19. Fire Doors, Frames and Hardware

Product categories associated with fire doors, frames and associated hardware are included in Volume 3 of this Directory. See Product Category index (GSNV). This includes leakage-rated products investigated to limit the spread of smoke through these assemblies.

20. Glazing, Wired Glass and Glass Blocks

The product category Fire-protection-rated Glazing Materials (KCMZ) contains information on wired glass and nonwired glazing investigated for fire resistance. The product category Glass Blocks (KCJU) contains information on glass blocks investigated for fire resistance.

III. FLOOR-CEILINGS AND ROOF-CEILINGS

The following guidelines are directed towards the materials and construction methods described for floor-ceiling and roof-ceiling assemblies. These guidelines are intended to supplement the specific description included with each design.

Specific guidelines for the application of beam designs to floor-ceiling and roof-ceiling assemblies are provided in this Directory under the heading entitled "Beams."

1. Concrete

The concrete compressive strength specified in the designs may be reduced 500 psi to obtain the minimum value. The maximum compressive strength is not limited. The thickness is a minimum unless otherwise indicated.

The concrete's air dry unit weight is determined in accordance with ASTM C567. The unit weight specifications (unless stated as a range for individual designs) have a tolerance of plus or minus 3 pcf. If normal weight concrete (145 to 155 pcf) is specified, the use of lightweight (90 to 120 pcf) is not recommended because its greater insulating properties could cause higher temperatures on supporting members. When lightweight concrete is specified, the use of normal weight concrete is not recommended because its lower insulating properties could cause higher unexposed surface temperatures.

2. Fiber Reinforcement

Classified synthetic fiber reinforcements may be added to the concrete mix for the purpose of controlling shrinkage cracks.

These fibers are not intended to satisfy any structural requirements. The structural capacity of the concrete slab should be maintained in accordance with the requirements of the ACI building code.

3. Steel Floor and Form Units

The type of unit and the minimum steel thickness is specified in each design.

The steel floor and roof deck minimum thickness table is based upon an industry standard for steel deck. The load tables published by the steel deck industry are based upon the design thickness and a 5% tolerance is applied to derive the minimum thickness. The tolerance is in accordance with AISI specifications. For steel floor and roof deck, the minimum bare metal thickness should be as follows:

Gauge	Design Thkns In.	Min Thkns Bare Metal In.
28	0.0149	0.014
26	0.0179	0.017
24	0.0238	0.023
22	0.0295	0.028

20	0.0358	0.034
18	0.0474	0.045
16	0.0598	0.057

The effect on the fire resistance of the assembly when cellular sections are used as air-handling units has not been investigated.

Some steel units are provided with patterned indentations and are thereby considered to act compositely with the concrete topping. Moment and shear capacities are usually determined empirically from structural tests. The allowable load is provided in the manufacturer's catalogs. The loading for floors with noncomposite units (without indentations) is based on their section modulus. Some fire tests have been conducted on slabs utilizing the composite units but with the loading based on the section modulus of the steel. In such cases the design will specify noncomposite loading. Fire tests have generally shown that composite slabs deflect more than similar noncomposite slabs. Therefore, the ratings developed with composite units would not be jeopardized if noncomposite units of the same profile are used provided the loading is based on the section modulus of the noncomposite units.

The steel form units used in floor or roof assemblies may be painted or galvanized when used in designs that include suspended ceilings (Designs G0--, G2--, G4--, G5--, P0--, P2--, P4--, P5--). In designs which specify the steel form units to be welded to supports with welding washers, the welding washers may be omitted when the steel form unit is 22 MSG gauge or heavier.

Normally, assemblies with steel deck are constructed and tested with simple span conditions, however, the ratings also apply to continuous span conditions.

4. Electrical Boxes for Concrete Floors

The category Outlet Boxes and Fittings Classified for Fire Resistance (CEYY) covers pre-set and post-set inserts for use in concrete floors for electrical and communication connections. These devices have demonstrated an ability to be used in specific assemblies without reducing their fire-resistive ratings. In those floor-ceiling designs where the inserts are not specifically shown, penetrations to the concrete topping with electrical inserts may jeopardize the rating unless proper compensating protection is provided. In the absence of specific information for inserts in individual designs, inserts which do not penetrate through the entire floor and bear the UL Classification Mark for Outlet Boxes and Fittings Classified for Fire Resistance may be used in floor-ceiling designs which include fire-resistive coating materials on both fluted and cellular floor units for the entire floor span between supports. The cellular units should be protected in one of the following ways:

1. For inserts that penetrate into the top of the cell and where concrete is not removed from the valleys of the steel floor units, the thickness of fireproofing material specified below standard trench headers (with bottom pan) is applicable.

2. For inserts that penetrate into the sides of the cells with no concrete in the valley between the cells under the inserts, the thickness of the fire-resistive coating specified below the bottomless trench header (without bottom pan) is applicable.

The above recommended protection is intended only for structural concrete floors which contain welded wire fabric or fiber reinforcement when permitted and consist of a blend of one or more fluted to one cellular unit. The entire underside of the cellular units should be protected with the same material and thickness as required below the trench headers with a gradual reduction in thickness to that specified for fluted units in the designs. The spacing between inserts should be sufficient for structural integrity. The diameter of any holes in the insert cover for the passage of wire should be no more than 1/8 in. larger than the diameter of the wire.

5. Nonmetallic Outlet Boxes for Ceilings

Nonmetallic outlet boxes investigated for installation in floor-ceiling or roof-ceiling assemblies are included in Outlet Boxes and Fittings Classified for Fire Resistance (CEYY).

6. Metallic Electrical Outlet Boxes

Listed metallic outlet boxes with metallic or nonmetallic cover plates may be used in floor-ceiling and roof-ceiling assemblies with ratings not exceeding 2 hours. These assemblies should have gypsum wallboard membranes. The metallic outlet boxes should be securely fastened to the joists and the opening in the wallboard facing should be cut so that the clearance between the box and the gypsum wallboard does not exceed 1/8 in. The surface area of individual boxes should not exceed 16 sq. in. The aggregate surface area of the boxes should not exceed 100 sq. in. per 100 sq. ft of ceiling surface.

7. Steel Joists

The specified minimum size joist in floor- or roof-ceiling designs is the joist that meets the requirements for both the minimum depth and the minimum weight per foot. Joists that exceed the specified minimum size may be used, provided the accessories are compatible. The dimension from the bottom chord of joists to the ceiling, whether given or calculated, is a minimum.

Spacing between joists may be increased from that specified to a maximum of 4 ft on centers if the floor slab meets structural requirements and the spacing of the hanger wires supporting the ceiling is not increased. Where it is necessary to provide support for the ceiling hanger wires between the joists, this may be accomplished by using 1-1/2 in., No. 16 gauge or larger cold-rolled steel channels. Each channel with its web oriented vertically should be placed on top of and perpendicular to the joist's bottom chord and tied thereto with a double strand of No. 18 SWG galvanized steel wire.

The area of bridging bars or angles specified in the individual designs is a minimum. Larger bridging may be necessary in order to meet the structural and/or code requirements.

For designs requiring application of coating materials to steel joists, the bridging bars or angles should be protected with the coating material thickness required on the joist for a minimum distance of 12 in. beyond the joist.

When the joists are coated with a fire-resistive material, the cavities, if any, between the upper flange of the joist and the steel floor or roof units should be filled with the fire-resistive coating material applied to the joist, unless specified otherwise in the individual design.

For designs that require the bottom chords of the joists to consist of round bars, the substitution of angles of an equivalent area is not recommended.

K-Series joists, LH-Series joists and joist girders specified in floor- or roof-ceiling assemblies should be designed and fabricated in accordance with the Steel Joist Institute's Specifications adopted November 4, 1985, and revised May 1, 2000.

K-Series joists may be substituted for other joists specified in floor- or roof-ceiling designs as follows:

Floor-Ceiling Assemblies

K-Series joists of equal or greater depth and weight per foot may be substituted for any S-, J-, H-, LH- and/or DLH-Series joists in any floor-ceiling design, which employs a structural concrete floor and a suspended membrane ceiling.

Roof-Ceiling Assemblies

K-Series joists of equal or greater depth and weight per foot may be substituted for any S-, J-, H-, LH- and/or DLH-Series joists in any roof-ceiling design, with the following restrictions:

a) Minimum Nominal Depth = 10 in.

b) Maximum Tensile Stress = 26,000 psi.

Any stress limitation specified in floor or roof designs containing S-, J-, H-, LH- and/or DLH-Series joists should remain applicable when a K-Series joist is substituted.

When a K-Series joist is substituted, any restriction regarding minimum allowable joist member sizes, areas of steel, and/or bridging material sizes remain applicable. Refer to section "Fire-Resistance Ratings with Steel Joists" in the Standard Specifications Load Tables & Weight Tables for Steel Joists and Joist Girders, 41st edition, published by the Steel Joist Institute, for guidance.

8. Precast Concrete Units

For restrained assembly ratings, some designs require end clearances and lateral expansion joints with the use of noncombustible compressible materials along the sides of the precast concrete units. This requirement may be waived and the clearance spaces filled with sand-cement grout if the stiffness of the building floor and supporting column system surrounding the precast concrete units does not exceed 80% of the stiffness of the test frame in which the assemblies are tested and rated.

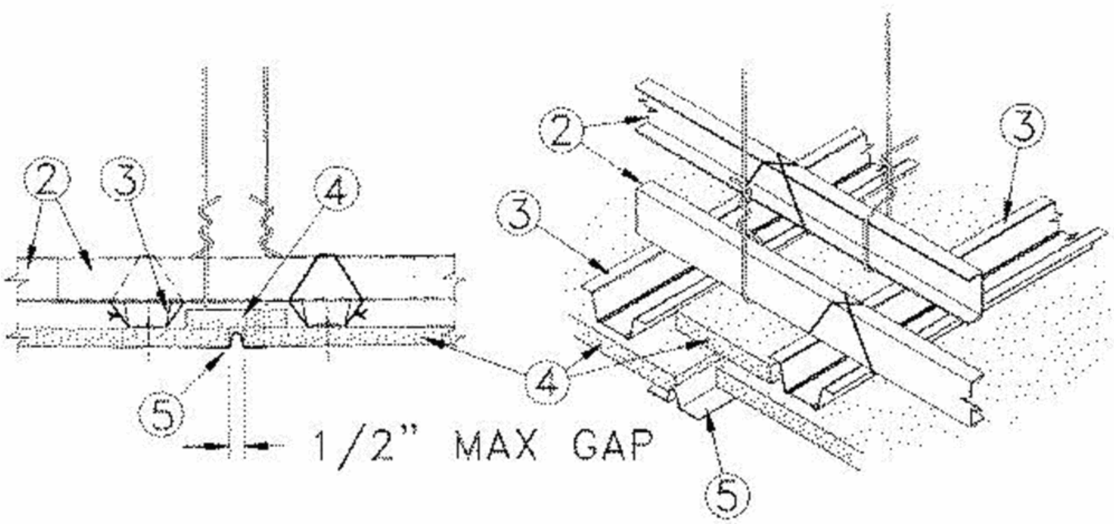
The relative stiffness of the frame work surrounding a building floor assembly may be calculated using an approximate test frame size of 14 ft by 17 ft and an approximate stiffness of frame of 700,000 KIP-in. and 850,000 KIP-in., expressed by EI/L, along the 17 ft and 14 ft dimensions, respectively.

For unrestrained assembly ratings, clearances should be provided around the ends and sides of the precast concrete units so that they may expand freely during fire exposure.

In most floor-ceiling designs, sand-cement grout is required to be poured between adjacent precast units. This grout may be omitted if a minimum 1 in. thick concrete topping is placed over the precast concrete units.

9. Ceiling Control Joints

For G500, L500 and M500-Series floor-ceiling designs having a maximum 1 hr Unrestrained Assembly Rating and having a ceiling membrane consisting of a single-layer of nominal 5/8 in. thick gypsum wallboard, max 1/2 in. wide control joints may be incorporated in the ceiling using one of the following methods:



Ceiling Suspended Below Floor Assembly

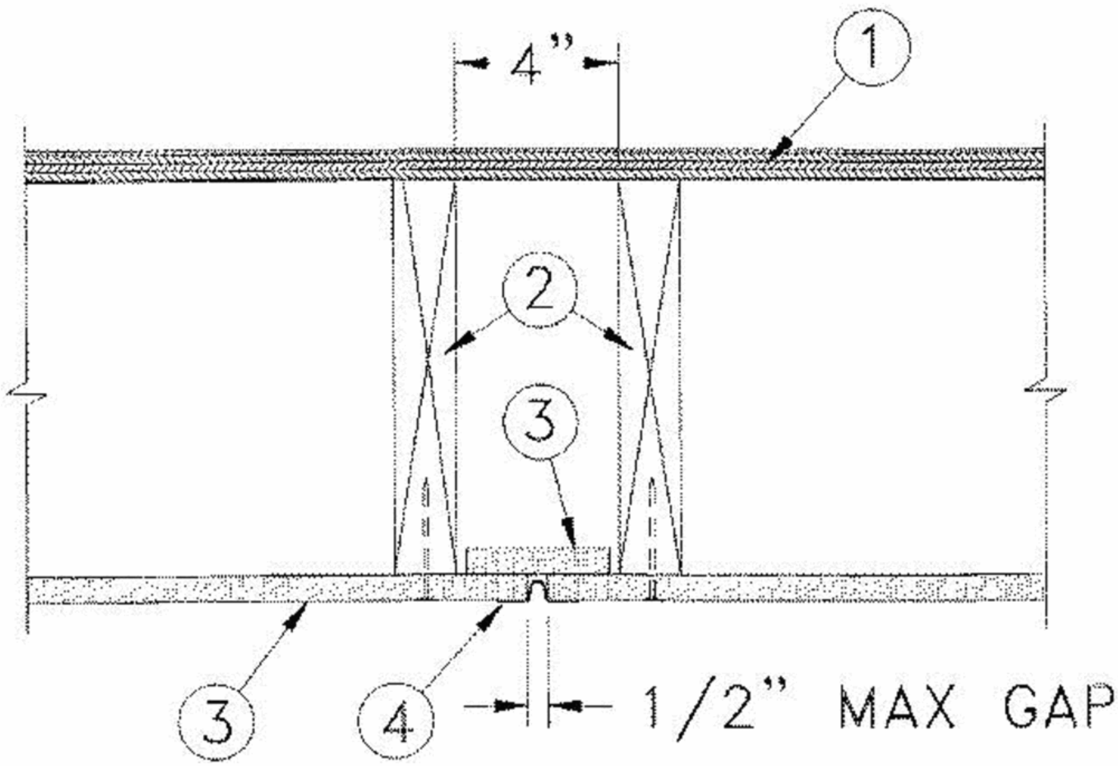
1. **Floor Assembly** — **(Not Shown)** — The floor assembly should be constructed of the materials and in the manner described in the individual G-500, L500 or M500-Series Floor-Ceiling design.

2. **Cold-Rolled Steel Channel** — Nom 1-1/2 in. deep, min 16 gauge cold-rolled steel channels installed perpendicular to control joint direction. Channels suspended from floor joists with 12 SWG galv steel hanger wires. Hanger wires spaced max 48 in. OC. Channels spaced max 24 in. OC. Channels installed to extend approx 6 in. past control joint location with channels on opposite sides of control joint offset from each other. Hanger wire at end of each channel to be located in span between furring channels over control joint location.

3. **Furring Channels** — Nom 7/8 in. deep, min 25 gauge painted or galv steel rigid furring channels installed perpendicular to cold-rolled steel channels and spaced max 16 in. OC. Furring channel along each side of ceiling control joint to be located with its centerline 3 in. from the center of the control joint. Furring channels secured to cold-rolled steel channels with a double strand of 18 SWG galv steel wire.

4. **Gypsum Board** — Installed with long dimension perpendicular to furring channels. Gypsum wallboard type, fastener type and fastener spacings to be as specified in the individual L500-Series Floor-Ceiling design. Max width of control joint centered between furring channels is 1/2 in. Strip of gypsum wallboard over control joint to be nom 5/8 in. thick by 3-1/2 in. wide and to be secured to ceiling along only one side of control joint with 1-1/2 in. long Type G wallboard screws spaced max 24 in. OC.

5. **Control Joint** — Vinyl or zinc control joint conforming to ASTM C1047, "Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base." Control joint stapled to gypsum wallboard on each side of joint opening prior to finishing of ceiling.



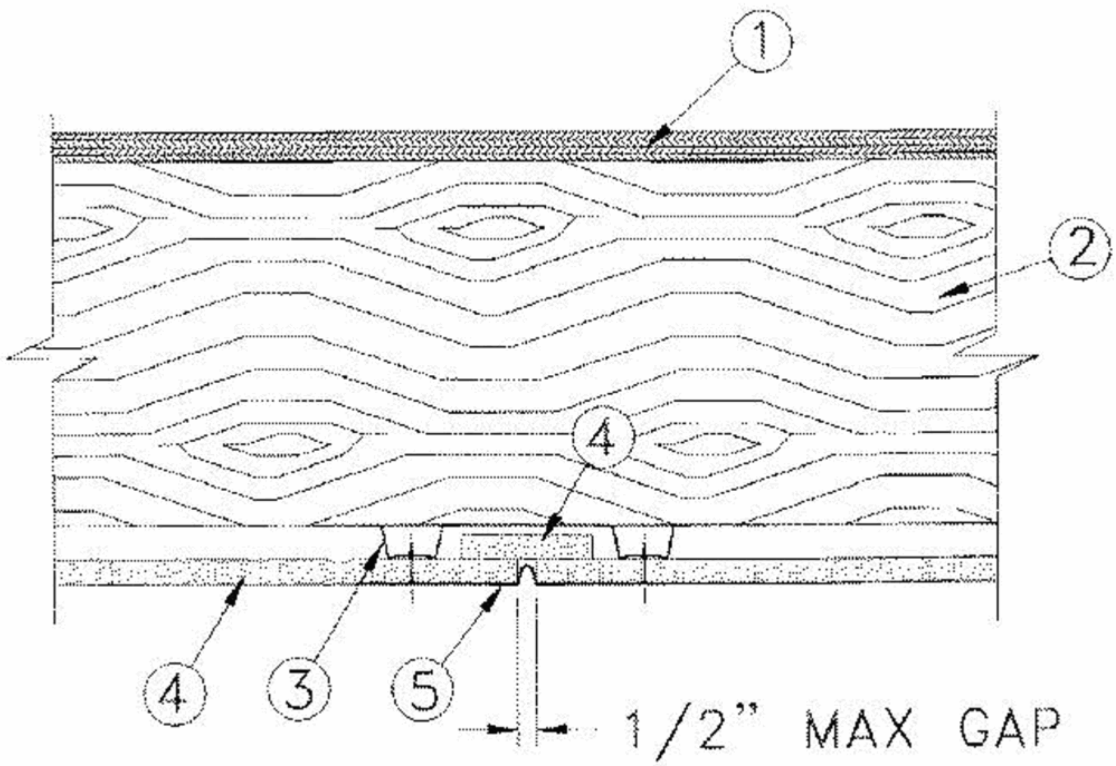
Control Joint Parallel With Wood Joists

1. **Flooring** — Lumber or plywood subfloor with finish floor of lumber, plywood or floor-topping mixture as specified in the individual L500 or M500-Series Floor-Ceiling design.

2. **Wood Joists** — 2 by 10 in., spaced 4 in. apart at the control joint location and max 16 in. OC away from control joint as specified in the individual L500 or M500-Series Floor-Ceiling design.

3. **Gypsum Board** — Installed with long dimension perpendicular to wood joists. Gypsum wallboard type, fastener type and fastener spacings to be as specified in the individual L500-Series Floor-Ceiling design. Max width of control joint centered between wood joists is 1/2 in. Strip of gypsum wallboard over control joint to be nom 5/8 in. thick by 3-1/2 in. wide and to be secured to ceiling along only one side of control joint with 1-1/2 in. long Type G wallboard screws spaced max 24 in. OC.

4. **Control Joint** — Vinyl or zinc control joint conforming to ASTM C1047. Control joint stapled to gypsum wallboard on each side of joint opening prior to finishing of ceiling.



Control Joint Perpendicular to Wood Joists

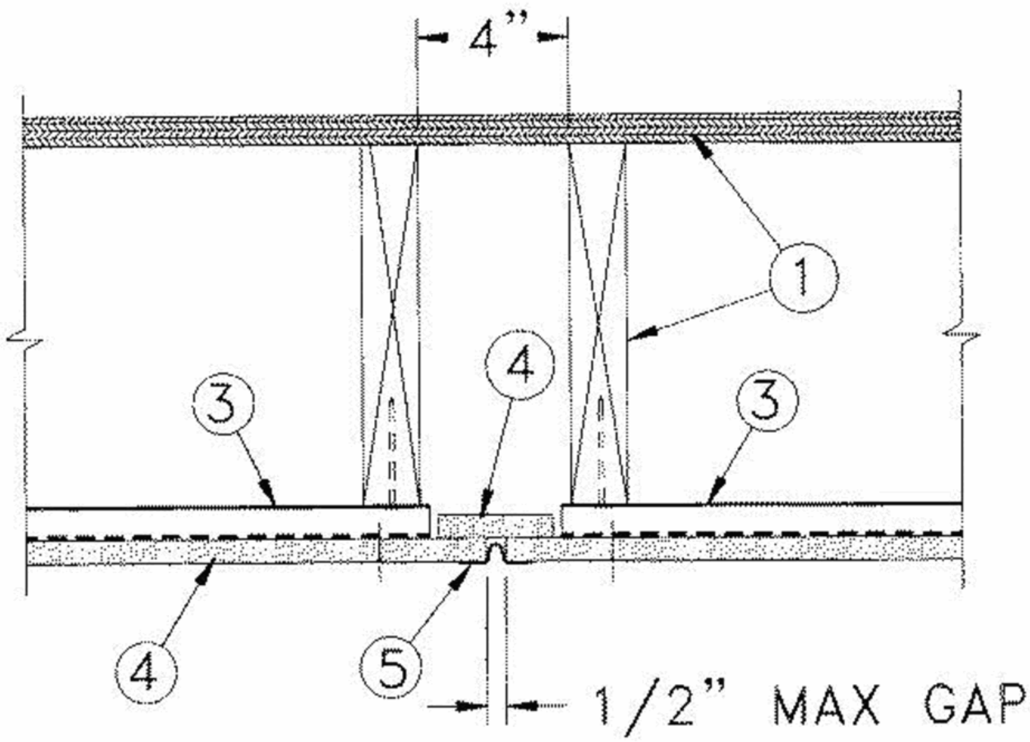
1. **Flooring** — Lumber or plywood subfloor with finish floor of lumber, plywood or floor-topping mixture as specified in the individual L500 or M500-Series Floor-Ceiling design.

2. **Wood Joists** — 2 by 10 in., spaced max 24 in. OC as specified in the individual L500 or M500-Series Floor-Ceiling design.

3. **Furring Channels** — Nom 7/8 in. deep, min 25 gauge painted or galv steel rigid furring channels installed perpendicular to wood joists and spaced max 16 in. OC. Furring channel along each side of ceiling control joint to be located with its centerline 3 in. from the center of the control joint. Furring channels secured to wood joists as specified in the individual L500-Series Floor-Ceiling design.

4. **Gypsum Board** — Installed with long dimension perpendicular to furring channels. Gypsum wallboard type, fastener type and fastener spacings to be as specified in the individual L500-Series Floor-Ceiling design. Max width of control joint centered between furring channels is 1/2 in. Strip of gypsum wallboard over control joint to be nom 5/8 in. thick by 3-1/2 in. wide and to be secured to ceiling along only one side of control joint with 1-1/2 in. long Type G wallboard screws spaced max 24 in. OC.

5. **Control Joint** — Vinyl or zinc control joint conforming to ASTM C1047. Control joint stapled to gypsum wallboard on each side of joint opening prior to finishing of ceiling.



Control Joint Parallel with Wood Joists

1. **Flooring** — Lumber or plywood subfloor with finish floor of lumber, plywood or floor-topping mixture as specified in the individual L500 or M500-Series Floor-Ceiling design.

2. **Wood Joists** — 2 by 10 in., spaced max 24 in. OC as specified in the individual L500 or M500-Series Floor-Ceiling design.

3. **Furring Channels** — Nom 7/8 in. deep, min 25 gauge painted or galv steel rigid furring channels installed perpendicular to wood joists and spaced max 16 in. OC. Furring channels to cantilever approx 1/4 in. beyond wood joist in 4 in. wide joist cavity containing control joint. Furring channels secured to wood joists as specified in the individual L500-Series Floor-Ceiling design.

4. **Gypsum Board** — Installed with long dimension perpendicular to furring channels. Gypsum wallboard type, fastener type and fastener spacing to be as specified in the individual L500-Series Floor-Ceiling design. Max width of control joint centered in 4 in. wide joist cavity is 1/2 in. Strip of gypsum wallboard over control joint to be nom 5/8 in. thick by 3 in. wide and to be secured to ceiling along only one side of control joint with 1-1/2 in. long Type G wallboard screws spaced max 24 in. OC.

5. **Control Joint** — Vinyl or zinc control joint conforming to ASTM C1047. Control joint stapled to gypsum wallboard on each side of joint opening prior to finishing of ceiling.

10. Acoustical Material

The type and size is specified in each design. Where a range of panel sizes is indicated, compatible sizes of suspension members must be used. Designs incorporating lay-in acoustical ceiling panels specify the use of hold-down clips. Hold-down clips are required for assemblies incorporating ceiling panels weighing less than 1 lb per square foot.

11. Suspension Systems

The type and size of the suspension system are specified on the design. Support of the system is an important feature in its performance. Spacing of the supports should not exceed but may be less than specified. When the length of cross tee between the main runner and the wall molding is 30 in. or longer, each such cross tee should be supported by a hanger wire at midpoint of the tee or at a location nearer the wall unless specified differently in the design.

As an alternate to the wall molding specified in the designs, the molding may be an angle fabricated from minimum 0.017 in. thick steel. Each leg of the angle should be at least 7/8 in. long with a 0.115 in. hemmed edge. The wall molding should be reliably secured to the wall with steel fasteners on maximum 16 in. centers unless specified otherwise in a design.

Cross tees which are parallel and adjacent to walls and are spaced 12 in. or less from the wall should each be supported by a hanger wire at midpoint. These hanger wires are intended to minimize their rotation under fire conditions due to the unbalanced weight of panels on their flanges.

Where a ceiling is supported directly from structural members, it may be lowered and intermediate supports may be used, if necessary, provided they produce an in place stiffness equivalent to that of the originally tested elements. A suggested method for providing an equivalent in place stiffness is by use of 1-1/2 in. cold-rolled channels made of No. 16 gauge or heavier painted or galvanized steel, with the web oriented vertically and suspended from the structural members by No. 12 SWG or heavier galvanized steel wire at a maximum spacing of 48 in. OC. The channels may be oriented parallel or perpendicular to the structural members but should be spaced not more than the spacing of the members.

Where it is necessary to cut away the expansion mechanism of suspension members to fit room dimensions or corridor widths, the member is to be installed with a gap of approximately 1/10 in. per ft of length to permit free thermal expansion.

Hanger wires should be installed vertically unless permitted otherwise in a design.

Some floor-ceiling designs with structural concrete topping on steel floor units specify the use of steel hanger clips as an attachment provision for hanger wires. As an alternate to hanger clips, low-velocity, powder-actuated, steel-eye pin fasteners may be used for hanger wire attachment in the floor-ceiling designs. The fasteners should have a minimum 5/32 in. diameter by minimum 7/8 in. long pointed shank with a washer and nominal 7/8 in. long by 7/16 in. wide head containing a rounded slot opening. The fasteners are intended to be secured to concrete in valleys of fluted steel floor units with powder charges sufficient to fully embed the shank portion without shattering the concrete.

12. Fluorescent Recessed Luminaires

Luminaires may be installed individually or end to end (in rows). Side-by-side installation has not been investigated.

The spacing of luminaires specified in the designs refers to the maximum aggregate area of the luminaires to be used in each 100 sq ft of ceiling. Unless specified differently, the luminaires are of the fluorescent lamp type with steel housing and hardware.

Where air-handling type luminaires were tested, the design may describe the luminaire as air handling or as provided with slots in the housing. However, since no air movement was employed during the test, the ratings require that air movement be effectively stopped at the start of a fire. Air-handling luminaires may be used in any design that specifies luminaires, provided it is not necessary to alter the enclosure surrounding the luminaire and that provisions are made for effectively stopping the movement of air at the start of a fire.

In ceilings employing an exposed grid suspension system, when hanger wire is required at midpoint of the cross tee on each side of luminaires, the wire should be installed with approximately 1/8 in. of slack such that it will not be pulling on the cross tee at room temperature conditions.

13. Enclosures for Fluorescent Recessed Luminaires

Enclosures for luminaires should be spaced away from the top of luminaire housing as shown on individual designs. When luminaires are installed end to end, one end piece of the protection material that is part of the enclosure should be placed on top of the adjoining top protection pieces to cover the gap at the junction of the luminaires. Spacers placed on top of the luminaire housing to provide clearance for the protection material should not be located directly over or adjacent to luminaire ballasts. Installation is intended to be in conformance with ANSI/NFPA 70, "National Electrical Code." For lay-in panel ceilings, as an alternate to the spacers cut from ceiling material or mineral wool batts, pieces of ceiling suspension system tees may be used to maintain the clearance between the protection material and the top of the luminaire.

14. Luminaires Classified for Fire Resistance

In addition to the luminaires described above, luminaires specifically investigated for installation in floor-ceiling and roof-ceiling designs are included in the category Luminaires, Luminaire Assemblies and Luminaire Enclosures Classified for Fire Resistance (CDHW). Refer to the individual Classifications in that product category for details on the designs in which the luminaires have been investigated and found acceptable.

15. Restrained and Unrestrained Assemblies

Floor-ceiling and roof-ceiling assemblies include fire-resistance ratings for use in both restrained or unrestrained conditions. It is up to the designer and Authority Having Jurisdiction to determine if an assembly is being used in a restrained or unrestrained application, as required by the building code being enforced. Unrestrained Assembly ratings may be used for floor-ceilings and roof-ceilings designed for either restrained or unrestrained conditions.

The conditions of acceptance in ANSI/UL 263 provide criteria for Restrained Assembly Ratings, Unrestrained Assembly Ratings, Restrained Beam Ratings and Unrestrained Beam Ratings. Because of their more onerous criteria, Unrestrained Assembly Ratings may be used for floors and roofs designed for either restrained or unrestrained conditions.

Classifications resulting from a tested assembly containing a full representation of a floor or roof construction may include: (1) Restrained Assembly Ratings and (2) Unrestrained Assembly Ratings. Results from test of these assemblies are identified as Design Nos. A ____, D ____, G ____, J ____, or P ____. Tested assemblies supported by beams may also include an Unrestrained Beam Rating, but do not include a Restrained Beam Rating. A Restrained Beam Rating is determined only from a test on an assembly with a restrained beam and a partial representation of a floor or roof. Results from tests on this type of assembly are identified as Design Nos. N ____ or S ____.

D900 Series Dual Unrestrained Assembly Ratings

Two unrestrained assembly ratings are indicated for some D900 Series floor-ceiling designs that include unprotected steel floor units. These unrestrained assembly ratings are influenced by the span of the steel floor units. For the longer rating, the maximum span is the span with which the assembly was tested. This rating is determined by the assembly's structural performance during the fire test. The shorter rating is determined by the steel temperatures measured during the test and the span is limited only by the manufacturer's loading tables.

Restraint Conditions

Classifications of floor-ceiling and roof-ceiling assemblies and individual beams include restrained and unrestrained ratings. ANSI/UL 263 and, specifically, Appendix C, provides general information with respect to the concept of these classifications.

Appendix C of ANSI/UL 263 defines restraint in buildings as: "Floor-ceiling and roof-ceiling assemblies and individual beams in buildings should be considered restrained when the surrounding or supporting structure is capable of resisting substantial thermal expansion throughout the range of anticipated elevated temperatures. Constructions not complying with this definition are assumed to be free to rotate and expand and should be therefore considered as unrestrained."

The restrained condition in fire tests is defined in Appendix C of ANSI/UL 263 as: "one in which expansion at the supports of a load carrying element resulting from the effects of the fire is resisted by forces external to the element." This definition may not be appropriate for conditions of restraint in actual structures. The Standard recognizes that the exercise of engineering judgement is required to determine what constitutes "substantial thermal expansion" when determining the conditions under which the restrained or unrestrained ratings should be used.

Restrained conditions for the fire-test assemblies are provided by constructing floor-, beam- and roof-test assemblies within nominal 14 ft by 17 ft frames of composite steel/concrete cross sections having an approximate stiffness (EI/L) of 850,000 kip-in. and 700,000 kip-in. along the 14 ft and 17 ft sides, respectively. The frame stiffness remains constant throughout the fire test because the test frame is insulated from the fire environment.

When applying the published restrained ratings, it is recognized that the individual responsible for the design of the fire-rated construction may ascertain that a different degree of restraint may be provided to the building assembly during a fire condition than was provided to the test sample during the fire test. Under these conditions, the designer may review the Conditions of Acceptance for restrained and unrestrained assemblies and beams in ANSI/UL 263 for additional guidance when determining whether restrained or unrestrained ratings should be specified.

16. Air Ducts and Protection Systems

For designs employing means for the movement of air, ANSI/NFPA 90A, "Installation of Air-Conditioning and Ventilating Systems," or appropriate model mechanism code is to be consulted.

Unless otherwise specified by the design, the ratings were developed based on fire tests employing no air movement. The ratings, therefore, require that air movement be effectively stopped at the start of a fire.

Unless specified otherwise, the minimum distance between the bottom of the duct and the top of ceiling membrane is not to be less than 4 in.; where a greater minimum distance is specified, it may be reduced to 4 in. minimum. For ducts equipped with hinged sheet-steel dampers over duct outlets, unless specified otherwise, the maximum distance between the bottom of the duct and the top of the ceiling is not to exceed 8 in. When Classified ceiling dampers are used, no limit is required for the maximum distance between the bottom of the duct and the top of the ceiling since fire dampers are installed close to the top of ceiling membrane per installation instructions. Where hinged sheet steel dampers are specified, they should be equipped with spring catches and corrosion resistant hinges. Dampers designed to close by gravity should be installed to close in the direction of the air flow. Air diffusers are to be of steel and attached to the duct outlet with steel sheet metal screws. Spacing of screws should be at least three equally spaced for round diffusers and 8 in. OC max per side for square diffusers, with no less than one on each side.

Except where noted in the design, the air diffusers used in the test assemblies were of the surface-mounted type which also supported the surrounding acoustical material by a flange at least 1 in. wide. The opening in the ceiling membrane for attachment of the diffuser to the duct outlet should not be more than 1 in. greater than the size of the duct outlet. Lay-in-type diffusers may be used when they are described in the individual design(s) or in the Classification information of Ceiling Air Diffusers (BZZU) for individual companies.

Classified Ceiling Dampers (CABS) may be used in lieu of the hinged door type dampers in those designs which employ air ducts with the duct outlet protected with a hinged door type damper. The maximum area for individual duct outlets and the total aggregate area of duct outlets per each 100 sq ft of the ceiling area are specified in the design and are applicable when the hinged door type damper is used. If the Classified ceiling damper is also eligible for use in the design, when the maximum size of the duct outlets for the Classified ceiling damper would apply. The size of the duct outlets should be no larger than the maximum size of the Classified ceiling damper.

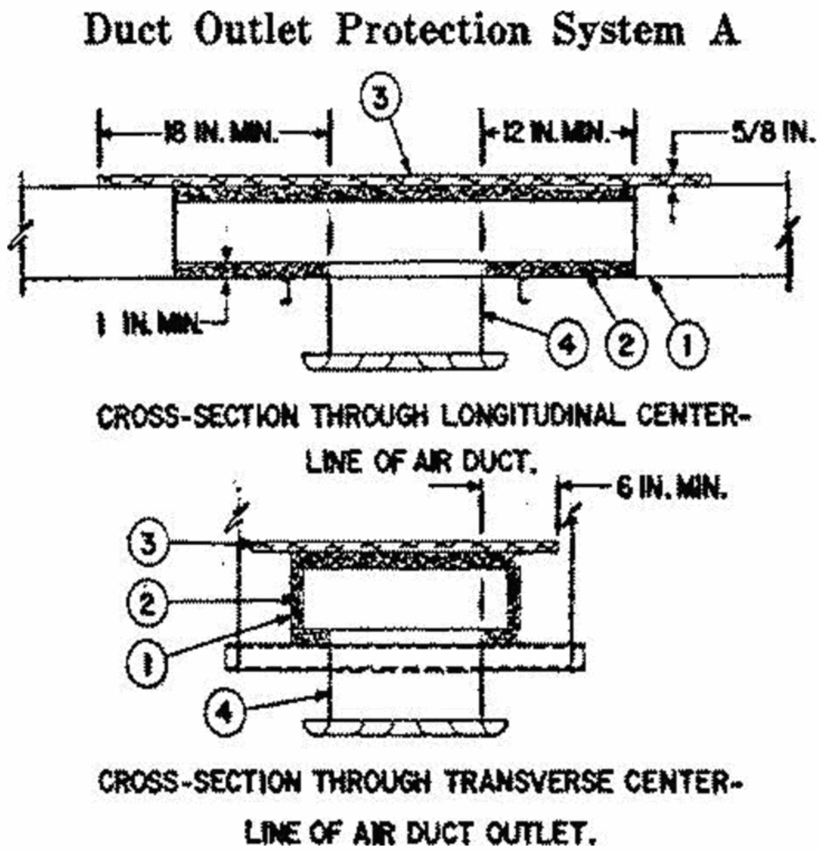
Some designs specify a smaller aggregate duct outlet area for each 100 sq ft of ceiling area than the maximum size of an individual outlet. In this case, when a Classified ceiling damper is used, the allowable outlet area per 100 sq ft of ceiling area should be established on the basis of 1/2 the area of the individual maximum size.

When a design requires the use of a covering material around the duct outlet and/or the hinged door damper, ceramic paper or a material having equivalent thermal properties of the ceramic paper should be used.

Duct outlets should be located in the field of an acoustical panel; however, where it is necessary to cut a main runner or cross tee, each cut end should be supported by a vertical No. 12 SWG hanger wire. A 1/2 in. clearance should be maintained between the duct outlet and each cut end of main runner or cross tee. the duct outlet should be located so that no more than one main runner or cross tee is cut when penetrating the ceiling membrane.

Flexible air ducts may be used with Classified Air Terminal units designated for use in designs. The flexible air duct should be 6 to 8 in. diameter, Class 0 or Class 1 Air Connector or Air Duct, bearing the UL Listing Mark. For assemblies with wood joists ("L" series designs), use Air ducts only. The flexible duct should be supported 4 to 6 ft OC with steel straps and/or No. 12 SWG steel hanger wire so that no portion of the flexible duct is within 4 in. of the top of the ceiling membrane, except where connected to the Air Terminal Unit.

The following duct outlet protection may be used as alternate systems. System A may only be used when it is specified in the individual design. System B may be used in any design which contains a steel duct with the duct outlet protected by a hinged door damper, for equal or smaller outlet size. the systems have been investigated for their effectiveness in retarding the transfer of heat into the ceiling space but their ability to retard smoke and other combustion products have not been investigated.



Duct Outlet Protection System A

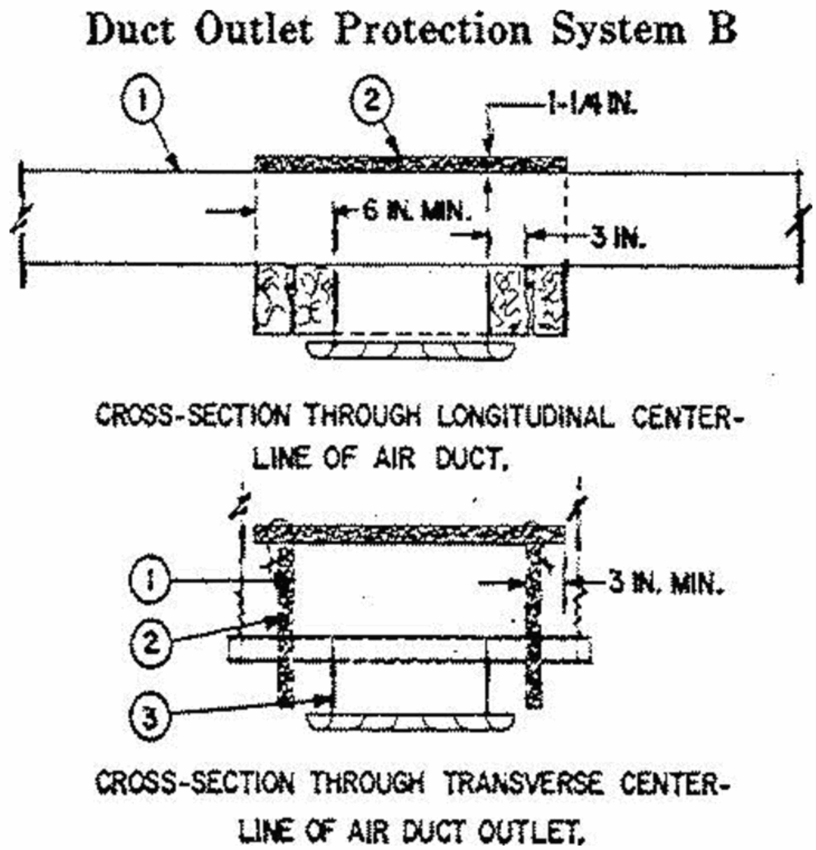
1. **Steel Air Duct** — Construction and support provisions are specified by the individual fire-resistance design. Duct outlet to be provided with a louvered, surface mounted, steel air diffuser, secured with steel fasteners. Duct supported by 1-1/2 in., min 0.053 in. thick (No. 16 gauge) cold-rolled steel channels hung at each end from structural members of floor or roof with No. 12 SWG galv steel wire. When duct outlets are 144 sq in. or smaller, cold-rolled channels should be located adjacent to one or both sides of the duct outlet and spaced a max of 48 in. OC. When duct outlets are larger than 144 sq in., cold-rolled channels should be located adjacent to each side of the duct outlet and spaced a max of 48 in. OC.

2. **Glass Fiber Duct Lining** — Min 1 in. thick, 3.0 to 5.0 pcf density, unfaced or faced with paper, foil, plastic film or asphalt emulsion. Lining affixed to inside of duct with adhesive or

steel fasteners or both. Lining and adhesive should have a flame spread rating of 25 or less and a smoke developed index of 50 or less, as determined by the ANSI/UL 723 and should comply with all other specifications in ANSI/NFPA 90A. Lining should cover the full inside perimeter of the duct, extending at least 12 in. beyond the edges of the duct outlet. Lining on bottom of duct to be cut flush with the edges of the duct outlet.

3. **Acoustical Lay-in Panel** — Any nom 5/8 in. acoustical lay-in panel Classified by UL for use in fire-resistance designs. Panels should be laid on top of duct, extending at least 6 in. beyond sides of duct outlet along width of duct, and extending at least 18 in. beyond sides of duct outlet along length of duct. More than one panel may be butted together to form a panel of the required dimensions. Panels should have a flame spread index of 25 or less and a smoke developed index of 50 or less as determined by ANSI/UL 723 and should comply with all other specifications in ANSI/NFPA 90A.

4. **Ceramic Paper** — Where specified by the individual fire-resistance design, ceramic paper should be affixed to the duct outlet.



Duct Outlet Protection System B

1. **Steel Air Duct** — Construction and support provisions as specified in the individual designs. Outlet to be provided with a louvered, surface mounted, steel diffuser, fastened securely with

steel fasteners. Duct supported by 1-1/2 in., min 0.053 in. thick (No. 16 gauge) cold-rolled steel channel hung at each end from structural members of floor or roof with No. 12 SWG galv steel wire. When duct outlets are 144 sq in. or smaller, cold-rolled channels should be located adjacent to one or both sides of the duct outlet and spaced a max of 48 in. OC. When duct outlets are larger than 144 sq in., cold-rolled channels should be located adjacent to each side of the duct outlet and spaced a max of 48 in. OC.

2. **Mineral Wool Batts** — 1-1/4 in. thick mineral wool batts, 3.5 to 8.0 pcf density. Top piece of batt should extend at least 3 in. beyond the sides of the duct and 6 in. beyond the edges of the duct outlet. Side pieces should extend from the lower face of the top piece to the upper face of the ceiling membrane along the entire length of the top piece. Side pieces tied to top piece with No. 18 SWG galv steel wire, 18 in. OC. Material should have a flame spread index of 25 or less, a smoke developed index of 50 or less as determined by ANSI/UL 723, and should comply with all other specifications in ANSI/NFPA 90A.

3. **Ceramic Paper** — Where specified in the design, ceramic paper should be affixed to the duct outlet.

17. Blanket Insulation

Unless specifically described in a design, the addition of insulation in the concealed space between the ceiling membrane and the floor or roof structure may reduce the hourly rating of an assembly by causing premature disruption of the ceiling membrane and/or higher temperatures on structural components under fire exposure conditions.

Insulation in G500, L500, M500 and P500 Series Designs — For 1-hour rated G500, L500, M500 and P500 series assemblies, fiberglass insulation, either loose-fill, batts or blankets may be added to the plenum or joist space above the gypsum wallboard provided an additional layer of gypsum wallboard is added to the assembly. The gypsum wallboard should be of the same type as shown in the individual designs. The base layer of wallboard should be attached with the fastener type and spacing as described in the design. It is not necessary to tape the joints of the base layer. The finish layer of gypsum wallboard should also be attached with the fastener type and spacing as described in the individual design. The length of the fasteners should be increased by a minimum of the wallboard thickness of the additional layer. The joints in the finish layer should be finished as described in the design.

Other methods of adding insulation in the plenum or joist cavity are not permitted unless indicated in the individual designs.

18. Wood Frame Construction

Spaces between joists or trusses and spaces between the ceiling and the floor above should be provided with firestopping or draft stopping as specified in the provisions of applicable building codes.

When a non-fire-rated wood stud wall assembly abutts the bottom of a wood joist floor-ceiling assembly employing a membrane ceiling, the membrane should be continuous above the top plate of the wall assembly.

19. Roof Coverings

Most roof assemblies are tested with Class C roof covering. The fire-resistance ratings for these assemblies are also applicable when the roof covering is a Class A, B or C system consisting of hot mopped or cold-applied bituminous materials. The Class A, B and C ratings are determined by ANSI/UL 790, "Standard Test Methods for Fire Tests of Roof Coverings."

Class A, B or C roof coverings consisting of hot mopped or cold applied bituminous materials or a roof covering material Classified under Roofing Membranes (CHCI) may be applied directly to the concrete or wood surface of floor designs being used as roofs without a reduction of fire-resistance ratings.

Class A, B or C prepared roof covering may be used on wood floor designs without a reduction of the fire-resistance rating provided a nailer of equal thickness to the length of the mechanical fasteners is added to the flooring.

20. Roof Insulation

Roof insulation is to be carefully controlled relative to manufacturer, type and thickness as specified. Less than the specified thickness could result in higher temperatures on the roof covering while a greater thickness of insulation could cause earlier structural failure.

Classified polystyrene insulation, with a density of 5 pcf or less, may be placed on concrete floors or structural concrete roofs without reducing the assembly rating.

When mineral and fiber boards, polystyrene insulation exceeding 5 pcf or polyisocyanurate insulation are used over the concrete in D 900 Series designs, the unrestrained beam rating should be increased by a minimum of 1/2 hr.

21. Uplift Resistance

The resistance of the roof assemblies to uplift by pressures on the roof surface or other damage which may result from high-velocity wind has not been investigated. Roof deck constructions Classified for uplift resistance are illustrated in the Roofing Materials and Systems Directory.

22. Steel Roof Deck Fasteners

Steel Roof Deck Fasteners that have been investigated as part of a Roof Deck Construction may be used to fasten the roof deck to steel joists or beams in lieu of welding or screws, in fire-resistive assemblies. See Roof Deck Fasteners (TLSX) for a list of manufacturers. See Roof Deck Constructions (TGKX) for a list of roof constructions that have been investigated for uplift resistance. The steel fasteners must be compatible with the construction shown in the individual fire-resistive designs.

Screw tips penetrating the steel roof deck in all P700 and P800 series designs require spray-applied fire-resistive material. The spray-applied fire-resistive material specified in the design should be applied to cover the tips at a minimum thickness of 1/2 in.

23. Steel Floor Unit Fasteners

The connection of the steel floor or roof units to the supporting steel structure is specified in the individual design. For A___, D___ and G___ series designs requiring puddle welds of the steel floor units to the supporting steel structure, power-driven fasteners may be used as an alternate to the puddle welds, provided equivalent strength capacity is maintained in the connection.

Minimum 3/4-in. long #10 self-drilling screws may be used as an alternate to button-punching the side laps of adjacent steel floor and form units in A ____, D ____, G ____ and P ____ series designs. The spacing of the screws should be the same as indicated for the button punches.

IV. BEAMS

This section on beams applies to W, M or S shaped hot rolled structural steel sections as defined by the American Institute of Steel Construction.

The conditions of acceptance in ANSI/UL 263 provide criteria for Restrained Beam Ratings and Unrestrained Beam Ratings. A greater thickness of protection material is typically required for the Unrestrained Beam Rating as compared to the protection material thickness required for the Restrained Beam Rating based on the differences in the rating criteria. Accordingly, Unrestrained Beam Ratings may be used for beams designed for either restrained or unrestrained conditions. Restrained Beam Ratings may be used for beams designed for restrained conditions.

ANSI/UL 263 provides for beams to be included in two types of test assemblies. One type of test assembly contains a full representation of the floor or roof construction being supported by the beam. Classifications resulting from this type of tested assembly may include: (1) Restrained Assembly Ratings, (2) Unrestrained Assembly Ratings, and (3) Unrestrained Beam Ratings. Restrained Beam Ratings are not determined from this type of test assembly. Results from these tests are identified as Design Series Nos. A00, D00, G00, J00 or P00. The other type of test assembly contains a partial representation of the floor or roof construction. Classifications resulting from this type of tested assembly may include: (1) Restrained Beam Ratings and (2) Unrestrained beam Ratings. Ratings for floor or roof assemblies are not determined from this type of test assembly. Results from these tests are identified as Design Series Nos. N00 or S00.

1. Beam Size

For fire-resistance purposes, the minimum beam size is expressed in terms of a W/D ratio, where W is the weight of the beam per lineal foot and D is the perimeter of protection material at the interface between the steel section and the protection material. Accordingly, beams of the same configuration and having a greater W/D ratio than the beam size specified in the fire-resistive design are considered larger than the specified minimum size beam and may be used in that design.

W/D values are published by the American Institute of Steel Construction, Inc. In 2001, the method used to calculate the perimeter was refined to include the fillets of hot-rolled sections rather than assuming right angle intersections. An example of this change results in the W/D value for a W8x28 section changing from 0.80 to 0.819.

Application of equations in the Fire Resistance Directory that include proportional relationship of the (W/D) value are not affected by the change in the calculation process for (W/D), provided the (W/D) values used are determined by a single method.

2. Composite and Noncomposite Beams

The load applied on beams during the fire tests has been determined by the allowable stress design method specified by the American Institute of Steel Construction. Noncomposite beams may be substituted when composite beams are specified in a design because composite beams deflect more under fire conditions when loaded to their design load than noncomposite beams. Composite beams may only be substituted into designs which specify composite beams.

3. Cavities

Cavities, if any, between the upper beam flange and the steel floor or roof units should be filled with the fire-resistive coating material applied to the beam, unless specified otherwise on the individual design.

4. Beam Substitution

Beam ratings depend upon the type of floor or roof the beam is supporting and the protection on the floor or roof units, as well as the type and thickness of protection material applied to the beam. The substitution of beams into a floor assembly (A--, D--, G-- or J-- Design) or roof assembly (P-- Design) should be limited to assemblies which have a similar or greater capacity for heat dissipation from the beam as compared to the capacity for heat dissipation of the floor or roof construction specified in the design from which the beam is being transferred.

For concrete floors, an equal or greater capacity for heat dissipation exists when the concrete has an equal or greater density range and volume per unit floor area.

Spray-applied Fire-resistive Materials

Application of N Series Designs

When it is the intent to only maintain the existing Assembly Rating, the beams, steel joists and steel trusses from N Series Designs may be substituted for the tested structural member provided the hourly Unrestrained Beam Rating of the structural member being transferred is at least equal to the Unrestrained Beam Rating of the structural member being replaced. Additionally, for steel joists and steel trusses the Restrained Beam Rating of the joist or truss being transferred is to be equal to or greater than the Restrained Assembly Rating of the floor-ceiling assembly into which the joist or truss is being transferred.

When it is the intent to comply with requirements that the structural member's hourly rating be equal to or greater than the assembly's hourly rating, the structural member from the N Series Design may be substituted for the tested structural member provided also that the hourly Beam Rating of the structural member being transferred is at least equal to the hourly rating of the requirement. Additionally, the Restrained Beam Rating of the structural member being transferred is to be equal to or greater than the Restrained Assembly Rating of the floor assembly into which the structural member is being transferred.

For applications where the assembly's hourly rating differs from the structural member rating, particular attention should be made to the thickness of fire protection materials applied to the underside of the floor adjacent to the structural member. The thickness of fire protection material required within 12 in. beyond the edges of the structural member should be the lesser of the beam protection thickness or the deck protection thickness as required by the N Series Design but not less than the thickness of fire protection material required by the assembly.

Application of S Series Designs

When it is the intent to only maintain the existing Assembly Rating, the beams, steel joists and steel trusses from the S Series Designs may be substituted for the tested structural member provided the hourly Unrestrained Beam Rating of the structural member being transferred is at least equal to the Unrestrained Beam Rating of the structural member being replaced. Additionally, the Restrained Beam Rating of the structural member being transferred is to be equal to or greater than the Restrained Assembly Rating of the roof assembly into which the structural member is being transferred.

When it is the intent to comply with requirements that the structural member's hourly rating be equal to or greater than the assembly's hourly rating, the structural member from the S Series Design may be substituted for the tested beam provided also that the hourly Beam Rating of the structural member being transferred is at least equal to the hourly rating of the requirement. Additionally, the Restrained Beam Rating of the structural member being transferred is to be equal to or greater than the Restrained Assembly Rating of the roof assembly into which the structural member is being transferred.

For applications where the assembly's hourly rating differs from the structural member rating, particular attention should be made to the thickness of fire protection material applied to the underside of the roof deck adjacent to the structural member. The thickness of fire protection material required within 12 in. beyond the edges of the structural member should be the lesser of the beam protection thickness or the deck protection thickness as required by the S Series Design but not less than the thickness of fire protection material required by the assembly.

Application of A, D, G, J and P Series Designs

When it is the intent to only maintain the existing Assembly Rating, the beams from A, D, G, J and P Series Designs may be substituted for the tested beam provided that: (1) the Unrestrained Beam Rating of the beam being transferred is equal to or greater than the Unrestrained Beam Rating of the beam being replaced; and (2) the Restrained Assembly Rating of the assembly from which the beam is being transferred is equal to or greater than the Restrained Assembly Rating of the assembly into which the beam is being transferred.

When it is the intent to comply with requirements that the beam's hourly rating be equal to or greater than the assembly's hourly rating, the beams from A, D, G, J and P Series Designs may be substituted for the tested beam provided also that the hourly Unrestrained Rating of the beam being transferred is at least equal to the hourly rating of the requirement.

Mastic and Intumescent Coatings

Application of N Series and S Series Designs

The beams, steel joists and steel trusses from N Series Designs may be substituted for the tested structural member, provided the hourly Unrestrained Beam Rating of the structural member being transferred is at least equal to the Unrestrained Beam Rating of the structural member being replaced, and the Restrained Beam Rating of the structural member being transferred is equal to or greater than the Restrained Assembly Rating of the floor-ceiling assembly into which the structural member is being transferred.

5. Unprotected Floors and Roofs

The Unrestrained Beam Ratings in the N400, N600, N700 and N800 Series designs with spray-applied fire protection material on the steel floor decks may be used with unprotected steel floor deck assembly designs (D900 Series) or unprotected precast concrete floors provided that the beam fire protection material is oversprayed to the underside of the floor on both sides of the beam for a minimum width of 12 in. beyond the edges of the beam flange. The thickness of the protection material oversprayed to the underside of the floor should be the same as required for the beam. Overspraying is not required when the N Series designs with unprotected steel floor decks are substituted in the D900 Series designs or to support unprotected precast concrete units.

The Unrestrained Beam Ratings in the S400, S600, S700 and S800 Series designs with spray-applied protection material on the steel roof decks may be used with unprotected steel roof deck assembly designs (P9-- designs) provided the beam protection material is oversprayed to the underside of the roof on both sides of the beam for a minimum distance of 12 in. beyond the edges of the beam flange. The thickness of protection material oversprayed to the underside of the roof should be the same as required for the beam. Overspraying is not required when the S--designs with unprotected steel roof decks are substituted in the P9-- roof designs.

6. Adjustment of Thickness of Spray-applied Fire-resistive Materials for Restrained and Unrestrained Beams

Alternate-sized steel beams may be substituted for the given beam in the A700, A800, A900, D700, D800, D900, G700, G800, J700, J800, J900, N700, N800, P700, P800, P900, S700 and S800 series designs, provided the beams are of the same shape, and the thickness of spray-applied fire-resistive material for 1, 1-1/2, 2, 3 and 4 h Restrained and Unrestrained Beam ratings is adjusted in accordance with the following equation:

$$T_1 = \frac{\left(\frac{W_2}{D_2} + 0.6\right)(T_2)}{\left(\frac{W_1}{D_1} + 0.6\right)}$$

Where:

T = Thickness (in.) of spray-applied material

W = Weight of beam (lb/ft)

D = Perimeter of protection, at the interface of the protection material and the steel through which heat is transferred to steel (in.)

Subscript 1 = Refers to alternate beam size and required material thickness

Subscript 2 = Refers to given beam size and material thickness shown on the individual design

1) W/D values are not less than 0.37

2) T_1 values are not less than 3/8 in. and

3) the Unrestrained and Restrained Beam Rating is not less than 1 h.

The use of this procedure is applicable to the adjustment of spray-applied fire-resistive material thickness on restrained and unrestrained beams having solid web members. It is not applicable to the adjustment of mastic and intumescent coatings on restrained and unrestrained beams.

When used to adjust the material thickness for a restrained beam, the use of this procedure is limited to steel sections classified as compact in accordance with the Specification for the Design of Structural Steel Buildings by the American Institute of Steel Construction, Load and Resistance Factor Design (Third Ed.).

7. Restrained and Unrestrained Conditions

Classifications of floor-ceiling and roof-ceiling assemblies and individual beams include restrained and unrestrained ratings. See **Section III FLOOR-CEILINGS AND ROOF-CEILINGS, Item 16 Restrained and Unrestrained Assemblies** for additional information on this subject.

V. COLUMNS

The minimum column size and configuration of the steel member is specified in the X and Y Series designs. The same hourly rating applies when a steel section with an equal or greater W/D ratio is substituted for the specified column size of the same configuration.

W/D values are published by the American Institute of Steel Construction, Inc, for contour and box protection configurations. In 2001, the method used to calculate the contour perimeter was refined to include the rounded fillets of hot-rolled sections rather than assuming right angle web-flange intersections. An example of this change results in the W/D value for a W10x49 section (with four side contour protection) changing from 0.83 to 0.84.

Application of equations in the Fire Resistance Directory that include a proportional relationship of the (W/D) value is not affected by the change in the calculation process for (W/D), provided the (W/D) values used in each application are determined consistently by a single method.

The thickness of the coating materials in the X700, X800 and Y700 Series designs required on wide flange steel sections smaller than specified in a design may be calculated as follows:

$$X_2 = 1.25(X_1)\left(\frac{W_1}{D_1}\right)\left(\frac{D_2}{W_2}\right)$$

Where:

x2 = Thickness of coating for smaller wide flange section

x1 = Thickness of coating used on the rated steel section

W2 = Weight per foot of smaller wide flange section

W1 = Weight per foot of the rated steel section

D2 = Perimeter of smaller steel section at interface with coating

D1 = Perimeter of the rated steel section at interface with coating

Guidance addressing the application of spray-applied fire-resistive materials to primed or similarly painted wide flange steel shapes is provided in the section titled **Coating Materials**.

The fire-resistive materials applied to the steel sections should be protected from damage.

VI. WALLS AND PARTITIONS

The ratings for walls and partitions apply when either face of the assembly is exposed to the fire unless indicated otherwise on a specific design. Flashing and corner details may vary from those described in a design provided structural equivalency is maintained and similar materials to those specified in the design are used for supports, fasteners and flashings. Where dynamic movement is specified in Joint Systems (XHBN) that utilizes either U400-, V400- or W400-Series fire-resistance-rated wall and partition assemblies, the special features of the walls to accommodate dynamic movement are intended to be as specified in the individual designs under XHBN.

The hourly rating of a load-bearing assembly also applies to the same assembly when it is used as a non-load-bearing assembly.

The size of studs is minimum unless otherwise stated in a design.

The spacing of studs is a maximum unless otherwise stated in a design.

Spacing between parallel rows of studs are minimums unless otherwise stated in the individual designs.

Gypsum board thicknesses specified in specific designs are minimums. Greater thicknesses of gypsum board are permitted as long as the fastener length is increased to provide penetration into framing that is equal to or greater than that achieved with the specified gypsum board thickness and fasteners.

Additional layers of gypsum board are permitted to be added to any design.

Orientation, vertical or horizontal, of the application of gypsum board in walls and partitions is specified in the individual designs.

Except when gypsum board is allowed to be applied horizontally in the individual wall designs, horizontal butt joints of vertically applied gypsum board should be backed by the same type studs as specified in the design. Alternatively, minimum 25 gauge steel framing with a minimum attachment face of 1-1/4 in. may be used for the backing. Both edges of the gypsum board forming the horizontal joint should be attached to the backing with the same screws and spacing as specified in the design for the attachment of the gypsum board edges, then finished as specified for the vertical joints.

Horizontal butt joints on opposite sides of the studs in single-layer applications should be staggered a minimum of 12 in. unless otherwise stated in the individual designs. Horizontal butt joints in adjacent layers on the same face of the assembly in multiple-layer applications should be staggered a minimum of 12 in. unless otherwise stated in the individual designs.

1. Wood Stud Walls

The firestopping requirements for wood stud assemblies should be determined from the Authority Having Jurisdiction. Horizontal bridging is included in most fire-test samples in order to fully load the wood studs. This horizontal bridging should not be considered as a means of firestopping.

The hourly fire ratings for load-bearing wood stud walls tested before January 1, 2009, were derived with a superimposed load applied to the wall assembly intended to theoretically develop maximum working stresses not exceeding the design values published in the Supplement to the 1991 Edition of the National Design Specification for wood construction. In addition, the design load per square inch of cross-sectional area for any wood stud should not exceed 385 psi. For fire-resistive designs based upon data generated after December 31, 2008, the superimposed load applied to the wall assembly was derived from ASTM D6513, "Standard Practice for Calculating the Superimposed Load on Wood-frame Walls for Standard Fire-Resistance Tests," and includes a reference to the edition of the National Design Specification used to calculate the design load, the design method, the limiting design factor, and the percentage of the design load applied to the test sample.

Wood stud walls may contain fire-retardant-treated studs as well as untreated wood studs. The use of fire-retardant-treated plywood (wood structural panels) may be used in designs that contain use of untreated plywood when all other specified attributes are equivalent to the wood structural panel in the design.

2. Steel Studs

The dimensions and gauge of steel studs are minimums. The hourly ratings apply when the steel studs are of a heavier gauge and/or larger dimensions than specified in a design. The superimposed load of bearings walls utilizing steel studs should be based on the capacity of the studs as determined by the "North American Specification and Commentary for the Design of Cold-Formed Steel Structural Members" (2007).

Where lateral support of studs (by means of straps, channels or similar steel members) is required in the design, the loads applied to steel studs should be based on the steel-braced design. The loads based on sheathing bracing should not be assumed, unless otherwise stated in the design.

The loads applied to steel studs having a yield stress higher than the stated minimum should be based upon the specified minimum yield stress stated in the design.

Non-load-bearing steel studs are produced in accordance with ASTM C645, "Standard Specification for Nonstructural Steel Framing Members." In accordance with ASTM C645, the minimum flange width should be 1-1/4 in. and the minimum return lip should be 3/16 in. Studs are also produced with steel having a minimum yield strength of 33 ksi.

3. Metal Thickness

Unless otherwise indicated in the individual designs, the following minimum metal thickness tables apply where a metal gauge designation is stated. Metal gauges are no longer referenced in ASTM Standards. It is still an industry practice to specify steel components by gauge. Because many of the designs contained herein refer to metal gauge the following information is to be used as a guide where field questions occur. The tables shown herein should be used as a reference and the Authority Having Jurisdiction should be consulted if discrepancies exist between these tables and a local code requirement. Due to structural considerations and fire performance considerations the minimum thickness tables are different for steel deck (floor or roof), load-bearing studs and non-load-bearing studs.

The minimum thickness for load-bearing steel studs is based upon ASTM C955-96, "Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks) and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases." The color code denoted by the ASTM Standard is also shown below. For load-bearing steel studs, the minimum bare metal thickness should be as follows:

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Gauge	Color Code	Min Thkns Bare Metal In.
20	White	0.0329
18	Yellow	0.0428
16	Green	0.0538
14	Orange	0.0677

For non-load-bearing studs, the minimum thickness is based upon ASTM C645. The color code denoted by the ASTM Standard is also shown below. For non-load-bearing steel studs, the minimum bare metal thickness should be as follows.

Gauge	Color Code	Min Thkns Bare Metal, In.
25	None	0.0179
22	Black	0.0269
20	White	0.0329
18	None	0.0428
16	None	0.0538

4. Gypsum Board Joint Treatment

The joints in gypsum board applied to wood or steel studs may either be exposed or covered with joint tape and joint compound for that portion of the joint above a suspended ceiling which is part of a fire-resistive floor-ceiling or roof-ceiling assembly.

5. Nonmetallic Electrical Outlet Boxes

Outlet Boxes and Fittings Classified for Fire Resistance (CEYY) includes Classifications for nonmetallic outlet and switch boxes for use in wall or partition assemblies. The information provided for each Classification includes the model numbers for the Classified products, a description of the rated assemblies, the spacing limitations for the boxes and the installation details. Nonmetallic boxes should not be installed on opposite sides of walls or partitions of staggered stud construction unless Classified for use in such constructions.

6. Metallic Electrical Outlet Boxes

Listed single and double gang metallic outlet and switch boxes with metallic or nonmetallic cover plates may be used in bearing and nonbearing wood stud and steel stud walls with ratings not exceeding 2 h. These walls should have gypsum wallboard facings similar to those shown in

Design Nos. U301, U411 and U425. The metallic outlet or switch boxes should be securely fastened to the studs and the opening in the wallboard facing should be cut so that the clearance between the box and the wallboard does not exceed 1/8 in. The surface area of individual metallic outlet or switch boxes should not exceed 16 sq in. The aggregate surface area of the boxes should not exceed 100 sq in. per 100 sq ft of wall surface. The aggregate surface area of the boxes may be exceeded when Wall-opening Protective Materials (CLIV) are installed according to the requirements of their Classification.

Metallic boxes located on opposite sides of walls or partitions should be separated by a minimum horizontal distance of 24 in. This minimum separation distance between metallic boxes may be reduced when Wall-opening Protective Materials (CLIV) are installed according to the requirements of their Classification.

Metallic boxes should not be installed on opposite side of walls or partitions of staggered stud construction unless Wall Opening Protective Materials are installed with the metallic boxes in accordance with Classification requirements for the protective materials.

7. Exterior Walls

The fire-resistive designs and UL Classified materials for walls and partitions are investigated to ANSI/UL 263, which addresses fire-resistive requirements only with the understanding that their use is intended for interior applications. Where an exterior application of a UL Classified wall or partition design is desired, the local building code and Authority Having Jurisdiction should be consulted to ensure compliance with other code requirements applicable to exterior walls.

8. Concrete Masonry Units

Unless otherwise indicated in the individual designs, the allowable compressive stress for the concrete masonry units have been determined from the empirical design method for masonry found in the model codes. For assemblies that have been tested at less than 100% of the allowable compressive stress, the design states the maximum allowable compressive stress for the assembly.

ADDITIONAL INFORMATION

For additional information, see Fire Resistance Ratings (BXRH).

* *

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Last Updated on 2012-11-05

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Member of the FM Global Group

Approval Standard for Lightweight Insulating Concrete for Use in Class 1 and Noncombustible Roof Constructions

Class Number 4454

July 2010

R5411

Date Submitted	7/19/2012	**Section**	1509.6.4 Equipment and applianc	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5411-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

Life safety issue for workers and inspectors. Same language and in compliance with 2010 Florida Mechanical Code Chapter 3 General Regulations and 2009 International Fuel Gas Code Chapter 3 General Regulations. DOL/OSHA , OSHA - 29 CFR 1910.27(d)(1)(ii), (d)(2) and (d)(5) Fixed Ladders.
Important information for designers, roofing contractors, building owners and Inspectors to have that is roofing related and part of a reroofing process. Removal of significant information that has been part of the code for 10 years and is not a part of the ICC is no reason to change to make the process harder.

1509.6.4 Equipment and appliances on roofs or elevated structures.

Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope).

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).

2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.

3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.

4. There shall be a minimum of 18 inches (457 mm) between rails.

5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.

6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m^2) per square foot.

7. Ladders shall be protected against corrosion by approved means. Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 occupancies.

R5412

Date Submitted	7/19/2012	**Section**	1509.6.5 Mechanical units.	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5412-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

Found in mechanical code however important to roofing installations and needs to stay in roofing section.
2010 Florida Mechanical Code
301.12 Wind resistance.
Mechanical equipment, appliances and supports that are exposed to wind shall be designed and installed to resist the wind pressures on the equipment and the supports as determined in accordance with the Florida Building Code, Building.
Roof-mounted mechanical units and supports shall be secured to the structure. The use of wood “sleepers” shall not be permitted.
Important information for designers, roofing contractors, building owners and Inspectors to have that is roofing related and part of a reroofing process. Removal of significant information that has been part of the code for 10 years and is not a part of the ICC is no reason to change to make the process harder.

1509.6.5 Mechanical units.

Roof mounted mechanical units shall be mounted on curbs raised a minimum of 8 inches (203 mm) above the roof surface, or where roofing materials extend beneath the unit, on raised equipment supports providing a minimum clearance height in accordance with Table 1509.7.

TABLE 1509.6.5 CLEARANCE BELOW RAISED ROOF MOUNTED MECHANICAL UNITS

WIDTH OF MECHANICAL UNIT (inches)	MINIMUM CLEARANCE ABOVE SURFACES (inches)
≤ 24	14
24 < 36	18
36 < 48	24
48 < 60	30
≥ 60	48

-

For SI: 1 inch = 25.4 mm.

R5288

Date Submitted	7/18/2012	**Section**	1509	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5288-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

1509.6 and 1509.7 need to stay in the1509 Rooftop Structures roofing section.
Same language and in compliance with 2010 Florida Mechanical Code Chapter 3 General Regulations and 2009 International Fuel Gas Code Chapter 3 General Regulations.
2010 Florida Mechanical Code
301.12 Wind resistance.
Mechanical equipment, appliances and supports that are exposed to wind shall be designed and installed to resist the wind pressures on the equipment and the supports as determined in accordance with the Florida Building Code, Building.
Roof-mounted mechanical units and supports shall be secured to the structure. The use of wood “sleepers” shall not be permitted.
Important information for designers, roofing contractors, building owners and Inspectors to have that is roofing related and part of a reroofing process. Removal of significant information that has been part of the code for 10 years and is not a part of the ICC is no reason to change to make the process harder.

1509.1 General.
The provisions of this section shall govern the construction of rooftop structures.

1509.2 Penthouses.
Penthouses in compliance with Sections 1509.2.1 through 1509.2.5 shall be considered as a portion of the story directly below the roof deck on which such penthouses are located. All other penthouses shall be considered as an additional story of the building.

1509.2.1 Height above roof deck.
Penthouses constructed on buildings of other than Type I construction shall not exceed 18 feet (5486 mm) in height above the roof deck as measured to the average height of the roof of the penthouse.

Exceptions:

1. Where used to enclose tanks or elevators that travel to the roof level, penthouses shall be permitted to have a maximum height of 28 feet (8534 mm) above the roof deck.

2. Penthouses located on the roof of buildings of Type I construction shall not be limited in height.

1509.2.2 Area limitation.
The aggregate area of penthouses and other enclosed rooftop structures shall not exceed one-third the area of the supporting roof deck. Such penthouses and other enclosed rooftop structures shall not be required to be included in determining the building area or number of stories as regulated by Section 503.1. The area of such penthouses shall not be included in determining the fire area specified in Section 901.7.

1509.2.3 Use limitations.
Penthouses shall not be used for purposes other than the shelter of mechanical or electrical equipment, tanks, or vertical shaft openings in the roof assembly.

1509.2.4 Weather protection.
Provisions such as louvers, louver blades or flashing shall be made to protect the mechanical and electrical equipment and the building interior from the elements.

1509.2.5 Type of construction.
Penthouses shall be constructed with walls, floors and roofs as required for the type of construction of the building on which such penthouses are built.

Exceptions:

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

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

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

1509.3 Tanks.
Tanks having a capacity of more than 500 gallons (2 m^3) located on the roof deck of a building shall be supported on masonry, reinforced concrete, steel or Type IV construction provided that, where such supports are located in the building above the lowest story, the support shall be fire-resistance rated as required for Type IA construction.

1509.3.1 Valve and drain.
In the bottom or on the side near the bottom of the tank, a pipe or outlet, fitted with a suitable quick-opening valve for discharging the contents into a drain in an emergency shall be provided.

1509.3.2 Location.
Tanks shall not be placed over or near a stairway or an elevator shaft, unless there is a solid roof or floor underneath the tank.

1509.3.3 Tank cover.
Unenclosed roof tanks shall have covers sloping toward the perimeter of the tanks.

1509.4 Cooling towers.
Cooling towers located on the roof deck of a building and greater than 250 square feet (23.2 m^2) in base area or greater than 15 feet (4572 mm) in height above the roof deck, as measured to the highest point on the cooling tower, where the roof is greater than 50 feet (15 240 mm) in height above grade plane shall be constructed of noncombustible materials. The base area of cooling towers shall not exceed one-third the area of the supporting roof deck.

Exception: Drip boards and the enclosing construction shall be permitted to be of wood not less than 1 inch (25 mm) nominal thickness, provided the wood is covered on the exterior of the tower with noncombustible material.

1509.5 Towers, spires, domes and cupolas.
Towers, spires, domes and cupolas shall be of a type of construction having fire-resistance ratings not less than required for the building on top of which such tower, spire, dome or cupola is built. Towers, spires, domes and cupolas greater than 85 feet (25 908 mm) in height above grade plane as measured to the highest point on such structures, and either greater than 200 square feet (18.6 m^2) in horizontal area or used for any purpose other than a belfry or an architectural embellishment, shall be constructed of and supported on Type I or II construction.

1509.5.1 Noncombustible construction required.
Towers, spires, domes and cupolas greater than 60 feet (18 288 mm) in height above the highest point at which such structure contacts the roof as measured to the highest point on such structure, or that exceeds 200 square feet (18.6 m^2) in area at any horizontal section, or which is intended to be used for any purpose other than a belfry or architectural embellishment, or is located on the top of a building greater than 50 feet (1524 mm) in building height shall be constructed of and supported by noncombustible materials and shall be separated from the building below by construction having a fire-resistance rating of not less than 1.5 hours with openings protected in accordance with Section 712. Such structures located on the top of a building greater than 50 feet (15 240 mm) in building height shall be supported by noncombustible construction.

1509.5.2 Towers and spires.
Enclosed towers and spires shall have exterior walls constructed as required for the building on top of which such towers and spires are built. The roof covering of spires shall not be less than the same class of roof covering required for the building on top of which the spire is located.

1509.6 Mechanical equipment screens.
Mechanical equipment screens shall be constructed of the materials specified for the exterior walls in accordance with the type of construction of the building. Where the fire separation distance is greater than 5 feet (1524 mm), mechanical equipment screens shall not be required to comply with the fire-resistance rating requirements.

1509.6.1 Height limitations.
Mechanical equipment screens shall not exceed 18 feet (5486 mm) in height above the roof deck, as measured to the highest point on the mechanical equipment screen.

Exception: Where located on buildings of Type IA construction, the height of mechanical equipment screens shall not be limited.

1509.6.2 Types I, II, III and IV construction.
Regardless of the requirements in Section 1509.6, mechanical equipment screens shall be permitted to be constructed of combustible materials where located on the roof decks of building of Type I, II, III or IV construction in accordance with any one of the following limitations:

1. The fire separation distance shall not be less than 20 feet (6096 mm) and the height of the mechanical equipment screen above the roof deck shall not exceed 4 feet (1219 mm) as measured to the highest point on the mechanical equipment screen.

2. The fire separation distance shall not be less than 20 feet (6096 mm) and the mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2303.2 for exterior installation.

3. Where exterior wall covering panels are used, the panels shall have a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use with each face tested independently in accordance with ASTM E 84 or UL 723. The panels shall be tested in the minimum and maximum thicknesses intended for use in accordance with, and shall comply with the acceptance criteria of, NFPA 285 and shall be installed as tested. Where the panels are tested as part of an exterior wall assembly in accordance with NFPA 285, the panels shall be installed on the face of the mechanical equipment screen supporting structure in the same manner as they were installed on the tested exterior wall assembly.

1509.6.3 Type V construction.
The height of mechanical equipment screens located on the roof decks of buildings of Type V construction, as measured from grade plane to the highest point on the mechanical equipment screen, shall be permitted to exceed the maximum building height allowed for the building by other provisions of this code where complying with any one of the following limitations, provided the fire separation distance is greater than 5 feet (1524 mm):

1. Where the fire separation distance is not less than 20 feet (6096 mm), the height above grade plane of the mechanical equipment screen shall not exceed 4 feet (1219 mm) more than the maximum building height allowed;

2. The mechanical equipment screen shall be constructed of noncombustible materials;

3. The mechanical equipment screen shall be constructed of fire-retardant-treated wood complying with Section 2303.2 for exterior installation; or

4. Where the fire separation distance is not less than 20 feet (6096 mm), the mechanical equipment screen shall be constructed of materials having a flame spread index of 25 or less when tested in the minimum and maximum thicknesses intended for use with each face tested independently in accordance with ASTM E 84 or UL 723.

<u>1509.6.4 Equipment and appliances on roofs or elevated structures.</u>

<u>Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope).</u>

<u>Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:</u>

<u>1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).</u>

<u>2. Ladders shall have rung spacing not to exceed 14 inches (356 mm) on center.</u>

<u>3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.</u>

<u>4. There shall be a minimum of 18 inches (457 mm) between rails.</u>

5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.

6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m^2) per square foot.

7. Ladders shall be protected against corrosion by approved means. Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 occupancies.

1509.6.5 Mechanical units.

Roof mounted mechanical units shall be mounted on curbs raised a minimum of 8 inches (203 mm) above the roof surface, or where roofing materials extend beneath the unit, on raised equipment supports providing a minimum clearance height in accordance with Table 1509.7.

TABLE 1509.6.5 CLEARANCE BELOW RAISED ROOF MOUNTED MECHANICAL UNITS

WIDTH OF MECHANICAL UNIT (inches)	MINIMUM CLEARANCE ABOVE SURFACES (inches)
< 24	14
24 < 36	18
36 < 48	24
48 < 60	30
> 60	48

For SI: 1 inch = 25.4 mm.

Exception: In buildings where the existing rooftop equipment, in the opinion of the building official, provides sufficient clearance to repair, recover, replace and/or maintain the roofing system or any of its components, such existing equipment need not comply with Table 1509.6.5

1509.7 Photovoltaic systems.
Rooftop mounted photovoltaic systems shall be designed in accordance with this section.

1509.7.1 Wind resistance.
Rooftop mounted photovoltaic systems shall be designed for wind loads for component and cladding in accordance with Chapter 16 using an effective wind area based on the dimensions of a single unit frame.

1509.7.2 Fire classification.
Rooftop mounted photovoltaic systems shall have the same fire classification as the roof assembly required by Section 1505.

1509.7.3 Installation.
Rooftop mounted photovoltaic systems shall be installed in accordance with the manufacturer's installation instructions.

1509.7.4 Photovoltaic panels and modules.
Photovoltaic panels and modules mounted on top of a roof shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with the manufacturer's installation instructions.

1509.8 Other rooftop structures.
Rooftop structures not regulated by Sections 1509.2 through 1509.7 shall comply with Sections 1509.8.1 through 1509.8.5 as applicable.

1509.8.1 Aerial supports.
Aerial supports shall be constructed of noncombustible materials.

Exception: Aerial supports not greater than 12 feet (3658 mm) in height as measured from the roof deck to the highest point on the aerial supports shall be permitted to be constructed of combustible materials.

1509.8.2 Bulkheads.
Bulkheads used for the shelter of mechanical or electrical equipment or vertical shaft openings in the roof assembly shall comply with Section 1509.2 as penthouses. Bulkheads used for any other purpose shall be considered as an additional story of the building.

1509.8.3 Dormers.
Dormers shall be of the same type of construction as required for the roof in which such dormers are located or the exterior walls of the building.

1509.8.4 Fences.
Fences and similar structures shall comply with Section 1509.6 as mechanical equipment screens.

1509.8.5 Flagpoles.
Flagpoles and similar structures shall not be required to be constructed of noncombustible materials and shall not be limited in height or number.

R5291

Date Submitted	7/18/2012	**Section**	1510	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5291-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

SECTION 1510 REROOFING

1510.1 General.
Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

Exception: Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.

1510.2 Structural and construction loads.
Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

1510.3 Recovering versus replacement.
New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.

3. Where the existing roof has two or more applications of any type of roof covering.

4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining materials secured down before applying additional roofing.

5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section 1504.1 cannot be met.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

2. ~~Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.Reserved.~~

3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

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

1510.4 Roof recovering.
Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place.

1510.5 Reinstallation of materials.

Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

1510.6 Flashings.

Flashings shall be reconstructed in accordance with approved manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

R5731

Date Submitted	7/29/2012	**Section**	1510	**Proponent**	Katherine Cleary
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

1510.3 Recovering versus replacement.

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofigng.

Summary of Modification

Vague code language. Set forth an allowable moistre by weight content roof membrane and insulation will give determine the suitabilty of the existing roof to receive a re-roof or a re-cover.

Rationale

Excessive moisture in roof membrane and roof insulation can lead to following:

1. accelerate corrosion of steel deck
2. cause roof system to blister
3. High moisture reduces Thermal Resistance Ration Percentage (TRR) performance
4. High moisture increases decay of roof system over time and reduces (TRR)

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Language is no longer vague. The TAS 126 Roof Moisture Survey, reference document 2.3 refers to research conducted to set forth a benchmark for "wet".

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

Setting a benchmark for "wet" in roof membrane and insulation. Will set guidelin for unaccapetable membrane and insulation due to loss of insulalting ability and material decay.

Impact to industry relative to the cost of compliance with code

Set a guideline for contractors to follow a benchmark for "wet".

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, Accepatable roof area that can be repaired/replaced.

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

Roof Moisture Survey benchmark for "wet" in roof membrane and roof insulation as be set for in Section 1521 High-Velocity Hurricane Zones-Reroofing, 1521.12 and 1521.4

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

5731-A2

Proponent Katherine Cleary **Submitted** 12/13/2012 **Attachments** Yes

Rationale

Setting a performance standard to meet a provision from the previous Florida Building Code

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No, This is part of the building code.

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

Currently part of the building code.

Impact to industry relative to the cost of compliance with code

This is part of the current code.

Requirements

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

Yes: 1. High moisture effects Thermal Resistance Ratio Percentage (TRR) Performance of the roof system. 2. High moisture increases the decay of the roof system over time and reduces (TRR).

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

Yes: 1. Florida is a coastal state with no part of the state being more than 120 miles from the ocean. 2. The climate in Florida in sub-tropical. 3. Trapped moisture in roof systems could cause blistering and accelerate corrosion of the steel deck or reinforcing steel in concrete decks.

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

No.

Does not degrade the effectiveness of the code

No. Florida is a sub tropical climate in which high moisture can cause roof blisters and accelerate corrosion of the steel deck or reinforcing steel in concrete decks.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

R5731-G1

Proponent Deborah Lawson **Submitted** 12/14/2012 **Attachments** No

Comment:

The alternative language submitted on 12/13/12 attempts to incorporate a portion of the language currently in s. 1521.12 for High Velocity Hurricane Zones into the general reroofing section of the code, without incorporating additional language that creates exceptions and specifies testing criteria. This has the potential to 1) make the code more confusing; 2) make the code inconsistent; and 3) make the non HVHZ provisions more stringent than the HVHZ provisions and discriminates against materials that are intended to have a higher moisture content.

Section 1510 Reroofing

1510.3 Recovering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following condtions occur:

~~1.Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~

1. Moisture content of the existing roofing assembly to be covered by a new roofing system shall not exceed 5 percent by weight in the roofing membrane and 8 percent by weight in commercially manufactured rigid board roof insulation as verified by moisture survey performed in accordance with TAS 126. Test results shall be submitted with the Uniform Roofing Permit Application. Testing for moisture content shall not be required for existing lightweight insulating concrete, gypsum, and **cementitiou**s wood fiber roof decks. All existing lightweight insulating concrete, gypsum and **cementitiou**s wood fiber roof decks shall be tested per Section 1521.7 to confirm compliance with wind load requirements of Chapter 16 (High-Velocity Hurricane Zones). 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 entire existing roofing system or roof section is replaced to conform to requirements of this code.

1510.3 Recovering versus replacement.

New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. ~~Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~

1. Moisture content of the existing roofing assembly to be covered by a new roofing system shall not exceed 5 percent by weight in the roofing membrane and 8 percent by weight in commercially manufactured rigid board roof insulation

ANSI/SPRI/RCI NT-1

Detection and Location of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization

Approved July 20, 2012

Table of Contents

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Disclaimer
This standard is intended for use by architects, engineers, registered roof consultants, roofing contractors, and building owners of low-slope roofing systems in the roofing industry, and their representatives. SPRI, its Members and employees do not warrant that this standard is proper and applicable in all circumstances and under all conditions.

1.0 Scope

1.1 Radioisotopic thermalization, performed in accordance with this standard, can effectively be used in the roofing industry to:

1.1.1 Locate and quantify latent moisture contained in the roofing material and/or roof deck materials.

1.1.2 Locate hidden sources of moisture entry by tracing subsurface paths of moisture migration.

1.1.3 Provide a basis for investigating roofing material and/or roof deck material degradation over a period of years when used as part of a preventive maintenance program.

1.2 This standard provides a minimum set of procedures for conducting surveys of moisture in membrane roofing systems, and for analyses of the data obtained in such surveys. Included are operating, verification, and reporting procedures, as well as operator qualification criteria.

1.3 This standard addresses the effect of roof construction, material differences and roof conditions on the numerical data output provided by the nuclear equipment.

1.4 This standard addresses limitations in the use of radioisotopic thermalization.

1.5. This standard addresses the governmental control of the equipment used to conduct nuclear moisture surveys.

2.0 Terminology/Definitions

2.1 Agreement States
Certain States that have an agreement with the United States Nuclear Regulatory Commission (USNRC) which permits these States to control, within the State, those radioactive materials for which the USNRC is responsible.

2.2 Backscatter
The number of neutrons reflected back in contrast to the number passing through a substance.

2.3 Film Badge
Photographic film used to measure exposure to ionizing radiation for purposes of personnel monitoring. See Commentary C2.3.

2.4 Radioisotopic Thermalization
The process undergone by high-energy (fast) neutrons as they lose energy by collision. Thermalization occurs when the energy of fast neutrons is partially absorbed by moderators of hydrogen atom collision.

2.5 United States Nuclear Regulatory Commission (USNRC)
The U.S. Nuclear Regulatory Commission (NRC) was created as an independent agency by Congress in 1974 to ensure the safe use of radioactive materials for beneficial civilian purposes while protecting people and the environment. The NRC has jurisdiction over licensing requirements for nuclear sources in the United States. Many other countries will have a similar agency with jurisdiction.

3.0 Survey Equipment and Licensing Requirements

3.1 The equipment shall be specifically designed for performing roof moisture surveys. An isotopic radioactive source consisting of Americum-241, Radium 226, or Cesium 137 with a Beryllium target is required.

3.2 The possession and use of by-product radioactive material in the US requires a license issued by the United States Nuclear Regulatory Commission (USNRC) or the equivalent agency of a State which has entered into an agreement with USNRC to assume control over the distribution. The following applies within the US, and many foreign countries have similar regulations.

3.2.1 Certain States have an agreement with the USNRC which permits these States to control, within the State, those radioactive materials for which the USNRC is responsible. These States, known as "Agreement States," have, in general, enacted laws and regulations for the control of radioactive material.

3.2.2 Most "Agreement States" have a reciprocity clause in their regulations that permits a user, licensed in his own State, to operate in another State for certain periods of time. Prior notification to the visited State is generally required.

3.2.3 Licensing requirements can differ depending upon the radioactive element being used in the equipment.

3.3 Commercially available equipment utilized for radioisotope thermalization shall be capable of meeting the requirements of the governing regulatory agency.

3.4 Since changes are continuously made governing regulation, the user shall stay current with the appropriate regulations. Responsibility for compliance with the regulations falls upon the owner of the equipment.

3.5 Licensing Considerations

3.5.1 User Training
The user shall complete an approved training program provided by the equipment manufacturer or other organization acceptable to the licensing authority.

3.5.2 Manufacturer's Instruction Manual
Each user shall have access to and be familiar with the equipment manufacturer's instruction manual.

3.5.3 Storage, Transportation, and Use
The equipment shall be stored in a locked area, base down, and in contact with shielding material such as concrete. Transportation shall be in an approved shipping container approved and labeled for use by the governing agency (typically provided by the equipment manufacturer), secured against removal by unauthorized personnel, and be accompanied by a current "Shipper's Certification for Radioactive Materials". During cleaning and use of the equipment, the operator shall avoid direct contact with the base of the equipment and shall instruct others to do likewise.

3.5.4 Radiation Leak Testing
Radiation leak tests shall be performed in accordance with the manufacturer's specifications, at prescribed intervals, and in accordance with the procedures designated by the licensing authority.

3.5.5 Maintenance and Servicing
The user shall not be authorized to remove the source or perform any maintenance on the source or source holder. These services shall be performed by the equipment manufacturer or other persons specifically licensed to perform these operations.

3.5.6 Personal Protection
Unless otherwise allowed by the Governing Agency having jurisdiction, all users shall be provided with film badge type dosimeters to be worn when handling or using the equipment. Authorized personnel, meeting the requirements of part 4 below, shall see to it that other persons are kept away from the equipment during use, transportation, or storage.

3.5.7 Waste Disposal
The equipment containing radioactive material shall be disposed of by either:

3.5.7.1 Transfer to another specifically licensed user or disposal agency.

3.5.7.2 Return to equipment manufacturer.

3.6 Moisture Detection

3.6.1 Fast neutrons from the radioactive source are involved with moisture content measurements. Fast neutrons from the radioactive source enter the material being surveyed and are both scattered and slowed down by collision with the nuclei of the atoms composing the material. Nuclei of all materials slow down the neutrons by momentum exchange, but the speed reduction is greatest for collisions with hydrogen nuclei, which have about the same mass as the neutrons. When water or moisture is present more hydrogen atoms exist for collisions. Some of the slow neutrons or thermal neutrons are scattered in such a way that they reach the slow neutron detector and are counted for a specified period of time.

3.6.2 In general, the detector measures the backscattering of slow neutrons that have collided with hydrogen nuclei. The resulting numerical readout displayed by the equipment is a relative measurement of hydrogen present in the material at the point of survey. It is important to note that elevated readings can be influenced by sources of hydrogen other than moisture content, i.e., bitumen thickness, wood deck, etc.

4.0 Survey Personnel

4.1 The moisture survey shall be performed under the supervision of a Survey Director. The Survey Director shall be thoroughly trained in the operation of the equipment and radiation safety, and have a thorough understanding of modern roofing technology, including knowledge of:

4.1.1 Types of roofing membrane material and the aging process.

4.1.2 Construction procedures.

4.1.3 Types of roofing insulations.

4.1.4 Types of roofing decks.

4.1.5 Types of roof assemblies.

4.1.6 Equilibrium moisture contents.

4.1.7 Effects of structural building components on moisture survey results.

4.1.8 Moisture migration in buildings.

4.2 The Survey Director shall have completed the following training:

4.2.1 Operational and radiological safety training conducted by the manufacturer of the equipment being used.

4.2.2 Previous field experience in this surveying discipline with "hands on application," for a period of not less than two (2) years.

4.3 All other personnel involved in the survey shall have been instructed in radiological safety, equipment operation, rooftop safety, and basic roofing technology.

5.0 Survey and Analysis Procedures

5.1 Preparation

5.1.1 Prior to or as part of the nondestructive nuclear evaluation, a physical roof survey is required to visually determine areas that are not safe for access by persons required to perform the survey. To assist with the physical roof survey secure architectural or structural drawings (if possible), verify composition of existing roof materials, and solicit historical information pertaining to the roof system performance. See Commentary C5.1.1.

5.2 Execution

5.2.1 Establish a reference point for each roof section to be surveyed. A roof section is an area of homogeneous roof construction. The reference point shall be located to permit horizontal (x-axis) measurements to the right of the reference point when facing the reference point and vertical (y-axis) measurements toward the viewer when facing the reference point. All measurements relating to x-y coordinates and the location of structural elements of the building rising above the roof surface, roof penetration(s), and/or membrane defects shall be made from this reference point.

5.2.2 The entire roof area to be surveyed shall be laid out with a grid based upon the x-y coordinates. Distance between the x-y coordinates shall be determined by the Survey Director and shall be consistent in each direction resulting in a pattern best suited to provide an adequate number of equipment readings to permit a thorough evaluation. Grid size will be influenced by the size and configuration of the roof section being surveyed and the material make up of the roof system (see Table 1).

5.2.2.1 Equal x-y coordinates [e.g., 10' X 10' US or 3 m X 3 m Metric, 6' X 6' US or 2 m X 2 m Metric, or 3' X 3' US or 1 m X 1 m Metric] in even increments and whole or half units of measure (US or Metric applied) shall be used. The distance between x-y coordinates shall not be greater than ten (10) feet US or three (3) meters Metric). Five feet US or 1.5 meters Metric is typically recommended. The distance between x-y coordinates used shall be consistent throughout the roof section being tested. A smaller increment between readings does improve the results by reducing the distance between readings but also increases the work required to provide the results. See Commentary C5.2.2.1.

5.2.2.2 x-y coordinates shall be located such that readings will not be required on the increased material thickness at perimeters and penetration flashings. One method of avoiding the extra material thickness is to come off the exterior perimeters and away from all penetration flashings a distance of two (2) to three (3) feet (one meter). In the field of the roof, areas of increased material thickness that cannot be avoided shall be treated as a separate roof section for analysis purposes.

5.2.2.3 x-y coordinate markings shall be made on the roof surface and on wall flashings around the perimeter of the area being surveyed to allow for identification of readings obtained for sampling and further investigation. Obtain permission from the building owner prior to the use of permanent marking material. Ensure that marking material is compatible with the surface being marked.

5.2.2.4 All structural elements of the building rising above the roof surface, penetrations, and obvious patched areas shall be accurately recorded on the recording sheet.

5.2.2.5 Prior to taking nuclear readings the device shall be tested on the roof to confirm it is functioning properly by taking ten readings in the same location without moving the equipment and recording them. When the equipment is functioning properly 99.7% of the readings recorded will fall between the plus or minus three (3) standard deviation limits established by the manufacturer for the equipment.

5.2.2.6 Nuclear readings shall be taken and recorded at each x-y coordinate or grid point.

5.3 Limitations

5.3.1 In order for this technique to be useful in detecting moisture, the material thickness is required to be constant (+/- 10 percent). Extra thickness of material, that normally occurs at flashings, penetrations, walkway layers, and patches, can alter the material thickness or reference level of the material composition being surveyed.

5.3.1.1 Over a deck or above-deck materials of varying thickness, the reference level can be altered (e.g., significantly tapered insulation material, precast tees, or waffle form decks).

5.3.1.2 A change in material below the roof membrane surface (e.g., metal deck vs. concrete deck; isocyanurate (polyisocyanurate) vs. fiberboard; additional plies of roofing material) can alter the reference level.

5.3.1.3 Heavy, moist, and dirty gravel can alter the reference level.

5.3.1.4 Equipment readings shall not be taken as part of a roof section survey in areas covered with standing water, ice, or snow. If nuclear readings must be taken in these areas, they shall be analyzed as a separate roof section, and must include a uniform covering of water, ice, or snow.

5.3.1.5 Roof assemblies composed of multiple layers of various materials derived from roof recover operations can alter the reference level.

5.3.2 For ballasted membranes and protected membrane roof (PMR) assemblies, the aggregate or paver ballast shall be removed in appropriate x-y coordinate spacing throughout the roof area in order to obtain equipment readings directly against the roof membrane and underlying insulation layers (if any). If the protective insulation layer of a PMR is left in place for the equipment reading, the core samples shall include this layer, since its moisture absorption level could adversely affect the overall survey.

5.3.3 Nuclear radioisotopic thermalization techniques for determining moisture contents of materials shall not be used over metal roof systems.

6.0 Verification and Quantification

6.1 General

6.1.1 The field data (numeric readout) is only relative and shall be quantified by core cuts. Three or more cores shall be extracted, with a core extracted at a general low (but not the lowest) reading, intermediate reading, and high (but not the highest) reading for each roof section surveyed. Core size shall not be less than a nominal two (2) inches (50 mm) in diameter and shall include all material down to the deck. If the deck material is capable of moisture absorption, a portion of it shall be included (structural concrete cores are not required). See Commentary C6.1.1.

6.1.2 Each element (membrane, each Insulation layer, if they are not multiple layers of the same material within the extracted cores) shall be immediately sealed in separate moisture tight containers and labeled to identify the date, location (building, roof section, and x-y coordinate), person taking the core, and any other information required by the Survey Director.

6.1.3 The core cuts to provide samples for testing shall be extracted directly after the equipment readings have been completed for the roof section to assure the core cuts are taken from the correct x-y coordinate point relational to the equipment reading obtained.

6.1.4 Core samples shall be analyzed for moisture content by weight. Separate different elements of the roof assembly, such as insulation layers and construction material layers (without damaging materials), and perform gravimetric analysis (see 6.2) separately for each layer of each core sample (i.e., membrane, insulation, base sheet, vapor retarder, moisture sensitive deck, etc.).

6.1.5 Sampling and the repair of core cuts made shall be accomplished in accordance with the manufacturer's recommendations and/or *NRCA Repair Manual for Low-slope Membrane Roofing*.

6.2 Gravimetric Analysis

6.2.1 The different elements of the roof assembly (see 6.1.4) shall be separated at the time of sampling and analyzed separately. Each element (deck, vapor retarder, insulation, and membrane) shall be weighed immediately after removing from the sealed container. The sample container and material extracted from the roof shall be chamber dried for a minimum of 24 hours at 220° F/104.4° C and re-weighed. The chamber drying procedure shall continue until no weight loss is observed (within limits of balance equipment). Moisture content by weight is determined by the following formula:

[(Wet weight-Dry weight)/Dry Weight] x 100 [Eq. 1]

See commentary C.6.2.1.

6.2.2 A determination of moisture content by dry weight shall be made for each analyzed material. For bituminous built up roof membrane materials moisture content shall be determined by ASTM D95, *Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation.*

7.0 Analysis of Collected Data

7.1 The interpretation of the nuclear equipment readings and the correlation of core sample test data shall be accomplished by the Survey Director. See Commentary C7.1.

7.2 Once the actual moisture content levels have been determined for the low, mid, and high readings, a straight line graph shall be drawn relating count rates to actual moisture levels. The measurement counts must be converted to a defined unit of measurement, such as percent moisture (See Table 2).

7.3 Histogram
The volume of data collected is normally voluminous. A histogram shall be prepared to compile the data into a compact form. A histogram simply groups data points by defining intervals and combining all data points that fall within that interval.

7.3.1 The interval size shall be carefully considered; it shall be large enough to ease the computational task, but small enough to easily distinguish the normal distribution produced by the dry sections of a dry roof (See Table 3).

7.3.2 The normal distribution curve shall be calculated for the main part of the data, with the three-sigma limits corresponding roughly to the acceptable moisture limits for "dry" insulation of the materials being considered (See Table 4).

7.4 Graphic Plot

Once the wet areas can be defined from the count rate data, a graph of the roof plan shall be drawn to summarize the survey. The moisture map shall be prepared depicting a minimum of three (3) levels of moisture content (See Table 2) per material tested. The graphic plot (moisture map) shall be prepared by computer program, hand contouring, or colored graphics within a spreadsheet program.
If possible, the graphic plot of suspected wet areas shall be overlaid onto scaled drawings of each surveyed section roof and compared to architectural and structural drawing available to determine potential impact of latent building and structural features on the collected field data. See Commentary C7.4.

7.5 Statistical Analysis of Data

7.5.1 Statistically, the histogram produced by using a nuclear gauge on a dry roof section will form a bell-shaped curve. This curve is called the "normal distribution." Two conditions shall be met to produce a statistically meaningful curve:

7.5.1.1 The roof section must be of similar composition throughout.

7.5.1.2 A minimum of 100 data points shall be taken within the roof section to allow the normal distribution to appear.

7.5.2 The "width" of the normal distribution is determined by the standard deviation of the main data. The importance of the standard deviation is that once the mean (average) and the standard deviation are known, the "end points" of the normal distribution, and therefore the count rate range for dry areas of the roof, can be defined.

7.5.3 The normal distribution curve shall be overlaid on the measurement data histogram. To verify the end points for the overlay process, the mean and standard deviation must be calculated for the main data (excluding extreme outlying data points). The mean is simply the sum of the midpoint of the histogram interval multiplied by the frequency of occurrence and divided by the total number of points. The equation is:

$$\mathbf{Mean = (Xi \times Fi) / N}$$

[Eq. 2]

7.5.4. The equation for standard deviation for grouped data is:

$$\frac{\left\{ \dfrac{[(Xi)^2 \times Fi]-[Xi \times Fi]^2}{N} \right\}^{1/2}}{(N-1)^{1/2}}$$

[Eq. 3]

Where
Xi = the midpoint of histogram interval

Fi = Frequency of occurrence

N = Total number of points

Note: These equations are easily implemented with a programmable calculator, computer, or spreadsheet

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8.0 Precision & Bias

8.1 Precision, 99.7% of the measurement counts for the dry areas of the roof will fall between the plus or minus three (3) standard deviation limits.

8.2 Bias, since there is no accepted reference material suitable for determining bias for this test method, bias has not been determined.

9.0 Reporting

9.1 The Nuclear Roof Moisture Survey Report shall include, at a minimum, the following information:

9.1.1 Description of methodology.

9.1.2 Identification of existing roof construction and the make and model of the nuclear equipment used.

9.1.3 A record of all nuclear readings including the ten test readings taken on the roof prior to the start of the survey confirming proper function of the equipment.

9.1.4 Analysis of data, including moisture content charts correlating to the moisture map.

9.1.5 A scaled drawing depicting at least three (3) distinct moisture levels and including major roof top structures and penetrations.

9.1.6 A histogram summarizing all data collected.

9.1.7 Record of laboratory gravimetric analysis of extracted core cuts.

9.1.8 A record of all core cuts including precise location.

9.1.9 A statement of basis for unacceptable moisture content levels established for each material present. See Commentary C9.1.9.

Table 1

Moisture Levels Computed From Gravimetric Analysis of Core Samples (Example)

Moisture Levels Based on Core Cuts		
Core #1 =	1.4% Membrane	2.4% Insulation
Core #2 =	2.2% Membrane	223.0% Insulation
Core #3 =	3.1% Membrane	443.7% Insulation

Table 2

Moisture Contour Levels (Example only)

Moisture Level	Moisture in Plies	Moisture in Insulation	Sq. Ft. of Area
1 (Low)	1.4%	2.4%	1,540
2	1.8%	112% (Interpolated)	14,730*
3	2.2%	223%	619*
4	2.6%	333% (Interpolated)	357*
5 (High)	3.1%	444%	111*

*Water Saturated Areas Requiring Removal

Table 3
Moisture Content of Roofing Materials
See commentary

Type Material	Equilibrium Moisture Content at 90% RH 75° F	Maximum Moisture Content Obtained by Immersion
Organic Felt Membrane	1.0%	20%
Fiberboard	12.0%	430%
Perlite Board	4.0%	580%
Glass Fiber	2.0%	610%
Urethane	6.0%	520%
Expanded Polystyrene	3.0%	540%
Lightweight Concrete	6.0%	110%
Dry Asphaltic Fills	0.1%	60%
Cellular Glass	0.01%	30%
Extruded Polystyrene	0.5%	10% to 15%

Source: Anderson, Richard G., "Dry Range and Wet Range Moisture Content of Roofing Materials as Found in Existing Roofs." *Proceedings of the 1985 International Symposium on Roofing Technology: A Decade of Change and Future Trends in Roofing*, National Roofing Contractors Association, Chicago, 1985

Table 4
Equilibrium Moisture Content and Moisture Content at 80% TRR
See commentary

(TRR = thermal resistance ratio)

Insulation	Equilibrium M.C. (% of dry weight)		Moisture Content (% of dry weight) at 80% TRR
	at 45% RH	at 90% RH	
Cellular Glass	0.1	0.2	23
Expanded Polystyrene [16 kg/m³ (1.0 pcf)]	1.9	2.0	383
Extruded Polystyrene	0.5	0.8	185
Fibrous Glass	0.6	1.1	42
Isocyanurate	1.4	3.0	262
Perlite	1.7	5.0	17
Phenolic	6.4	23.4	25
Urethane	2.0	6.0	262

Source: Griffin, C.W., and Fricklas, R.L., *Manual of Low-Slope Roof Systems*, Fourth Edition. The McGraw-Hill Companies, Inc., New York, 2006, Table. 5.2, pg.81.

Table 5
Moisture Content at 80% TRR
See commentary

(TRR = thermal resistance ratio)

Type Material	(% of dry weight)	(% of volume)
Cork	39	9.9
Fibrous Glass	15	4.4
Perlite	17	2.7
Fibrous Glass	42	6.2
Cellular Glass	23	3.1
Gypsum	8	7.0
Lightweight Concrete 369 kg/m3 (23 pcf)	10	3.7
Lightweight Concrete 594 kg/m3 (37 pcf)	9	5.3
Expanded Polystyrene [16 kg/m3 (1 .0 pcf)]	383	6.1
Expanded Polystyrene [32 kg/m3 (2.0 pcf)]	248	7.2
Expanded Polystyrene [48 kg/m3 (3.0 pcf)]	82	4.3
Extruded Polystyrene	185	5.9
Urethane/Isocyanurate	262	8.8
Foamed-in-place urethane	130	6.5
Phenolic	25	1.0

Source: Griffin, C.W., and Fricklas, R.L., *Manual of Low-Slope Roof Systems, Fourth Edition, The McGraw-Hill Companies, Inc.*, New York, 2006, Table. 5.2, pg. 81

Commentary

This Commentary is not a part of this standard. It consists of explanatory and supplementary material designed to assist users in complying with the requirements. It is intended to create an understanding of the requirements through brief explanations of the reasoning employed in arriving at these requirements or to provide other clarifications. It therefore has not been processed in accordance with ANSI Essential Requirements, and may contain material that has not been subjected to public review or a consensus process. Thus it does not contain requirements necessary for conformance with the standard.

C.2.3 Per the Nuclear Regulatory Commission (NRC) the film badge may contain two or three films of differing sensitivities, and it may also contain a filter that shields part of the film from certain types of radiation.

C.5.1.1 Rooftop access should not be permitted without adequate roof and roof deck condition data. Prior to or as part of the nondestructive nuclear evaluation, a physical roof survey is required to visually determine areas that are not safe for access by persons required to perform the survey. The survey must include, at a minimum, a physical interior deck and exterior roof survey. Use a checklist to ensure that all equipment, supplies, and documentation required for the survey are operational, packed, and transported to the job site.

C.5.2.2.1 Exact US to SI conversions are not required or included since consistency in the increments between x-y coordinates throughout the roof section is most important, and maintaining an even number of units of measure improves accuracy during layout in the field. If the roof section grid or x-y coordinates layout is based upon feet or meters, use feet or meters throughout.

C.5.2.2.6 Additional readings may be taken in areas producing elevated readings and at other locations as determined by the Survey Director to optimize the survey results.

C.6.1.1 The Survey Director may decide to extract more cores on each roof section as dictated by job conditions and the readings obtained.

a) Caution should be taken to not extract cores at extreme low and high end readings unless there are a number of other readings at similar levels (preferably in the immediate vicinity). The low and high reading locations sampled for testing should represent at least ten percent of equipment readings obtained.

b) If the "high" core sample exhibits free water, it may be advisable to extract another core sample of more moderate moisture content, as determined by a review of the equipment readings obtained.

C.6.2.1 Oven drying of extracted roof materials at temperatures exceeding those tolerated by the materials will affect results:

a) High temperatures may damage or otherwise modify the chemical composition of styrene-based foam insulations, gypsum-based products, lightweight concretes, and sample containers. It is recommended that a lower temperature (e.g., 110° F/43° C) be utilized for such materials.

b) Moisture contents of organic felt-based BUR membranes cannot be accurately determined by oven drying, since the low end volatiles are typically cooked off with the moisture. These membranes require the use of distillation methods, such as ASTM D 95.

C.7.1 A licensed architect, Professional Engineer (PE) or Registered Roof Consultant (RRC) who meets the requirements of a survey director and is experienced with both roofing and the nuclear survey equipment is preferred but not required provided the survey director meets the requirements otherwise stated.

C.7.4 It is often sufficient to utilize three or four color ranges to indicate the degree of moisture saturation. Red may be “failed,” Orange may be “high,” Yellow may be “low,” and White (or blank) could be “dry.” However, some definition of these terms should be provided in relation to the extrapolated moisture levels estimated within each roof. The intervals chosen may be modified depending on the assembly under evaluation and the type of insulation within the roof system.

C.9.1.9 An evaluation of the acceptability of moisture contents within installed roofing materials is a highly subjective matter, and should be conducted on the basis of experience, practicality, and judgment. Certain guidelines may be derived from data available pertaining to the thermal resistance ratio (TRR) of insulation materials. The thermal resistance ratio is equal to the wet thermal resistivity divided by the dry thermal resistivity. Some experts have established a TRR of 80% or higher as acceptable from the perspective of thermal performance. For some materials, while the thermal resistance is still considered acceptable, the suitability of the product with highly elevated moisture content above equilibrium may not be suitable as a substrate for roofing material applications as determined by a roof expert or roof material manufacturer.

C Table 3, 4, 5

Tables 3, 4, and 5 provide published values for materials available and commonly used in roofing assemblies at the time of the study to develop the data presented in the tables. Other materials may be encountered that are not listed. For those materials not listed the manufacturer of the material may be the only source for similar data and test result information. Exercise caution to assure all products are judged on the same basis since 80% TRR data may not be available for all products that may be encountered.

NEW WETTING CURVES FOR COMMON ROOF INSULATIONS

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Specimens of common roof insulations were placed in an apparatus that maintained an air temperature of 4°C (40°F) and 75 percent relative humidity (RH) above the insulation, and 29°C (85°F) and 100 percent RH (or 70 percent RH) below. The specimens were periodically removed from this apparatus, weighed, wrapped in a thin plastic film and then tested in a thermal conductivity instrument with its top plate maintained at about 4°C (40°F) and its bottom plate at about 29°C (85°F). After a specimen's insulating ability was determined in this instrument according to the ASTM C 518-76 procedure, it was returned to the apparatus for further wetting. Some insulations accumulated moisture rapidly, but others gained very little moisture even after years of testing.

The ratio of a material's wet thermal resistivity to its dry thermal resistivity, expressed as a percentage, is termed its thermal resistance ratio (TRR). As moisture accumulates in a material, its TRR decreases. Graphs of TRR vs. moisture content were developed for fiberboard, perlite, cork, gypsum, insulating concrete, cellular glass, fibrous glass, expanded polystyrene, extruded polystyrene, urethane/isocyanurate, foamed-in-place urethane and phenolic insulations. TRR vs. moisture content equations have also been developed for each material. Insulation with a TRR of 80 percent or less is, by our definition, 'wet' and unacceptable. The moisture content at which the TRR equals 80 percent is tabulated for these materials.

KEYWORDS

Insulation, moisture, roofs, thermal resistance, vapor, wetting.

BACKGROUND

Twelve years ago at the Fifth Conference on Roofing Technology, Tobiasson and Ricard presented the paper "Moisture Gain and its Thermal Consequence for Common Roof Insulations."[1] The objective of those tests was to establish the effect of thermally induced vapor pressure gradients, such as are present in roofs, on insulation specimens. Early tests at CRREL[2] were conducted by immersing insulation specimens in water at room temperature, but Hedlin[3] had shown that foam plastic insulations gain much more moisture when subjected to thermally induced vapor pressure gradients than when soaked under isothermal conditions. Since there is often a significant temperature gradient through roofs, isothermal soaking is not a realistic test condition for predicting the installed performance of insulations in roofs.

The insulation wetting test program had not been completed when Reference 1 was written. Tests continued for several years on materials that wet very slowly, such as extruded polystyrene and cellular glass. Additional materials were added to the test program (e.g., gypsum and lightweight concrete) and as new materials became available (e.g., phenolic) they were also tested.

The findings in Reference 1 are being used by many individuals to estimate the insulating ability of in-place roof insulation. They obtain samples of insulations from roofs, often in conjunction with roof moisture surveys,[4] and then measure the moisture content of the insulation by drying it in an oven at about 49°C (120°F) until a constant weight is reached. Using the graphs in Reference 1 that relate the moisture content of insulations to their insulating ability, an indication of the in-place thermal performance of roofs is obtained.

When taking samples from roofs, one must separate the insulation and its facers from other components of the roof since the relationships in Reference 1 are based on the dry weight of the insulation and its facers. Once an insulation facer is adhered to a substrate or a membrane is adhered to an insulation facer, it is usually very difficult to separate the insulation and its facers from those components. Even if this can be done, some hot asphalt has entered the facer, causing wight gain that introduces errors. It would have been better (at least for this practical use of our information) to remove the insulation facers from the insulation specimens and present the moisture contents as a function of the dry weight of the insulating material only. That has been done in this paper. Consequently, the moisture content-insulating ability relationships herein for lightweight insulations with relatively heavy facers (e.g., urethane, isocyanurate and fibrous glass) are different from the relationships in Reference 1. Other relationships have also changed because the data base has been enlarged.

Another concern that developed from the first paper was caused by presentation of moisture contents as a percentage of dry weight, not as a percentage of volume. Use of weight-based water contents confuses some individuals since moisture contents in excess of 100 percent or even 1000 percent are possible. A weight-based moisture content of 1000 percent simply means that the water in the sample weighs 10 times as much as the dry sample. That is certainly possible for a lightweight material such as 16 kg/m^3 (1 pcf) expanded bead polystyrene foam (EPS).

However, a "high" weight-based moisture content of 50 percent may be quite damaging to a relatively heavy material such as perlite, while a lightweight material such as EPS would not suffer much from a weight-based moisture content as "low" as 50 percent.

Some individuals have suggested that this problem can be avoided by presenting moisture contents as a percentage of volume instead of dry weight. Unfortunately this requires users to measure both weights and volumes of samples taken from roofs. Since measuring the volume of such samples is very difficult, we continue to feel that the most useful form is to present water contents as a percentage of dry weight. However, we have also explained how to convert to volume-based moisture contents.

The dynamic thermal performance of wet insulation in roofs is a complex matter still under investigation. Hedlin[5] and others have shown that it takes very little moisture to cause a permeable insulation such as fibrous glass to lose much of its insulating ability when subjected to warming and cooling cycles. Most other roof insulations are less permeable and less influenced by dynamics. However, a steady-state laboratory test such as the one used in this study is limited in its ability to quantify the thermal performance of wet insulation in roofs. That limitation understood, such tests can provide useful guidance on the general behavior of wet roof insulation.

WETTING APPARATUS

The 305 X 305mm (12 X 12 in.) specimens of insulation were wetted by placing them in the cover of insulation wetting apparatuses (Figure 1) having a temperature of 29°C (85°F). The apparatuses were located in a 4°C (40°F) cold room; some were maintained at a relative humidity of 70 percent, while others were maintained at a relative humidity of 100 percent. Additional information on how the apparatuses were built, how temperatures and relative humidities were controlled and how specimens were prepared is presented in Reference 1.

For insulations with facers, our early tests were done with the facers in place. In order to isolate the effect of the facers, additional tests were conducted with the facers removed.

The edges of some specimens and the top and edges of others were sealed with a vapor barrier paint. Other specimens were not sealed. These three sealing conditions are referred to as follows:

- Top and edges sealed, TES
- Edges sealed, ES
- No seals, NS

As examples, an unsealed specimen tested with 70 percent RH below is designated as NS70 and an edge-sealed specimen with 100 percent RH below is designated as ES100.

Edge seals were primarily applied to toughen the specimens against deterioration during the many times they were removed from the apparatus for weighing and thermal testing.

Top seals were used to prevent upward drying in the same way that waterproof membranes prevent upward drying of insulation in roofs.

The sealing condition influenced the amount and distribution of moisture in most insulations and the rate at which they gained moisture. As expected, specimens that were sealed on top accumulated moisture faster than those that could dry upward into the cold room. However, the sealing condition had only a minor influence on the moisture content-insulating ability relationship for most materials. Thus, tests were combined with different sealing conditions when generating the moisture content-insulating ability graphs and equations in this paper.

THERMAL RESISTANCE MEASUREMENTS

Periodically, each specimen was removed from the wetting apparatus, and carried to a 21°C (70°F) laboratory where it was quickly surface dried with a towel. It was then wrapped in a sheet of 0.013mm (0.0005 in.) thick plasticized PVC, weighed again, and placed in the thermal conductivity instrument, which had its top plate at about 4°C (40°F) and its bottom plate at about 29°C (85°F). Thus, during the test, the specimen was subjected to the same thermal environment that it encountered in the wetting instrument.

Isolating specimen moisture from the thermal conductivity instrument was essential to avoid measurement errors caused by condensation on cold portions of the instrument. The plastic film prevented moisture from entering or leaving the specimen during the test. Thus, the moisture environment in the thermal conductivity instrument was not identical to that encountered in the wetting apparatus. This does not appear to introduce significant errors in materials such as cellular plastics which have a relatively low vapor permeability, since little moisture migrates during the test. For materials such as fibrous glass, with a relatively high vapor permeability, some moisture migration occurs during the test. This causes test stabilization time to increase beyond 30 minutes and, we expect, decreases the accuracy of the final measurement.

After the 1- to 2½ hour thermal test was completed, the specimen was weighed, the wrap was removed, the specimen was weighed again, and then it was returned to the wetting apparatus.

A Dynatech Rapid-K thermal conductivity instrument was used to make the thermal measurements in accordance with ASTM Standard C518-76 "Test for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter."[6] The requirements of this test were met except that (1) specimens contained moisture since that was the purpose of this study, (2) six successive readings did not always yield thermal resistance values agreeing within 1 percent and (3) the 25C° (45F°) temperature difference across a few specimens thicker than 25mm (1 in.) was somewhat less than recommended.

Each day of testing, the instrument was calibrated by first determining the thermal resistance of a 305 X 305 X 22mm (12 X 12 X 1 in.) thick specimen of oven-dried fibrous glass insulation having a known thermal resistance.

MATERIALS TESTED

Table 1 lists the 15 different materials tested, the number of tests performed on each, and the average air-dry density and the average air-dry apparent thermal resistivity (R-value) before wetting.

Instead of presenting plots that relate the thermal resistivity of each material to its moisture content or its time under test, we have normalized thermal resistivity by dividing it by the specimen's air-dry thermal resistivity. This ratio (i.e., wet R-value/air-dry R-value), expressed as a percent, is called the thermal resistance ratio (TRR). A dry specimen has a TRR of 100 percent. As moisture accumulates in an insulation its TRR decreases.

AIR-DRY VS. OVEN-DRY

The specimens were conditioned at room temperature and about 40 percent RH for more than a week before they were placed in the wetting test. They were not oven-dried before testing and thus they contained a small amount of "equilibrium moisture." Such moisture is described by Cash.[7]

When samples of insulation are taken from a roof and oven-dried to determine their moisture content, most of the "equilibrium moisture" is removed. The small error introduced by changing the moisture datum was neglected for all insulations except phenolic.

The presence of somewhat more moisture in off-the-shelf "dry" phenolic insulation created problems. After removing the facers from phenolic specimens and allowing them to condition at room temperature and about 40 percent RH for several days, "air-dry" thermal resistivities were about 70 K•m/W (10 ft.^{2}•hr•°F/BTU•in.). The advertised and measured thermal resistivity of phenolic insulation with its facers intact is about 57 K•m/W (8.3 ft.^{2}•hr•°F/BTU•in.). Additional tests determined that the moisture content of phenolic insulation drops 5 percent to 8 percent a few days after the skins are removed. Although the phenolic wetting tests began at this lower moisture content and higher thermal resistivity, a "dry" thermal resistivity of 57 K•m/W (8.3 ft.^{2}•hr•°F/BTU•in.) was used when calculating TRR. This effectively corrected the phenolic results for the moisture content difference between as-supplied "dry" material and "air-dry" material. This correction was necessary because of the large (20 percent) difference in thermal resistivity between these two conditions for phenolic insulation. This difference in thermal resistivity was much less for all other insulations tested, so they were not corrected in this manner.

FACERS

In order to determine the TRR vs. moisture content relationship for urethane, isocyanurate and fibrous glass insulations without facers, specimens tested with facers were separated at the end of the test and the moisture contents of the facers and the core were determined separately. The proportion of moisture in the facers to that in the core was assumed to have remained constant throughout the test. By measuring the dry weight and thickness of the facers, the dry weight and dry density of the core could be calculated and compared to measurements made on the dried core. The facers contribute little to the thermal resistance of the specimen, and thus the TRR values for specimens with facers were assumed to be valid for specimens without facers.

Because of the assumptions necessary to apply test results with facers to the behavior of specimens without facers, several additional specimens were tested without facers. Time did not permit these tests to be run longer than a few months. Nevertheless, they verified that the procedure used to account for the facers was appropriate.

Other investigators have measured long-term thermal drift in some cellular plastic insulations. Since our specimens were without facers, were several months old before being tested, and were not subjected to high temperatures, it was assumed that little thermal drift occurred during our tests. Thermal resistivity measurements made of dried material after testing indicated that thermal drift could be ignored.

RATE OF WETTING

Figures 2 and 3 show the decrease in thermal resistance ratio (TRR) for 25mm (1 in.) thick top and edge-sealed (TES) specimens with 100 percent RH conditions below. Cork is shown as dashed since no 25mm (1 in.) thick, TES specimens were tested; the "cork" curve is for a 25mm (1 in.) thick specimen with no seals (NS100). Since a TES100 specimen should wet even faster, it is clear that cork wets rather fast. The cellular glass curve is also shown dashed since it is a 38mm (1½ in.) thick ES100 specimen, not a TES100 specimen. A TES100 specimen should have accumulated somewhat more moisture. However, we expect it also would have remained nearly dry, since a 25mm (1 in.) thick TES70 cellular glass specimen had no measurable loss in its insulating ability after 315 days of testing.

Since the primary focus of these tests was to study the behavior of insulations in membrane roofing systems, TES specimens with top seals were of primary interest. However, it should be realized that vapor drives across real roofs can be more or less (often less) than the values imposed on these specimens. Also, during warm weather, the direction of vapor drive in roofs often reverses, which tends to promote downward drying.

Essentially all insulations can get wet when they are subjected to thermally induced vapor pressure gradients such as are present in roofs. Under conditions that cause a permeable material such as fibrous glass to become quite wet in a few days, an extruded polystyrene or cellular glass insulation could survive for years without gaining much moisture. The rate of wetting for other roof insulations lies between these extremes.

Tests underway at CRREL indicate that cellular glass insulation can be destroyed by freeze-thaw action when moisture is present.

The rate of wetting for most insulations is great enough that they need to be protected from indoor moisture if they are subjected to high vapor pressure gradients for long periods. Reference 8 provides recommendations for when and where vapor retarders should be used in membrane roofing systems to provide such protection.

TRR-MOISTURE CONTENT RELATIONSHIPS

Graphs that relate the thermal resistance ratio (TRR) to moisture content by dry weight for the 15 materials tested are presented in Figures 4-9.

To find the volumetric moisture content of each material from these figures, multiply the material's dry-weight-based moisture content by its density in kg/m^3 (which is given in Table 1) and then divide by 1000 kg/m,^{3} the density of water. When the density is given in pounds per cubic foot, multiply by the density in pcf and divide by 62.4 pcf. For example, a 16 kg/m^3 (1 pcf) expanded polystyrene insulation with a moisture content of 3000 percent (dry weight basis) has a volumetric moisture content of 3000 X 16 kg/m^3/1000 kg/m^3 = 48 percent or 3000 X 1.0 pcf/62.4 pcf = 48 percent.

The graphs in Figures 4-9 were developed by fitting curves to each data set. An attempt was made to use the same form of curve for all materials ($y = ae^{bx} + c$) but the fit of another form ($y = ax^b + c$) was significantly better for the fiberboard, perlite, and phenolic data and thus was used. None of the curves was forced to go through the origin, which in this case was y (i.e., TRR) = 100, and x (i.e., moisture content) = 0. This introduces a little discrepancy near the origin. To resolve this, each curve can be ended where y = 90 percent and from that point to y = 100, a linear relationship can be assumed to exist. By doing this, the TRR of each air-dry material calculates to 100.

The two equations for each material are presented in Table 2 along with the x-value (i.e., moisture content) below which the linear relationship applies. The coefficient of determination (R^2) and the sample standard deviation (s) of each nonlinear equation are presented in Table 3.

PASS-FAIL MOISTURE CONTENTS

For about a decade now, we and others have used a TRR of 80 percent as the lowest acceptable value for any roof insulation. Insulation with a TRR below 80 percent is considered "wet" and unacceptable due to its loss of insulating ability.

For some insulations, less moisture than that required to reduce the TRR below 80 percent can be detrimental for other reasons (e.g., delamination, rot and corrosion of fasteners).[9] It is not yet known what those moisture "limit states" should be. Until it is known, the moisture content at which TRR equals 80 percent is proving to be a reasonable pass-fail criterion for judging when insulation is "wet" and unacceptable.

Cash[10] characterizes any material with much more than its equilibrium moisture content as "wet" and unacceptable. Table 4 compares Cash's equilibrium moisture contents[7] and our 80 percent TRR values. We agree that when constructing roofs, equilibrium moisture content is an appropriate pass-fail criterion for the new materials to be installed. For existing roofs, we feel that 80 percent TRR values, which are generally much greater than equilibrium moisture contents, are a more realistic pass-fail criteria. We are monitoring many roofs that are giving good service even though their insulation contains much more than its equilibrium moisture content.

CONCLUSION

Essentially all insulations can get wet when they are subjected to the thermally induced vapor pressure gradients that are present in roofs. The rate of wetting varies greatly among insulation types as Figures 2 and 3 show.

Moisture reduces the insulating ability of insulations. The reduced thermal value is termed thermal resistance ratio (TRR). It is related to moisture content for the 15 roof insulations in Figures 4 through 9 and Table 2. Those relationships are for the insulation itself without any facers that might be furnished with it. By taking core samples of the insulation itself and determining its moisture content, these relationships can provide an indication of the present insulating ability of roofs containing moisture.

Table 5 lists the moisture content at which the thermal resistance ratio of these insulations equals 80 percent. We have found that this is a convenient and useful pass-fail criterion for existing roofing systems. At higher moisture contents the insulation is considered 'wet' and unacceptable.

The TRR-moisture content relationships in this paper are being used in "ROOFER," the roof maintenance management system developed by the U.S. Army Corps of Engineers.[11] As additional information on other moisture "limit states" becomes available, it is expected that maximum acceptable moisture contents for some materials will decrease below the 80 percent TRR values.

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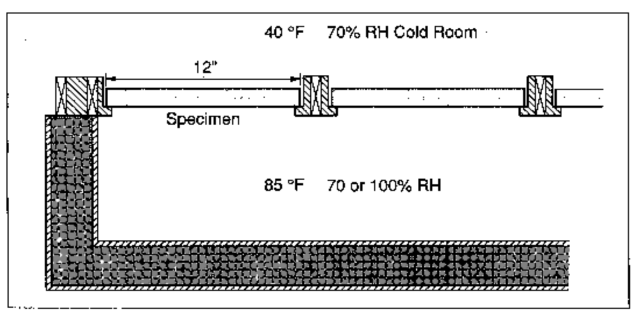

Figure 1 Sketch of specimens in wetting apparatus.

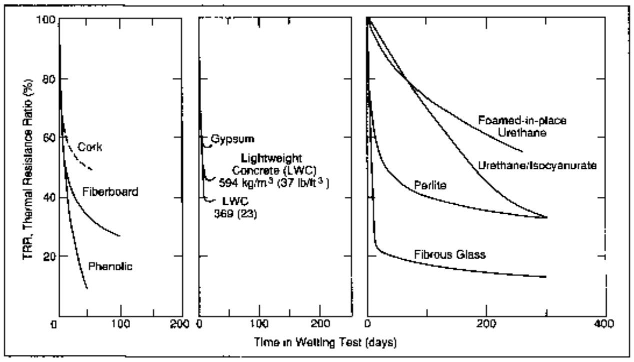

Figure 2 *Decay of TRR with time under test for specimens of cork, fiberboard, phenolic, gypsum, lightweight concrete, foamed-in-place urethane, urethane/isocyanurate, perlite and fibrous glass.*

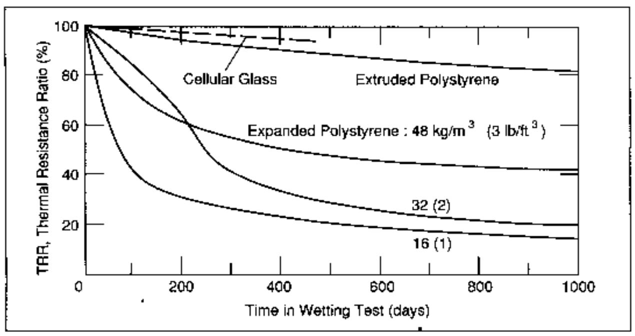

Figure 3 *Decay of TRR with time under test for specimens of cellular glass, extruded polystyrene and expanded polystyrene.*

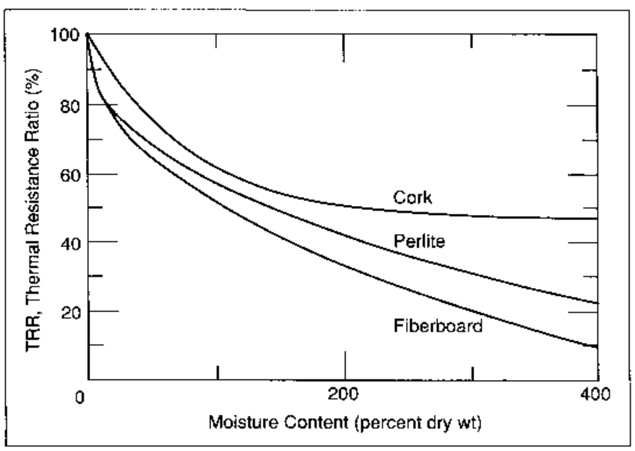

Figure 4 *TRR vs. moisture content relationships for cork, fiberboard and perlite.*

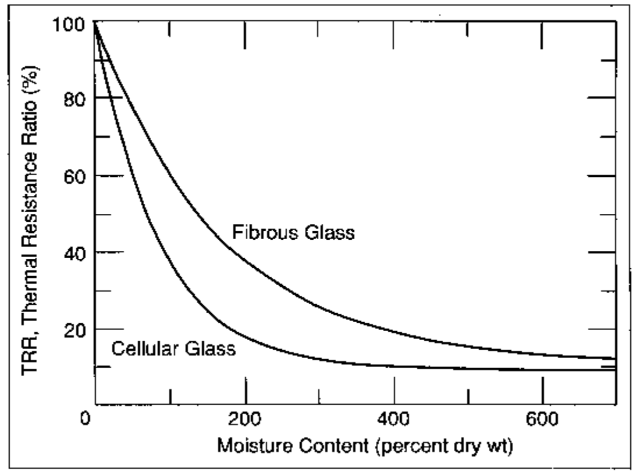

Figure 5 *TRR vs. moisture content relationships for fibrous glass and cellular glass.*

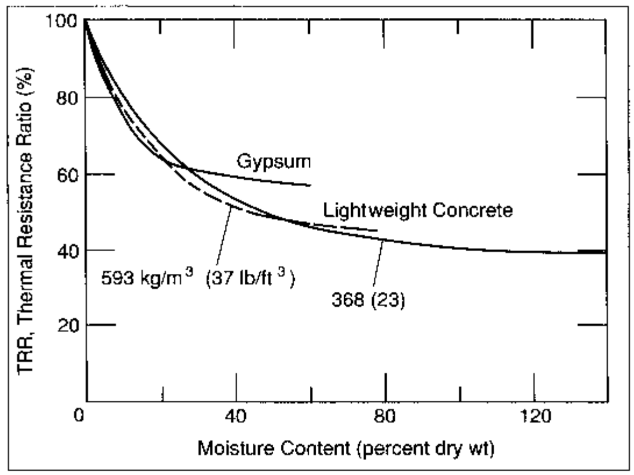

Figure 6 *TRR vs. moisture content relationships for gypsum and 369 and 594 kg/m (23 and 37 pcf) lightweight concrete.*

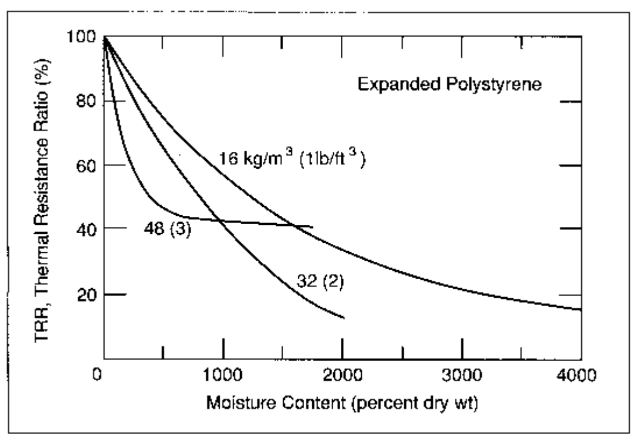

Figure 7 *TRR vs. moisture content relationships for 16, 32 and 48 kg/m (1, 2 and 3 pcf) expanded polystyrene.*

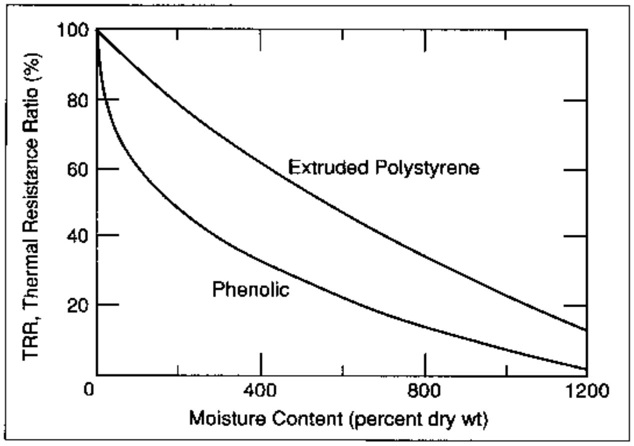

Figure 8 *TRR vs. moisture content relationships for extruded polystyrene, and phenolic.*

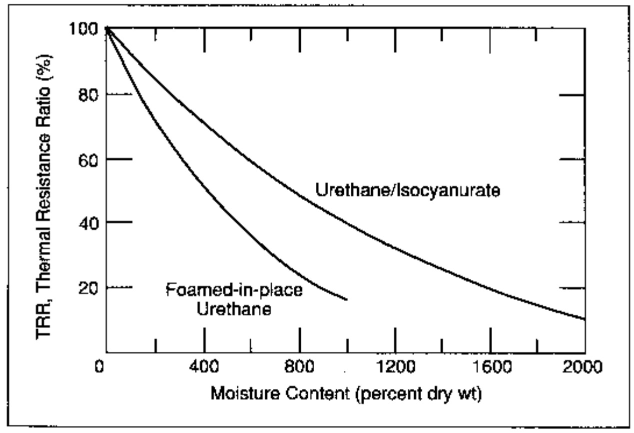

Figure 9 *TRR vs. moisture content relationships for urethane/isocyanurate and foamed-in-place urethane.*

Type	Number	Density (kg/m³/pcf)	Air-dried R-value*	Variations from normal (TES100) wetting condition
Cork	1	256/16.0	17.8/2.57	1 @ NS100
Fiberboard	6	295/18.4	17.6/2.54	2 @ ES100
Perlite	5	163/10.2	17.6/2.60	1 @ ES70, 1 @ NS100, 1 @ ES100
Fibrous glass	5	147/9.2	25.9/3.73	2 @ ES100
Cellular glass	6	134/8.4	28.5/4.11	2 @ ES70, 1 @ TES70, 2 @ NS100, 1 @ ES100
Gypsum	2	921/57.5	3.7/0.54	
Lightweight concrete 369 kg/m³ (23 pcf)	2	367/22.9	10.1/1.46	
Lightweight concrete 594 kg/m³ (37 pcf)	2	599/37.4	7.4/1.06	
Expanded polystyrene 16 kg/m³ (1 pcf)	2	16/1.0	25.5/3.68	
Expanded polystyrene 32 kg/m³ (2 pcf)	2	29/1.8	29.7/4.29	1 @ TES70
Expanded polystyrene 48 kg.m³ (3 pcf)	1	53/3.3	31.5/4.54	
Extruded polystyrene	4	32/2.0	35.7/5.15	
Urethane/isocyanurate	3	34/2.1	36.7/5.30	
Foamed-in-place urethane	2	50/3.1	41.3/5.96	
Phenolic	6	42/2.6	69.7/10.05	

* Apparent thermal resistivity (R-value) units are K•m/W and ft.²•hr•°F/BTU•in.

Table 1 *Background information on the 15 materials tested.*

Cork:	if $x > 19\%$ use $y = 56.54\, e^{-0.0135x} + 46.47$ if $x \leq 19\%$ use $y = 100 - 0.52\,(x)$
Fiberboard:	if $x > 4\%$ use $y = -7.294\, x^{0.4260} + 103.12$ if $x \leq 4\%$ use $y = 100 - 2.5\,x$
Perlite:	if $x > 3.3\%$ use $y = -5.983\, x^{0.4285} + 100.0$ if $x \leq 3.3\%$ use $y = 100 - 3.0\,x$
Fibrous glass	if $x > 20\%$ use $y = 90.53\, e^{-0.006148x} + 10.07$ if $x \leq 20\%$ use $y = 100 - 0.5\,x$
Cellular glass	if $x > 12.5\%$ use $y = 94.315\, e^{-0.0122x} + 8.993$ if $x \leq 12.5\%$ use $y = 100 - 0.80\,x$
Gypsum:	if $x > 3\%$ use $y = 43.11\, e^{-0.0720x} + 55.04$ if $x \leq 3\%$ use $y = 100 - 3.4\,x$
Lightweight concrete 369 kg/m³ (23 pcf)	if $x > 3.8\%$ use $y = 59.02\, e^{-0.0342x} + 38.23$ if $x \leq 3.8\%$ use $y = 100 - 2.6\,x$
Lightweight concrete 594 kg/m³ (37 pcf)	if $x > 4\%$ use $y = 56.67\, e^{-0.0510x} + 43.74$ if $x \leq 4\%$ use $y = 100 - 2.5\,x$
Expanded polystyrene 16 kg/m³ (1 pcf)	if $x > 181\%$ use $y = 91.40\, e^{-0.000649x} + 8.744$ if $x \leq 181\%$ use $y = 100 - 0.055\,x$
Expanded polystyrene 32 kg/m³ (2 pcf)	if $x > 109\%$ use $y = 117.65\, e^{-0.000655x} - 19.55$ if $x \leq 109\%$ use $y = 100 - 0.09\,x$
Expanded polystyrene 48 kg/m³ (3 pcf)	if $x > 33\%$ use $y = 55.96\, e^{-0.00480x} + 42.25$ if $x \leq 33\%$ use $y = 100 - 0.30\,x$
Extruded polystyrene	if $x > 84\%$ use $y = 137.37\, e^{-0.00080x} - 39.47$ if $x \leq 84\%$ use $y = 100 - 0.12\,x$
Urethane/isocyanurate	if $x > 129\%$ use $y = 117.75\, e^{-0.000734x} - 17.12$ if $x \leq 129\%$ use $y = 100 - 0.078\,x$
Foamed-in-place urethane	if $x > 56\%$ use $y = 107.09\, e^{-0.00144x} - 8.78$ if $x \leq 56\%$ use $y = 100 - 0.18\,x$
Phenolic	if $x > 9.7\%$ use $y = -19.067\, x^{0.263} + 124.62$ if $x \leq 9.7\%$ use $y = 100 - 1.03\,x$

***Table 2** Equations that relate TRR (y) and moisture content in percentage of dry weight (x) for common roof insulations.*

Material	**Coefficient of Determination R^2**	**Sample Standard Deviation s (%)**
Cork	0.953	4.0
Fiberboard	0.979	3.3
Perlite	0.978	3.6
Fibrous glass	0.937	6.3
Cellular glass	0.926	2.9
Gypsum	0.989	1.8
Lightweight concrete 369 kg/m³ (23 pcf)	0.973	3.7
Lightweight concrete 594 kg/m³ (37 pcf)	0.990	2.2
Expanded polystyrene 16 kg/m³ (1 pcf)	0.996	1.9
Expanded polystyrene 32 kg/m³ (2 pcf)	0.983	4.3
Expanded polystyrene 48 kg/m³ (3 pcf)	0.976	2.7
Extruded polystyrene	0.938	3.7
Urethane/isocyanurate	0.991	2.8
Foamed-in-place urethane	0.990	1.8
Phenolic	0.951	6.6

***Table 3** Statistical values for the nonlinear TRR vs. moisture content equations.*

Insulation	Equilibrium Moisture Content (% of dry weight) from Ref. 7 @ 45% RH	@ 90% RH	Moisture Content (% of dry weight) at 80% TRR
Cellular glass	0.1	0.2	23
Expanded polystyrene 16 kg/m³ (1 pcf)	1.9	2.0	383
Extruded polystyrene	0.5	0.8	185
Fibrous glass	0.6	1.1	42
Isocyanurate	1.4	3.0	262
Perlite	1.7	5.0	17
Phenolic	6.4	23.4	25
Urethane	2.0	6.0	262

Table 4 Comparison of equilibrium moisture contents and those at 80 percent TRR for insulations without facers.

Material	Moisture Content % of dry weight	% of volume*
Cork	39	9.9
Fiberboard	15	4.4
Perlite	17	2.7
Fibrous glass	42	6.2
Cellular glass	23	3.1
Gypsum	8	7.0
Lightweight concrete 369 kg/m³ (23 pcf)	10	3.7
Lightweight concrete 594 kg/m³ (37 (pcf)	9	5.3
Expanded polystyrene 16 kg/m³ (1 pcf)	383	6.1
Expanded polystyrene 32 kg/m³ (2 pcf)	248	7.2
Expanded polystyrene 48 kg/m³ (3 pcf)	82	4.3
Extruded polystyrene	185	5.9
Urethane/isocyanurate	262	8.8
Foamed-in-place urethane	130	6.5
Phenolic	25	1.0

* Using densities in Table 1.

Table 5 Moisture contents at which TRR equals 80 percent.

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Detection and Location of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization

Approved July 20, 2012

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Disclaimer

This standard is intended for use by architects, engineers, registered roof consultants, roofing contractors, and building owners of low-slope roofing systems in the roofing industry, and their representatives. SPRI, its Members and employees do not warrant that this standard is proper and applicable in all circumstances and under all conditions.

1.0 Scope

1.1 Radioisotopic thermalization, performed in accordance with this standard, can effectively be used in the roofing industry to:

1.1.1 Locate and quantify latent moisture contained in the roofing material and/or roof deck materials.

1.1.2 Locate hidden sources of moisture entry by tracing subsurface paths of moisture migration.

1.1.3 Provide a basis for investigating roofing material and/or roof deck material degradation over a period of years when used as part of a preventive maintenance program.

1.2 This standard provides a minimum set of procedures for conducting surveys of moisture in membrane roofing systems, and for analyses of the data obtained in such surveys. Included are operating, verification, and reporting procedures, as well as operator qualification criteria.

1.3 This standard addresses the effect of roof construction, material differences and roof conditions on the numerical data output provided by the nuclear equipment.

1.4 This standard addresses limitations in the use of radioisotopic thermalization.

1.5. This standard addresses the governmental control of the equipment used to conduct nuclear moisture surveys.

2.0 Terminology/Definitions

2.1 Agreement States
Certain States that have an agreement with the United States Nuclear Regulatory Commission (USNRC) which permits these States to control, within the State, those radioactive materials for which the USNRC is responsible.

2.2 Backscatter
The number of neutrons reflected back in contrast to the number passing through a substance.

2.3 Film Badge
Photographic film used to measure exposure to ionizing radiation for purposes of personnel monitoring. See Commentary C2.3.

2.4 Radioisotopic Thermalization
The process undergone by high-energy (fast) neutrons as they lose energy by collision. Thermalization occurs when the energy of fast neutrons is partially absorbed by moderators of hydrogen atom collision.

2.5 United States Nuclear Regulatory Commission (USNRC)
The U.S. Nuclear Regulatory Commission (NRC) was created as an independent agency by Congress in 1974 to ensure the safe use of radioactive materials for beneficial civilian purposes while protecting people and the environment. The NRC has jurisdiction over licensing requirements for nuclear sources in the United States. Many other countries will have a similar agency with jurisdiction.

3.0 Survey Equipment and Licensing Requirements

3.1 The equipment shall be specifically designed for performing roof moisture surveys. An isotopic radioactive source consisting of Americum-241, Radium 226, or Cesium 137 with a Beryllium target is required.

3.2 The possession and use of by-product radioactive material in the US requires a license issued by the United States Nuclear Regulatory Commission (USNRC) or the equivalent agency of a State which has entered into an agreement with USNRC to assume control over the distribution. The following applies within the US, and many foreign countries have similar regulations.

3.2.1 Certain States have an agreement with the USNRC which permits these States to control, within the State, those radioactive materials for which the USNRC is responsible. These States, known as "Agreement States," have, in general, enacted laws and regulations for the control of radioactive material.

3.2.2 Most "Agreement States" have a reciprocity clause in their regulations that permits a user, licensed in his own State, to operate in another State for certain periods of time. Prior notification to the visited State is generally required.

3.2.3 Licensing requirements can differ depending upon the radioactive element being used in the equipment.

3.3 Commercially available equipment utilized for radioisotope thermalization shall be capable of meeting the requirements of the governing regulatory agency.

3.4 Since changes are continuously made governing regulation, the user shall stay current with the appropriate regulations. Responsibility for compliance with the regulations falls upon the owner of the equipment.

3.5 Licensing Considerations

3.5.1 User Training
The user shall complete an approved training program provided by the equipment manufacturer or other organization acceptable to the licensing authority.

3.5.2 Manufacturer's Instruction Manual
Each user shall have access to and be familiar with the equipment manufacturer's instruction manual.

3.5.3 Storage, Transportation, and Use
The equipment shall be stored in a locked area, base down, and in contact with shielding material such as concrete. Transportation shall be in an approved shipping container approved and labeled for use by the governing agency (typically provided by the equipment manufacturer), secured against removal by unauthorized personnel, and be accompanied by a current "Shipper's Certification for Radioactive Materials". During cleaning and use of the equipment, the operator shall avoid direct contact with the base of the equipment and shall instruct others to do likewise.

3.5.4 Radiation Leak Testing
Radiation leak tests shall be performed in accordance with the manufacturer's specifications, at prescribed intervals, and in accordance with the procedures designated by the licensing authority.

3.5.5 Maintenance and Servicing
The user shall not be authorized to remove the source or perform any maintenance on the source or source holder. These services shall be performed by the equipment manufacturer or other persons specifically licensed to perform these operations.

3.5.6 Personal Protection
Unless otherwise allowed by the Governing Agency having jurisdiction, all users shall be provided with film badge type dosimeters to be worn when handling or using the equipment. Authorized personnel, meeting the requirements of part 4 below, shall see to it that other persons are kept away from the equipment during use, transportation, or storage.

3.5.7 Waste Disposal
The equipment containing radioactive material shall be disposed of by either:

3.5.7.1 Transfer to another specifically licensed user or disposal agency.

3.5.7.2 Return to equipment manufacturer.

3.6 Moisture Detection

3.6.1 Fast neutrons from the radioactive source are involved with moisture content measurements. Fast neutrons from the radioactive source enter the material being surveyed and are both scattered and slowed down by collision with the nuclei of the atoms composing the material. Nuclei of all materials slow down the neutrons by momentum exchange, but the speed reduction is greatest for collisions with hydrogen nuclei, which have about the same mass as the neutrons. When water or moisture is present more hydrogen atoms exist for collisions. Some of the slow neutrons or thermal neutrons are scattered in such a way that they reach the slow neutron detector and are counted for a specified period of time.

3.6.2 In general, the detector measures the backscattering of slow neutrons that have collided with hydrogen nuclei. The resulting numerical readout displayed by the equipment is a relative measurement of hydrogen present in the material at the point of survey. It is important to note that elevated readings can be influenced by sources of hydrogen other than moisture content, i.e., bitumen thickness, wood deck, etc.

4.0 Survey Personnel

4.1 The moisture survey shall be performed under the supervision of a Survey Director. The Survey Director shall be thoroughly trained in the operation of the equipment and radiation safety, and have a thorough understanding of modern roofing technology, including knowledge of:

4.1.1 Types of roofing membrane material and the aging process.

4.1.2 Construction procedures.

4.1.3 Types of roofing insulations.

4.1.4 Types of roofing decks.

4.1.5 Types of roof assemblies.

4.1.6 Equilibrium moisture contents.

4.1.7 Effects of structural building components on moisture survey results.

4.1.8 Moisture migration in buildings.

4.2 The Survey Director shall have completed the following training:

4.2.1 Operational and radiological safety training conducted by the manufacturer of the equipment being used.

4.2.2 Previous field experience in this surveying discipline with "hands on application," for a period of not less than two (2) years.

4.3 All other personnel involved in the survey shall have been instructed in radiological safety, equipment operation, rooftop safety, and basic roofing technology.

5.0 Survey and Analysis Procedures

5.1 Preparation

5.1.1 Prior to or as part of the nondestructive nuclear evaluation, a physical roof survey is required to visually determine areas that are not safe for access by persons required to perform the survey. To assist with the physical roof survey secure architectural or structural drawings (if possible), verify composition of existing roof materials, and solicit historical information pertaining to the roof system performance. See Commentary C5.1.1.

5.2 Execution

5.2.1 Establish a reference point for each roof section to be surveyed. A roof section is an area of homogeneous roof construction. The reference point shall be located to permit horizontal (x-axis) measurements to the right of the reference point when facing the reference point and vertical (y-axis) measurements toward the viewer when facing the reference point. All measurements relating to x-y coordinates and the location of structural elements of the building rising above the roof surface, roof penetration(s), and/or membrane defects shall be made from this reference point.

5.2.2 The entire roof area to be surveyed shall be laid out with a grid based upon the x-y coordinates. Distance between the x-y coordinates shall be determined by the Survey Director and shall be consistent in each direction resulting in a pattern best suited to provide an adequate number of equipment readings to permit a thorough evaluation. Grid size will be influenced by the size and configuration of the roof section being surveyed and the material make up of the roof system (see Table 1).

5.2.2.1 Equal x-y coordinates [e.g., 10' X 10' US or 3 m X 3 m Metric, 6' X 6' US or 2 m X 2 m Metric, or 3' X 3' US or 1 m X 1 m Metric] in even increments and whole or half units of measure (US or Metric applied) shall be used. The distance between x-y coordinates shall not be greater than ten (10) feet US or three (3) meters Metric). Five feet US or 1.5 meters Metric is typically recommended. The distance between x-y coordinates used shall be consistent throughout the roof section being tested. A smaller increment between readings does improve the results by reducing the distance between readings but also increases the work required to provide the results. See Commentary C5.2.2.1.

5.2.2.2 x-y coordinates shall be located such that readings will not be required on the increased material thickness at perimeters and penetration flashings. One method of avoiding the extra material thickness is to come off the exterior perimeters and away from all penetration flashings a distance of two (2) to three (3) feet (one meter). In the field of the roof, areas of increased material thickness that cannot be avoided shall be treated as a separate roof section for analysis purposes.

5.2.2.3 x-y coordinate markings shall be made on the roof surface and on wall flashings around the perimeter of the area being surveyed to allow for identification of readings obtained for sampling and further investigation. Obtain permission from the building owner prior to the use of permanent marking material. Ensure that marking material is compatible with the surface being marked.

5.2.2.4 All structural elements of the building rising above the roof surface, penetrations, and obvious patched areas shall be accurately recorded on the recording sheet.

5.2.2.5 Prior to taking nuclear readings the device shall be tested on the roof to confirm it is functioning properly by taking ten readings in the same location without moving the equipment and recording them. When the equipment is functioning properly 99.7% of the readings recorded will fall between the plus or minus three (3) standard deviation limits established by the manufacturer for the equipment.

5.2.2.6 Nuclear readings shall be taken and recorded at each x-y coordinate or grid point.

5.3 Limitations

5.3.1 In order for this technique to be useful in detecting moisture, the material thickness is required to be constant (+/- 10 percent). Extra thickness of material, that normally occurs at flashings, penetrations, walkway layers, and patches, can alter the material thickness or reference level of the material composition being surveyed.

5.3.1.1 Over a deck or above-deck materials of varying thickness, the reference level can be altered (e.g., significantly tapered insulation material, precast tees, or waffle form decks).

5.3.1.2 A change in material below the roof membrane surface (e.g., metal deck vs. concrete deck; isocyanurate (polyisocyanurate) vs. fiberboard; additional plies of roofing material) can alter the reference level.

5.3.1.3 Heavy, moist, and dirty gravel can alter the reference level.

5.3.1.4 Equipment readings shall not be taken as part of a roof section survey in areas covered with standing water, ice, or snow. If nuclear readings must be taken in these areas, they shall be analyzed as a separate roof section, and must include a uniform covering of water, ice, or snow.

5.3.1.5 Roof assemblies composed of multiple layers of various materials derived from roof recover operations can alter the reference level.

5.3.2 For ballasted membranes and protected membrane roof (PMR) assemblies, the aggregate or paver ballast shall be removed in appropriate x-y coordinate spacing throughout the roof area in order to obtain equipment readings directly against the roof membrane and underlying insulation layers (if any). If the protective insulation layer of a PMR is left in place for the equipment reading, the core samples shall include this layer, since its moisture absorption level could adversely affect the overall survey.

5.3.3 Nuclear radioisotopic thermalization techniques for determining moisture contents of materials shall not be used over metal roof systems.

6.0 Verification and Quantification

6.1 General

6.1.1 The field data (numeric readout) is only relative and shall be quantified by core cuts. Three or more cores shall be extracted, with a core extracted at a general low (but not the lowest) reading, intermediate reading, and high (but not the highest) reading for each roof section surveyed. Core size shall not be less than a nominal two (2) inches (50 mm) in diameter and shall include all material down to the deck. If the deck material is capable of moisture absorption, a portion of it shall be included (structural concrete cores are not required). See Commentary C6.1.1.

6.1.2 Each element (membrane, each Insulation layer, if they are not multiple layers of the same material within the extracted cores) shall be immediately sealed in separate moisture tight containers and labeled to identify the date, location (building, roof section, and x-y coordinate), person taking the core, and any other information required by the Survey Director.

6.1.3 The core cuts to provide samples for testing shall be extracted directly after the equipment readings have been completed for the roof section to assure the core cuts are taken from the correct x-y coordinate point relational to the equipment reading obtained.

6.1.4 Core samples shall be analyzed for moisture content by weight. Separate different elements of the roof assembly, such as insulation layers and construction material layers (without damaging materials), and perform gravimetric analysis (see 6.2) separately for each layer of each core sample (i.e., membrane, insulation, base sheet, vapor retarder, moisture sensitive deck, etc.).

6.1.5 Sampling and the repair of core cuts made shall be accomplished in accordance with the manufacturer's recommendations and/or *NRCA Repair Manual for Low-slope Membrane Roofing*.

6.2 Gravimetric Analysis

6.2.1 The different elements of the roof assembly (see 6.1.4) shall be separated at the time of sampling and analyzed separately. Each element (deck, vapor retarder, insulation, and membrane) shall be weighed immediately after removing from the sealed container. The sample container and material extracted from the roof shall be chamber dried for a minimum of 24 hours at 220° F/104.4° C and re-weighed. The chamber drying procedure shall continue until no weight loss is observed (within limits of balance equipment). Moisture content by weight is determined by the following formula:

[(Wet weight-Dry weight)/Dry Weight] x 100

[Eq. 1]

See commentary C.6.2.1.

6.2.2 A determination of moisture content by dry weight shall be made for each analyzed material. For bituminous built up roof membrane materials moisture content shall be determined by ASTM D95, *Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation*.

7.0 Analysis of Collected Data

7.1 The interpretation of the nuclear equipment readings and the correlation of core sample test data shall be accomplished by the Survey Director. See Commentary C7.1.

7.2 Once the actual moisture content levels have been determined for the low, mid, and high readings, a straight line graph shall be drawn relating count rates to actual moisture levels. The measurement counts must be converted to a defined unit of measurement, such as percent moisture (See Table 2).

7.3 Histogram
The volume of data collected is normally voluminous. A histogram shall be prepared to compile the data into a compact form. A histogram simply groups data points by defining intervals and combining all data points that fall within that interval.

7.3.1 The interval size shall be carefully considered; it shall be large enough to ease the computational task, but small enough to easily distinguish the normal distribution produced by the dry sections of a dry roof (See Table 3).

7.3.2 The normal distribution curve shall be calculated for the main part of the data, with the three-sigma limits corresponding roughly to the acceptable moisture limits for "dry" insulation of the materials being considered (See Table 4).

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7.4 Graphic Plot

Once the wet areas can be defined from the count rate data, a graph of the roof plan shall be drawn to summarize the survey. The moisture map shall be prepared depicting a minimum of three (3) levels of moisture content (See Table 2) per material tested. The graphic plot (moisture map) shall be prepared by computer program, hand contouring, or colored graphics within a spreadsheet program.
If possible, the graphic plot of suspected wet areas shall be overlaid onto scaled drawings of each surveyed section roof and compared to architectural and structural drawing available to determine potential impact of latent building and structural features on the collected field data. See Commentary C7.4.

7.5 Statistical Analysis of Data

7.5.1 Statistically, the histogram produced by using a nuclear gauge on a dry roof section will form a bell-shaped curve. This curve is called the "normal distribution." Two conditions shall be met to produce a statistically meaningful curve:

7.5.1.1 The roof section must be of similar composition throughout.

7.5.1.2 A minimum of 100 data points shall be taken within the roof section to allow the normal distribution to appear.

7.5.2 The "width" of the normal distribution is determined by the standard deviation of the main data. The importance of the standard deviation is that once the mean (average) and the standard deviation are known, the "end points" of the normal distribution, and therefore the count rate range for dry areas of the roof, can be defined.

7.5.3 The normal distribution curve shall be overlaid on the measurement data histogram. To verify the end points for the overlay process, the mean and standard deviation must be calculated for the main data (excluding extreme outlying data points). The mean is simply the sum of the midpoint of the histogram interval multiplied by the frequency of occurrence and divided by the total number of points. The equation is:

$$\textbf{Mean} = (Xi \times Fi) / N \qquad \text{[Eq. 2]}$$

7.5.4. The equation for standard deviation for grouped data is:

$$\frac{\left\{ \dfrac{[(Xi)^2 \times Fi]-[Xi \times Fi]^2}{N} \right\}^{1/2}}{(N-1)^{1/2}} \qquad \text{[Eq. 3]}$$

Where
Xi = the midpoint of histogram interval

Fi = Frequency of occurrence

N = Total number of points

Note: These equations are easily implemented with a programmable calculator, computer, or spreadsheet

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8.0 Precision & Bias

8.1 Precision, 99.7% of the measurement counts for the dry areas of the roof will fall between the plus or minus three (3) standard deviation limits.

8.2 Bias, since there is no accepted reference material suitable for determining bias for this test method, bias has not been determined.

9.0 Reporting

9.1 The Nuclear Roof Moisture Survey Report shall include, at a minimum, the following information:

9.1.1 Description of methodology.

9.1.2 Identification of existing roof construction and the make and model of the nuclear equipment used.

9.1.3 A record of all nuclear readings including the ten test readings taken on the roof prior to the start of the survey confirming proper function of the equipment.

9.1.4 Analysis of data, including moisture content charts correlating to the moisture map.

9.1.5 A scaled drawing depicting at least three (3) distinct moisture levels and including major roof top structures and penetrations.

9.1.6 A histogram summarizing all data collected.

9.1.7 Record of laboratory gravimetric analysis of extracted core cuts.

9.1.8 A record of all core cuts including precise location.

9.1.9 A statement of basis for unacceptable moisture content levels established for each material present. See Commentary C9.1.9.

Table 1
Moisture Levels Computed From
Gravimetric Analysis of Core Samples (Example)

Moisture Levels Based on Core Cuts		
Core #1 =	1.4% Membrane	2.4% Insulation
Core #2 =	2.2% Membrane	223.0% Insulation
Core #3 =	3.1% Membrane	443.7% Insulation

Table 2
Moisture Contour Levels (Example only)

Moisture Level	Moisture in Plies	Moisture in Insulation	Sq. Ft. of Area
1 (Low)	1.4%	2.4%	1,540
2	1.8%	112% (Interpolated)	14,730*
3	2.2%	223%	619*
4	2.6%	333% (Interpolated)	357*
5 (High)	3.1%	444%	111*

*Water Saturated Areas Requiring Removal

Table 3
Moisture Content of Roofing Materials
See commentary

Type Material	Equilibrium Moisture Content at 90% RH 75° F	Maximum Moisture Content Obtained by Immersion
Organic Felt Membrane	1.0%	20%
Fiberboard	12.0%	430%
Perlite Board	4.0%	580%
Glass Fiber	2.0%	610%
Urethane	6.0%	520%
Expanded Polystyrene	3.0%	540%
Lightweight Concrete	6.0%	110%
Dry Asphaltic Fills	0.1%	60%
Cellular Glass	0.01%	30%
Extruded Polystyrene	0.5%	10% to 15%

Source: Anderson, Richard G., "Dry Range and Wet Range Moisture Content of Roofing Materials as Found in Existing Roofs." *Proceedings of the 1985 International Symposium on Roofing Technology: A Decade of Change and Future Trends in Roofing*, National Roofing Contractors Association, Chicago, 1985

Table 4
Equilibrium Moisture Content and Moisture Content at 80% TRR
See commentary

(TRR = thermal resistance ratio)

Insulation	Equilibrium M.C. (% of dry weight)		Moisture Content (% of dry weight) at 80% TRR
	at 45% RH	at 90% RH	
Cellular Glass	0.1	0.2	23
Expanded Polystyrene [16 kg/m³ (1 .0 pcf)]	1.9	2.0	383
Extruded Polystyrene	0.5	0.8	185
Fibrous Glass	0.6	1.1	42
Isocyanurate	1.4	3.0	262
Perlite	1.7	5.0	17
Phenolic	6.4	23.4	25
Urethane	2.0	6.0	262

Source: Griffin, C.W., and Fricklas, R.L., *Manual of Low-Slope Roof Systems*, Fourth Edition. The McGraw-Hill Companies, Inc., New York, 2006, Table. 5.2, pg.81.

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Detection and Location of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization

Approved July 20, 2012

Table 5
Moisture Content at 80% TRR
See commentary

(TRR = thermal resistance ratio)

Type Material	(% of dry weight)	(% of volume)
Cork	39	9.9
Fibrous Glass	15	4.4
Perlite	17	2.7
Fibrous Glass	42	6.2
Cellular Glass	23	3.1
Gypsum	8	7.0
Lightweight Concrete 369 kg/m3 (23 pcf)	10	3.7
Lightweight Concrete 594 kg/m3 (37 pcf)	9	5.3
Expanded Polystyrene [16 kg/m3 (1 .0 pcf)]	383	6.1
Expanded Polystyrene [32 kg/m3 (2.0 pcf)]	248	7.2
Expanded Polystyrene [48 kg/m3 (3.0 pcf)]	82	4.3
Extruded Polystyrene	185	5.9
Urethane/Isocyanurate	262	8.8
Foamed-in-place urethane	130	6.5
Phenolic	25	1.0

Source: Griffin, C.W., and Fricklas, R.L., *Manual of Low-Slope Roof Systems, Fourth Edition*, *The McGraw-Hill Companies, Inc.*, New York, 2006, Table. 5.2, pg. 81

Commentary

This Commentary is not a part of this standard. It consists of explanatory and supplementary material designed to assist users in complying with the requirements. It is intended to create an understanding of the requirements through brief explanations of the reasoning employed in arriving at these requirements or to provide other clarifications. It therefore has not been processed in accordance with ANSI Essential Requirements, and may contain material that has not been subjected to public review or a consensus process. Thus it does not contain requirements necessary for conformance with the standard.

C.2.3 Per the Nuclear Regulatory Commission (NRC) the film badge may contain two or three films of differing sensitivities, and it may also contain a filter that shields part of the film from certain types of radiation.

C.5.1.1 Rooftop access should not be permitted without adequate roof and roof deck condition data. Prior to or as part of the nondestructive nuclear evaluation, a physical roof survey is required to visually determine areas that are not safe for access by persons required to perform the survey. The survey must include, at a minimum, a physical interior deck and exterior roof survey. Use a checklist to ensure that all equipment, supplies, and documentation required for the survey are operational, packed, and transported to the job site.

C.5.2.2.1 Exact US to SI conversions are not required or included since consistency in the increments between x-y coordinates throughout the roof section is most important, and maintaining an even number of units of measure improves accuracy during layout in the field. If the roof section grid or x-y coordinates layout is based upon feet or meters, use feet or meters throughout.

C.5.2.2.6 Additional readings may be taken in areas producing elevated readings and at other locations as determined by the Survey Director to optimize the survey results.

C.6.1.1 The Survey Director may decide to extract more cores on each roof section as dictated by job conditions and the readings obtained.

a) Caution should be taken to not extract cores at extreme low and high end readings unless there are a number of other readings at similar levels (preferably in the immediate vicinity). The low and high reading locations sampled for testing should represent at least ten percent of equipment readings obtained.

b) If the "high" core sample exhibits free water, it may be advisable to extract another core sample of more moderate moisture content, as determined by a review of the equipment readings obtained.

C.6.2.1 Oven drying of extracted roof materials at temperatures exceeding those tolerated by the materials will affect results:

a) High temperatures may damage or otherwise modify the chemical composition of styrene-based foam insulations, gypsum-based products, lightweight concretes, and sample containers. It is recommended that a lower temperature (e.g., 110° F/43° C) be utilized for such materials.

b) Moisture contents of organic felt-based BUR membranes cannot be accurately determined by oven drying, since the low end volatiles are typically cooked off with the moisture. These membranes require the use of distillation methods, such as ASTM D 95.

C.7.1 A licensed architect, Professional Engineer (PE) or Registered Roof Consultant (RRC) who meets the requirements of a survey director and is experienced with both roofing and the nuclear survey equipment is preferred but not required provided the survey director meets the requirements otherwise stated.

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C.7.4 It is often sufficient to utilize three or four color ranges to indicate the degree of moisture saturation. Red may be "failed," Orange may be "high," Yellow may be "low," and White (or blank) could be "dry." However, some definition of these terms should be provided in relation to the extrapolated moisture levels estimated within each roof. The intervals chosen may be modified depending on the assembly under evaluation and the type of insulation within the roof system.

C.9.1.9 An evaluation of the acceptability of moisture contents within installed roofing materials is a highly subjective matter, and should be conducted on the basis of experience, practicality, and judgment. Certain guidelines may be derived from data available pertaining to the thermal resistance ratio (TRR) of insulation materials. The thermal resistance ratio is equal to the wet thermal resistivity divided by the dry thermal resistivity. Some experts have established a TRR of 80% or higher as acceptable from the perspective of thermal performance. For some materials, while the thermal resistance is still considered acceptable, the suitability of the product with highly elevated moisture content above equilibrium may not be suitable as a substrate for roofing material applications as determined by a roof expert or roof material manufacturer.

C Table 3, 4, 5

Tables 3, 4, and 5 provide published values for materials available and commonly used in roofing assemblies at the time of the study to develop the data presented in the tables. Other materials may be encountered that are not listed. For those materials not listed the manufacturer of the material may be the only source for similar data and test result information. Exercise caution to assure all products are judged on the same basis since 80% TRR data may not be available for all products that may be encountered.

Designation: D 1864 – 89 (Reapproved 2002)

Standard Test Method for Moisture in Mineral Aggregate Used on Built-Up Roofs[1]

This standard is issued under the fixed designation D 1864; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of moisture in mineral aggregate for use on built-up roofs.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 75 Practice for Sampling Aggregates[2]

D 1863 Specification for Mineral Aggregate Used on Built-up Roofs[3]

3. Summary of Test Method

3.1 The aggregate is dried to constant mass in a 110°C (230°F) oven. The mass percent moisture is calculated as the loss in mass based on the mass of the oven dry aggregate.

4. Significance and Use

4.1 This test method measures the moisture in mineral aggregate required by Specification D 1863.

5. Apparatus

5.1 *Balance*, 1000-g (2.2-lb) capacity, sensitive to 0.01 % of the capacity.

5.2 *Oven*, large enough to hold the sample and capable of maintaining a temperature of 110°C (230°F) ± 1 %.

5.3 *Sample Container*, consisting of an evaporating dish or similar shallow container.

6. Sampling

6.1 Sample aggregates received in bulk in accordance with Practice D 75.

6.2 For aggregates received in bags or small containers, select a number of bags or small containers at random, equivalent to the cube root of the total number in the shipment.

7. Procedure

7.1 Transfer to a tared dish 500 g (1 lb) ± 1 % of the aggregate, weighed to the nearest 2×0.1 g (10^{-4}-lb). Place in an oven at 110°C (230°F) for 4 h. Cool in a desiccator. Weigh to the nearest 2×0.1 g (10^{-4}-lb). Repeat the drying for 1-h periods until constant mass is obtained.

8. Calculation

8.1 Calculate the percentage of moisture as follows:

$$\text{Moisture, \%} = [(B - C)/(C - A)] \times 100 \quad (1)$$

where:

A = mass of container,
B = original mass of sample and container, and
C = mass of sample and container after drying.

9. Precision and Bias

9.1 The following data should be used for judging the acceptability of results (95 % probability) on samples from the same lot from the same supplier:

9.1.1 *Repeatability*—Duplicate results by the same operator should not be considered suspect unless they differ by more than the following amount:

Moisture Content, %	Repeatability, percentage points
0 to 5	±0.5

9.1.2 *Reproducibility*—The results submitted by each of two laboratories should not be considered suspect unless they differ by more than the following amount:

Moisture Content, %	Reproducibility, percentage points
0 to 5	±1.0

9.2 *Bias*—There is no bias known in this test method.

10. Keywords

10.1 built-up roofs; mineral aggregate; moisture

[1] This test method is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.03 on Surfacing and Bituminous Materials for Membrane Waterproofing and Built-up Roofing.

Current edition approved Nov. 24, 1989. Published January 1990. Originally published as D 1864 – 76 (1980). Last previous edition D 1864 – 81(1988).

[2] *Annual Book of ASTM Standards*, Vol 04.03.

[3] *Annual Book of ASTM Standards*, Vol 04.04.

NEW WETTING CURVES FOR COMMON ROOF INSULATIONS

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Specimens of common roof insulations were placed in an apparatus that maintained an air temperature of 4°C (40°F) and 75 percent relative humidity (RH) above the insulation, and 29°C (85°F) and 100 percent RH (or 70 percent RH) below. The specimens were periodically removed from this apparatus, weighed, wrapped in a thin plastic film and then tested in a thermal conductivity instrument with its top plate maintained at about 4°C (40°F) and its bottom plate at about 29°C (85°F). After a specimen's insulating ability was determined in this instrument according to the ASTM C 518-76 procedure, it was returned to the apparatus for further wetting. Some insulations accumulated moisture rapidly, but others gained very little moisture even after years of testing.

The ratio of a material's wet thermal resistivity to its dry thermal resistivity, expressed as a percentage, is termed its thermal resistance ratio (TRR). As moisture accumulates in a material, its TRR decreases. Graphs of TRR vs. moisture content were developed for fiberboard, perlite, cork, gypsum, insulating concrete, cellular glass, fibrous glass, expanded polystyrene, extruded polystyrene, urethane/isocyanurate, foamed-in-place urethane and phenolic insulations. TRR vs. moisture content equations have also been developed for each material. Insulation with a TRR of 80 percent or less is, by our definition, 'wet' and unacceptable. The moisture content at which the TRR equals 80 percent is tabulated for these materials.

KEYWORDS

Insulation, moisture, roofs, thermal resistance, vapor, wetting.

BACKGROUND

Twelve years ago at the Fifth Conference on Roofing Technology, Tobiasson and Ricard presented the paper "Moisture Gain and its Thermal Consequence for Common Roof Insulations."[1] The objective of those tests was to establish the effect of thermally induced vapor pressure gradients, such as are present in roofs, on insulation specimens. Early tests at CRREL[2] were conducted by immersing insulation specimens in water at room temperature, but Hedlin[3] had shown that foam plastic insulations gain much more moisture when subjected to thermally induced vapor pressure gradients than when soaked under isothermal conditions. Since there is often a significant temperature gradient through roofs, isothermal soaking is not a realistic test condition for predicting the installed performance of insulations in roofs.

The insulation wetting test program had not been completed when Reference 1 was written. Tests continued for several years on materials that wet very slowly, such as extruded polystyrene and cellular glass. Additional materials were added to the test program (e.g., gypsum and lightweight concrete) and as new materials became available (e.g., phenolic) they were also tested.

The findings in Reference 1 are being used by many individuals to estimate the insulating ability of in-place roof insulation. They obtain samples of insulations from roofs, often in conjunction with roof moisture surveys,[4] and then measure the moisture content of the insulation by drying it in an oven at about 49°C (120°F) until a constant weight is reached. Using the graphs in Reference 1 that relate the moisture content of insulations to their insulating ability, an indication of the in-place thermal performance of roofs is obtained.

When taking samples from roofs, one must separate the insulation and its facers from other components of the roof since the relationships in Reference 1 are based on the dry weight of the insulation and its facers. Once an insulation facer is adhered to a substrate or a membrane is adhered to an insulation facer, it is usually very difficult to separate the insulation and its facers from those components. Even if this can be done, some hot asphalt has entered the facer, causing wight gain that introduces errors. It would have been better (at least for this practical use of our information) to remove the insulation facers from the insulation specimens and present the moisture contents as a function of the dry weight of the insulating material only. That has been done in this paper. Consequently, the moisture content-insulating ability relationships herein for lightweight insulations with relatively heavy facers (e.g., urethane, isocyanurate and fibrous glass) are different from the relationships in Reference 1. Other relationships have also changed because the data base has been enlarged.

Another concern that developed from the first paper was caused by presentation of moisture contents as a percentage of dry weight, not as a percentage of volume. Use of weight-based water contents confuses some individuals since moisture contents in excess of 100 percent or even 1000 percent are possible. A weight-based moisture content of 1000 percent simply means that the water in the sample weighs 10 times as much as the dry sample. That is certainly possible for a lightweight material such as 16 kg/m^3 (1 pcf) expanded bead polystyrene foam (EPS).

However, a "high" weight-based moisture content of 50 percent may be quite damaging to a relatively heavy material such as perlite, while a lightweight material such as EPS would not suffer much from a weight-based moisture content as "low" as 50 percent.

Some individuals have suggested that this problem can be avoided by presenting moisture contents as a percentage of volume instead of dry weight. Unfortunately this requires users to measure both weights and volumes of samples taken from roofs. Since measuring the volume of such samples is very difficult, we continue to feel that the most useful form is to present water contents as a percentage of dry weight. However, we have also explained how to convert to volume-based moisture contents.

The dynamic thermal performance of wet insulation in roofs is a complex matter still under investigation. Hedlin[5] and others have shown that it takes very little moisture to cause a permeable insulation such as fibrous glass to lose much of its insulating ability when subjected to warming and cooling cycles. Most other roof insulations are less permeable and less influenced by dynamics. However, a steady-state laboratory test such as the one used in this study is limited in its ability to quantify the thermal performance of wet insulation in roofs. That limitation understood, such tests can provide useful guidance on the general behavior of wet roof insulation.

WETTING APPARATUS

The 305 X 305mm (12 X 12 in.) specimens of insulation were wetted by placing them in the cover of insulation wetting apparatuses (Figure 1) having a temperature of 29°C (85°F). The apparatuses were located in a 4°C (40°F) cold room; some were maintained at a relative humidity of 70 percent, while others were maintained at a relative humidity of 100 percent. Additional information on how the apparatuses were built, how temperatures and relative humidities were controlled and how specimens were prepared is presented in Reference 1.

For insulations with facers, our early tests were done with the facers in place. In order to isolate the effect of the facers, additional tests were conducted with the facers removed.

The edges of some specimens and the top and edges of others were sealed with a vapor barrier paint. Other specimens were not sealed. These three sealing conditions are referred to as follows:

- Top and edges sealed, TES
- Edges sealed, ES
- No seals, NS

As examples, an unsealed specimen tested with 70 percent RH below is designated as NS70 and an edge-sealed specimen with 100 percent RH below is designated as ES100.

Edge seals were primarily applied to toughen the specimens against deterioration during the many times they were removed from the apparatus for weighing and thermal testing.

Top seals were used to prevent upward drying in the same way that waterproof membranes prevent upward drying of insulation in roofs.

The sealing condition influenced the amount and distribution of moisture in most insulations and the rate at which they gained moisture. As expected, specimens that were sealed on top accumulated moisture faster than those that could dry upward into the cold room. However, the sealing condition had only a minor influence on the moisture content-insulating ability relationship for most materials. Thus, tests were combined with different sealing conditions when generating the moisture content-insulating ability graphs and equations in this paper.

THERMAL RESISTANCE MEASUREMENTS

Periodically, each specimen was removed from the wetting apparatus, and carried to a 21°C (70°F) laboratory where it was quickly surface dried with a towel. It was then wrapped in a sheet of 0.013mm (0.0005 in.) thick plasticized PVC, weighed again, and placed in the thermal conductivity instrument, which had its top plate at about 4°C (40°F) and its bottom plate at about 29°C (85°F). Thus, during the test, the specimen was subjected to the same thermal environment that it encountered in the wetting instrument.

Isolating specimen moisture from the thermal conductivity instrument was essential to avoid measurement errors caused by condensation on cold portions of the instrument. The plastic film prevented moisture from entering or leaving the specimen during the test. Thus, the moisture environment in the thermal conductivity instrument was not identical to that encountered in the wetting apparatus. This does not appear to introduce significant errors in materials such as cellular plastics which have a relatively low vapor permeability, since little moisture migrates during the test. For materials such as fibrous glass, with a relatively high vapor permeability, some moisture migration occurs during the test. This causes test stabilization time to increase beyond 30 minutes and, we expect, decreases the accuracy of the final measurement.

After the 1- to 2½ hour thermal test was completed, the specimen was weighed, the wrap was removed, the specimen was weighed again, and then it was returned to the wetting apparatus.

A Dynatech Rapid-K thermal conductivity instrument was used to make the thermal measurements in accordance with ASTM Standard C518-76 "Test for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter."[6] The requirements of this test were met except that (1) specimens contained moisture since that was the purpose of this study, (2) six successive readings did not always yield thermal resistance values agreeing within 1 percent and (3) the 25C° (45F°) temperature difference across a few specimens thicker than 25mm (1 in.) was somewhat less than recommended.

Each day of testing, the instrument was calibrated by first determining the thermal resistance of a 305 X 305 X 22mm (12 X 12 X 1 in.) thick specimen of oven-dried fibrous glass insulation having a known thermal resistance.

MATERIALS TESTED

Table 1 lists the 15 different materials tested, the number of tests performed on each, and the average air-dry density and the average air-dry apparent thermal resistivity (R-value) before wetting.

Instead of presenting plots that relate the thermal resistivity of each material to its moisture content or its time under test, we have normalized thermal resistivity by dividing it by the specimen's air-dry thermal resistivity. This ratio (i.e., wet R-value/air-dry R-value), expressed as a percent, is called the thermal resistance ratio (TRR). A dry specimen has a TRR of 100 percent. As moisture accumulates in an insulation its TRR decreases.

AIR-DRY VS. OVEN-DRY

The specimens were conditioned at room temperature and about 40 percent RH for more than a week before they were placed in the wetting test. They were not oven-dried before testing and thus they contained a small amount of "equilibrium moisture." Such moisture is described by Cash.[7]

When samples of insulation are taken from a roof and oven-dried to determine their moisture content, most of the "equilibrium moisture" is removed. The small error introduced by changing the moisture datum was neglected for all insulations except phenolic.

The presence of somewhat more moisture in off-the-shelf "dry" phenolic insulation created problems. After removing the facers from phenolic specimens and allowing them to condition at room temperature and about 40 percent RH for several days, "air-dry" thermal resistivities were about 70 K•m/W (10 ft.²•hr•°F/BTU•in.). The advertised and measured thermal resistivity of phenolic insulation with its facers intact is about 57 K•m/W (8.3 ft.²•hr•°F/BTU•in.). Additional tests determined that the moisture content of phenolic insulation drops 5 percent to 8 percent a few days after the skins are removed. Although the phenolic wetting tests began at this lower moisture content and higher thermal resistivity, a "dry" thermal resistivity of 57 K•m/W (8.3 ft.²•hr•°F/BTU•in.) was used when calculating TRR. This effectively corrected the phenolic results for the moisture content difference between as-supplied "dry" material and "air-dry" material. This correction was necessary because of the large (20 percent) difference in thermal resistivity between these two conditions for phenolic insulation. This difference in thermal resistivity was much less for all other insulations tested, so they were not corrected in this manner.

FACERS

In order to determine the TRR vs. moisture content relationship for urethane, isocyanurate and fibrous glass insulations without facers, specimens tested with facers were separated at the end of the test and the moisture contents of the facers and the core were determined separately. The proportion of moisture in the facers to that in the core was assumed to have remained constant throughout the test. By measuring the dry weight and thickness of the facers, the dry weight and dry density of the core could be calculated and compared to measurements made on the dried core. The facers contribute little to the thermal resistance of the specimen, and thus the TRR values for specimens with facers were assumed to be valid for specimens without facers.

Because of the assumptions necessary to apply test results with facers to the behavior of specimens without facers, several additional specimens were tested without facers. Time did not permit these tests to be run longer than a few months. Nevertheless, they verified that the procedure used to account for the facers was appropriate.

Other investigators have measured long-term thermal drift in some cellular plastic insulations. Since our specimens were without facers, were several months old before being tested, and were not subjected to high temperatures, it was assumed that little thermal drift occurred during our tests. Thermal resistivity measurements made of dried material after testing indicated that thermal drift could be ignored.

RATE OF WETTING

Figures 2 and 3 show the decrease in thermal resistance ratio (TRR) for 25mm (1 in.) thick top and edge-sealed (TES) specimens with 100 percent RH conditions below. Cork is shown as dashed since no 25mm (1 in.) thick, TES specimens were tested; the "cork" curve is for a 25mm (1 in.) thick specimen with no seals (NS100). Since a TES100 specimen should wet even faster, it is clear that cork wets rather fast. The cellular glass curve is also shown dashed since it is a 38mm (1½ in.) thick ES100 specimen, not a TES100 specimen. A TES100 specimen should have accumulated somewhat more moisture. However, we expect it also would have remained nearly dry, since a 25mm (1 in.) thick TES70 cellular glass specimen had no measurable loss in its insulating ability after 315 days of testing.

Since the primary focus of these tests was to study the behavior of insulations in membrane roofing systems, TES specimens with top seals were of primary interest. However, it should be realized that vapor drives across real roofs can be more or less (often less) than the values imposed on these specimens. Also, during warm weather, the direction of vapor drive in roofs often reverses, which tends to promote downward drying.

Essentially all insulations can get wet when they are subjected to thermally induced vapor pressure gradients such as are present in roofs. Under conditions that cause a permeable material such as fibrous glass to become quite wet in a few days, an extruded polystyrene or cellular glass insulation could survive for years without gaining much moisture. The rate of wetting for other roof insulations lies between these extremes.

Tests underway at CRREL indicate that cellular glass insulation can be destroyed by freeze-thaw action when moisture is present.

The rate of wetting for most insulations is great enough that they need to be protected from indoor moisture if they are subjected to high vapor pressure gradients for long periods. Reference 8 provides recommendations for when and where vapor retarders should be used in membrane roofing systems to provide such protection.

TRR-MOISTURE CONTENT RELATIONSHIPS

Graphs that relate the thermal resistance ratio (TRR) to moisture content by dry weight for the 15 materials tested are presented in Figures 4-9.

To find the volumetric moisture content of each material from these figures, multiply the material's dry-weight-based moisture content by its density in kg/m³ (which is given in Table 1) and then divide by 1000 kg/m,³ the density of water. When the density is given in pounds per cubic foot, multiply by the density in pcf and divide by 62.4 pcf. For example, a 16 kg/m³ (1 pcf) expanded polystyrene insulation with a moisture content of 3000 percent (dry weight basis) has a volumetric moisture content of 3000 X 16 kg/m³/1000 kg/m³ = 48 percent or 3000 X 1.0 pcf/62.4 pcf = 48 percent.

The graphs in Figures 4-9 were developed by fitting curves to each data set. An attempt was made to use the same form of curve for all materials ($y = ae^{bx} + c$) but the fit of another form ($y = ax^b + c$) was significantly better for the fiberboard, perlite, and phenolic data and thus was used. None of the curves was forced to go through the origin, which in this case was y (i.e., TRR) = 100, and x (i.e., moisture content) = 0. This introduces a little discrepancy near the origin. To resolve this, each curve can be ended where y = 90 percent and from that point to y = 100, a linear relationship can be assumed to exist. By doing this, the TRR of each air-dry material calculates to 100.

The two equations for each material are presented in Table 2 along with the x-value (i.e., moisture content) below which the linear relationship applies. The coefficient of determination (R^2) and the sample standard deviation (s) of each nonlinear equation are presented in Table 3.

PASS-FAIL MOISTURE CONTENTS

For about a decade now, we and others have used a TRR of 80 percent as the lowest acceptable value for any roof insulation. Insulation with a TRR below 80 percent is considered "wet" and unacceptable due to its loss of insulating ability.

For some insulations, less moisture than that required to reduce the TRR below 80 percent can be detrimental for other reasons (e.g., delamination, rot and corrosion of fasteners).[9] It is not yet known what those moisture "limit states" should be. Until it is known, the moisture content at which TRR equals 80 percent is proving to be a reasonable pass-fail criterion for judging when insulation is "wet" and unacceptable.

Cash[10] characterizes any material with much more than its equilibrium moisture content as "wet" and unacceptable. Table 4 compares Cash's equilibrium moisture contents[7] and our 80 percent TRR values. We agree that when constructing roofs, equilibrium moisture content is an appropriate pass-fail criterion for the new materials to be installed. For existing roofs, we feel that 80 percent TRR values, which are generally much greater than equilibrium moisture contents, are a more realistic pass-fail criteria. We are monitoring many roofs that are giving good service even though their insulation contains much more than its equilibrium moisture content.

CONCLUSION

Essentially all insulations can get wet when they are subjected to the thermally induced vapor pressure gradients that are present in roofs. The rate of wetting varies greatly among insulation types as Figures 2 and 3 show.

Moisture reduces the insulating ability of insulations. The reduced thermal value is termed thermal resistance ratio (TRR). It is related to moisture content for the 15 roof insulations in Figures 4 through 9 and Table 2. Those relationships are for the insulation itself without any facers that might be furnished with it. By taking core samples of the insulation itself and determining its moisture content, these relationships can provide an indication of the present insulating ability of roofs containing moisture.

Table 5 lists the moisture content at which the thermal resistance ratio of these insulations equals 80 percent. We have found that this is a convenient and useful pass-fail criterion for existing roofing systems. At higher moisture contents the insulation is considered 'wet' and unacceptable.

The TRR-moisture content relationships in this paper are being used in "ROOFER," the roof maintenance management system developed by the U.S. Army Corps of Engineers.[11] As additional information on other moisture "limit states" becomes available, it is expected that maximum acceptable moisture contents for some materials will decrease below the 80 percent TRR values.

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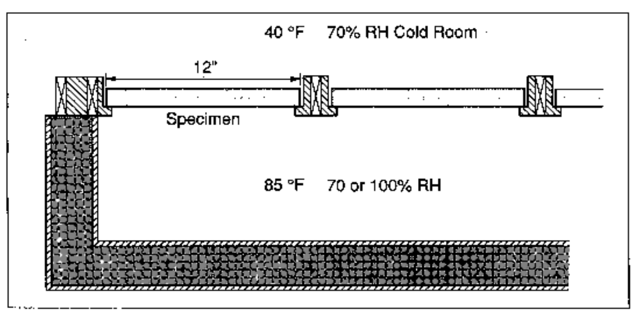

Figure 1 Sketch of specimens in wetting apparatus.

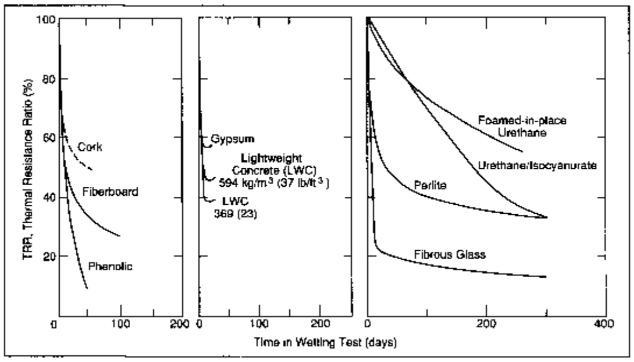

Figure 2 *Decay of TRR with time under test for specimens of cork, fiberboard, phenolic, gypsum, lightweight concrete, foamed-in-place urethane, urethane/isocyanurate, perlite and fibrous glass.*

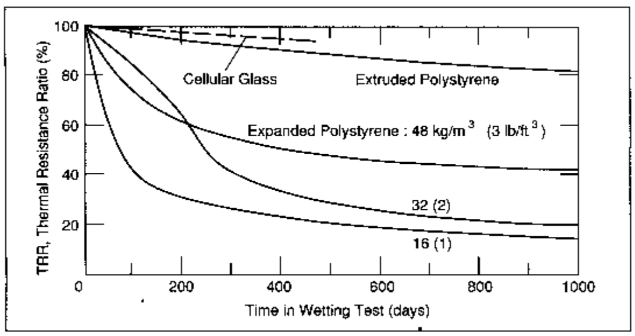

Figure 3 *Decay of TRR with time under test for specimens of cellular glass, extruded polystyrene and expanded polystyrene.*

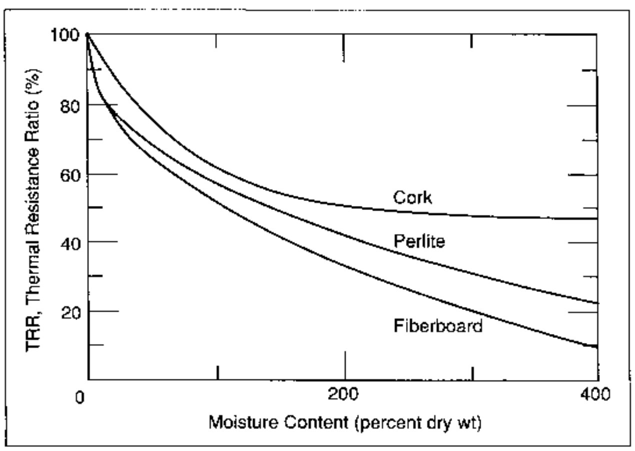

Figure 4 *TRR vs. moisture content relationships for cork, fiberboard and perlite.*

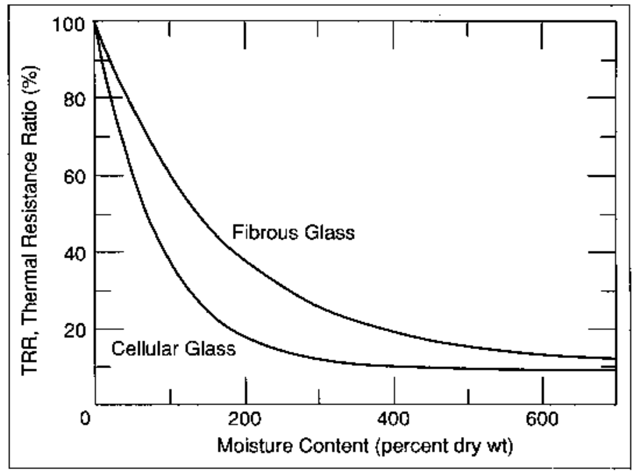

Figure 5 *TRR vs. moisture content relationships for fibrous glass and cellular glass.*

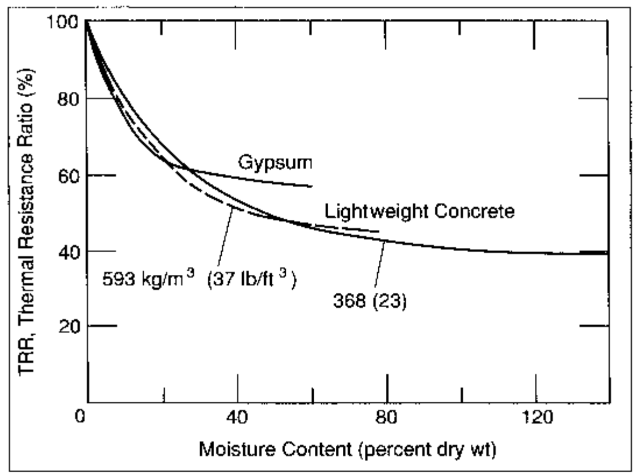

Figure 6 *TRR vs. moisture content relationships for gypsum and 369 and 594 kg/m (23 and 37 pcf) lightweight concrete.*

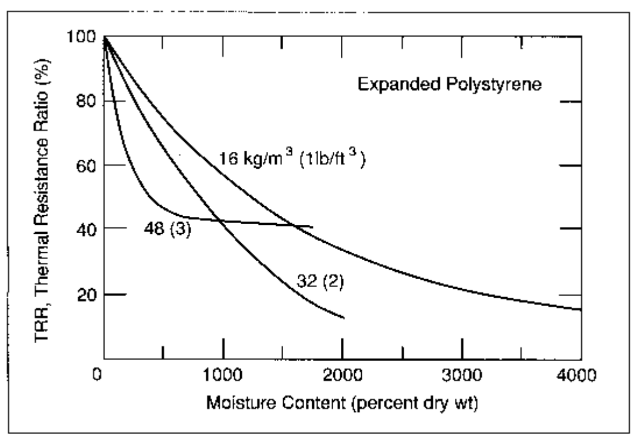

Figure 7 *TRR vs. moisture content relationships for 16, 32 and 48 kg/m (1, 2 and 3 pcf) expanded polystyrene.*

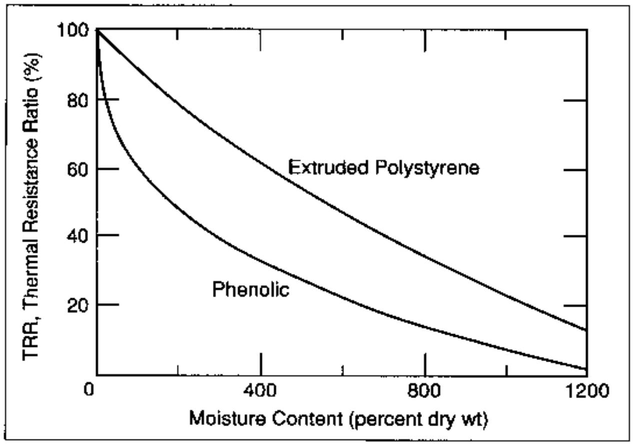

Figure 8 TRR *vs.* moisture content relationships for extruded polystyrene, and phenolic.

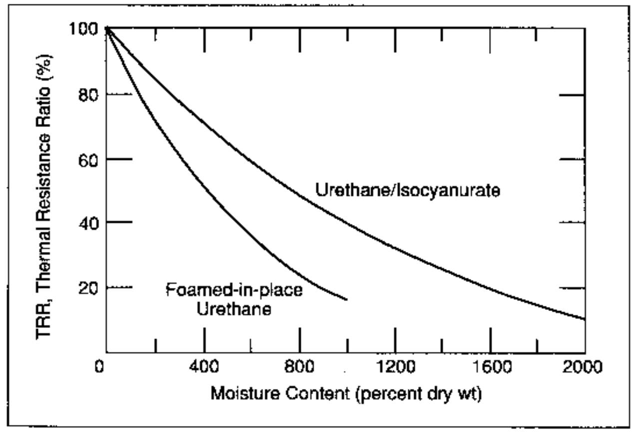

Figure 9 TRR *vs.* moisture content relationships for urethane/isocyanurate and foamed-in-place urethane.

Type	Number	Density (kg/m³/pcf)	Air-dried R-value*	Variations from normal (TES100) wetting condition
Cork	1	256/16.0	17.8/2.57	1 @ NS100
Fiberboard	6	295/18.4	17.6/2.54	2 @ ES100
Perlite	5	163/10.2	17.6/2.60	1 @ ES70, 1 @ NS100, 1 @ ES100
Fibrous glass	5	147/9.2	25.9/3.73	2 @ ES100
Cellular glass	6	134/8.4	28.5/4.11	2 @ ES70, 1 @ TES70, 2 @ NS100, 1 @ ES100
Gypsum	2	921/57.5	3.7/0.54	
Lightweight concrete 369 kg/m³ (23 pcf)	2	367/22.9	10.1/1.46	
Lightweight concrete 594 kg/m³ (37 pcf)	2	599/37.4	7.4/1.06	
Expanded polystyrene 16 kg/m³ (1 pcf)	2	16/1.0	25.5/3.68	
Expanded polystyrene 32 kg/m³ (2 pcf)	2	29/1.8	29.7/4.29	1 @ TES70
Expanded polystyrene 48 kg.m³ (3 pcf)	1	53/3.3	31.5/4.54	
Extruded polystyrene	4	32/2.0	35.7/5.15	
Urethane/isocyanurate	3	34/2.1	36.7/5.30	
Foamed-in-place urethane	2	50/3.1	41.3/5.96	
Phenolic	6	42/2.6	69.7/10.05	

* Apparent thermal resistivity (R-value) units are K•m/W and ft.²•hr•°F/BTU•in.

Table 1 Background information on the 15 materials tested.

Cork:	if $x > 19\%$ use $y = 56.54\, e^{-0.0135x} + 46.47$ if $x \leq 19\%$ use $y = 100 - 0.52\,(x)$
Fiberboard:	if $x > 4\%$ use $y = -7.294\, x^{0.4260} + 103.12$ if $x \leq 4\%$ use $y = 100 - 2.5\, x$
Perlite:	if $x > 3.3\%$ use $y = -5.983\, x^{0.4285} + 100.0$ if $x \leq 3.3\%$ use $y = 100 - 3.0\, x$
Fibrous glass	if $x > 20\%$ use $y = 90.53\, e^{-0.006148x} + 10.07$ if $x \leq 20\%$ use $y = 100 - 0.5\, x$
Cellular glass	if $x > 12.5\%$ use $y = 94.315\, e^{-0.0122x} + 8.993$ if $x \leq 12.5\%$ use $y = 100 - 0.80\, x$
Gypsum:	if $x > 3\%$ use $y = 43.11\, e^{-0.0720x} + 55.04$ if $x \leq 3\%$ use $y = 100 - 3.4\, x$
Lightweight concrete 369 kg/m^3 (23 pcf)	if $x > 3.8\%$ use $y = 59.02\, e^{-0.0342x} + 38.23$ if $x \leq 3.8\%$ use $y = 100 - 2.6\, x$
Lightweight concrete 594 kg/m^3 (37 pcf)	if $x > 4\%$ use $y = 56.67\, e^{-0.0510x} + 43.74$ if $x \leq 4\%$ use $y = 100 - 2.5\, x$
Expanded polystyrene 16 kg/m^3 (1 pcf)	if $x > 181\%$ use $y = 91.40\, e^{-0.000649x} + 8.744$ if $x \leq 181\%$ use $y = 100 - 0.055\, x$
Expanded polystyrene 32 kg/m^3 (2 pcf)	if $x > 109\%$ use $y = 117.65\, e^{-0.000655x} - 19.55$ if $x \leq 109\%$ use $y = 100 - 0.09\, x$
Expanded polystyrene 48 kg/m^3 (3 pcf)	if $x > 33\%$ use $y = 55.96\, e^{-0.00480x} + 42.25$ if $x \leq 33\%$ use $y = 100 - 0.30\, x$
Extruded polystyrene	if $x > 84\%$ use $y = 137.37\, e^{-0.00080x} - 39.47$ if $x \leq 84\%$ use $y = 100 - 0.12\, x$
Urethane/isocyanurate	if $x > 129\%$ use $y = 117.75\, e^{-0.000734x} - 17.12$ if $x \leq 129\%$ use $y = 100 - 0.078\, x$
Foamed-in-place urethane	if $x > 56\%$ use $y = 107.09\, e^{-0.00144x} - 8.78$ if $x \leq 56\%$ use $y = 100 - 0.18\, x$
Phenolic	if $x > 9.7\%$ use $y = -19.067\, x^{0.263} + 124.62$ if $x \leq 9.7\%$ use $y = 100 - 1.03\, x$

Table 2 Equations that relate TRR (y) and moisture content in percentage of dry weight (x) for common roof insulations.

Material	Coefficient of Determination R^2	Sample Standard Deviation s (%)
Cork	0.953	4.0
Fiberboard	0.979	3.3
Perlite	0.978	3.6
Fibrous glass	0.937	6.3
Cellular glass	0.926	2.9
Gypsum	0.989	1.8
Lightweight concrete 369 kg/m^3 (23 pcf)	0.973	3.7
Lightweight concrete 594 kg/m^3 (37 pcf)	0.990	2.2
Expanded polystyrene 16 kg/m^3 (1 pcf)	0.996	1.9
Expanded polystyrene 32 kg/m^3 (2 pcf)	0.983	4.3
Expanded polystyrene 48 kg/m^3 (3 pcf)	0.976	2.7
Extruded polystyrene	0.938	3.7
Urethane/isocyanurate	0.991	2.8
Foamed-in-place urethane	0.990	1.8
Phenolic	0.951	6.6

Table 3 Statistical values for the nonlinear TRR vs. moisture content equations.

Insulation	Equilibrium Moisture Content (% of dry weight) from Ref. 7 @ 45% RH	@ 90% RH	Moisture Content (% of dry weight) at 80% TRR
Cellular glass	0.1	0.2	23
Expanded polystyrene 16 kg/m³ (1 pcf)	1.9	2.0	383
Extruded polystyrene	0.5	0.8	185
Fibrous glass	0.6	1.1	42
Isocyanurate	1.4	3.0	262
Perlite	1.7	5.0	17
Phenolic	6.4	23.4	25
Urethane	2.0	6.0	262

Table 4 Comparison of equilibrium moisture contents and those at 80 percent TRR for insulations without facers.

Material	Moisture Content % of dry weight	% of volume*
Cork	39	9.9
Fiberboard	15	4.4
Perlite	17	2.7
Fibrous glass	42	6.2
Cellular glass	23	3.1
Gypsum	8	7.0
Lightweight concrete 369 kg/m³ (23 pcf)	10	3.7
Lightweight concrete 594 kg/m³ (37 (pcf)	9	5.3
Expanded polystyrene 16 kg/m³ (1 pcf)	383	6.1
Expanded polystyrene 32 kg/m³ (2 pcf)	248	7.2
Expanded polystyrene 48 kg/m³ (3 pcf)	82	4.3
Extruded polystyrene	185	5.9
Urethane/isocyanurate	262	8.8
Foamed-in-place urethane	130	6.5
Phenolic	25	1.0

* Using densities in Table 1.

Table 5 Moisture contents at which TRR equals 80 percent.

R5742

Date Submitted	7/31/2012	**Section**	1517.3 through 1517.6	**Proponent**	Deborah Lawson
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Former sections 1917.1 through 1917.4
Also, Proposed Code Modifications 5738 and 5739

Summary of Modification

Existing section 1917 is a Florida-specific code not in the base code. It is of importance to Florida including HVHZs. FRDA believes LWIC is more appropriate to address in the Roofing Insulation Code since it is a roofing insulation material.

Rationale

Lightweight Insulating Concrete Roof Deck provisions were part of the South Florida Building Code and were incorporated into the Uniform Florida Building Code when originally adopted. The provisions are unique to the Florida code and are relied upon for important guidance by contractors, applicators, manufacturers, code officials and design professionals.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. There could be negative impact if the code provisions are not readopted.

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

None. There could be negative impact if the code provisions are not readopted.

Impact to industry relative to the cost of compliance with code

None. There could be negative impact if the code provisions are not readopted.

Requirements

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

Proper application, testing and inspection of Lightweight Insulating Concrete Roof Decks is critical to the roofing process and the integrity of the building envelope.

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

Readoption of these code provisions will ensure continued consistency in the application, testing and regulation of Lightweight Insulating Concrete Roof Decks.

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

Does not discriminate against any materials, products, methods or systems.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code. Failure to readopt these provisions will degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5742-A1

Proponent Deborah Lawson **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The Florida Roof Deck Association believes preservation of the LIGHTWEIGHT INSULATING CONCRETE provisions of the Florida code is critical. If the TAC and/or the Commission agree, but do not agree that the provisions belong in Chapter 15, then retaining the proposed code provisions in their current Section 1917 would be recommended. Without readoption of these Florida-Specific provisions, no uniform regulations will exist. Florida's code provisions are the only code provisions in existence for LIGHTWEIGHT INSULATING CONCRETE.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None if adopted; however, if LWIC provisions are not readopted as "Florida-Specific Provisions" of the code, there will be negative impact as no provisions for consistent application and inspection of LWIC roof decks will exist.

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.

Requirements

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

Proper application, testing and inspection of Lightweight Insulating Concrete Roof Decks is critical to the integrity of the building envelope and insures performance in Florida's high wind and moisture conditions.

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

LWIC provisions strengthen Florida's code by insuring consistency in the use and inspection of this superior product within Florida's tropical, hurricane prone climate.

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

The provisions are not discriminatory.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5742-G1

Proponent Deborah Lawson **Submitted** 12/14/2012 **Attachments** No

Comment:

) The Roofing TAC found no affirmative recommendation for this proposal at its October 2012 meeting. Additional information is offered to support proposed mod 5742 which would place current code provisions relating to lightweight insulating concrete in the roofing chapter of the Florida Building Code. LIGHTWEIGHT INSULATING CONCRETE is exclusively a roofing insulation product. Although it contains cellular concrete, it is vastly different from other types of concrete and most critically, vastly different from LIGHTWEIGHT STRUCTURAL CONCRETE. The Florida Roof Deck Association believes placing these sections within the roofing code is a sensible approach since the provisions relate only to roofing. The Florida Roof Deck Association also believes that it is of critical importance to differentiate LIGHTWEIGHT INSULATING CONCRETE from other concrete products which have structural capabilities.

2nd Comment Period 10/31/2012 - 12/14/2012

R5742-G2

Proponent Deborah Lawson **Submitted** 12/14/2012 **Attachments** Yes

Comment:

There is a very important "Florida Specific Need" for readoption of LIGHTWEIGHT INSULATING CONCRETE provisions in the Florida Building Code. Because the base code does not address high velocity wind zones and the performance of products in high wind conditions, the base code has no specific criteria for installation and inspection of this product. Florida created the provisions of section 1917 to address Florida's specific need for uniform regulations with respect to LIGHWEIGHT INSULATING CONCRETE because the deck insulation material performs extremely well in Florida's extreme conditions and is widely utilized. Attached is information from one manufacturer, Elastizell Corporation, reporting the superior performance of their roof decks during Hurricane Andrew.

2nd Comment Period 10/31/2012 - 12/14/2012

R5742-G3

Proponent Leo Legatski **Submitted** 12/14/2012 **Attachments** Yes

Comment:

Elastizell Corporation of America supports this proposed Florida-specific code modification. Proper regulation of Lightweight Insulating Concrete is important for the State of Florida where extreme wind and moisture conditions exist and use of the product is widespread. Florida has a true need and benefits from the inclusion of these code provisions. Attached is a summary of Elastizell roof deck performance during Hurricane Andrew which supports maintaining the standards set forth in the Florida Building Code as "Florida Specific" provisions.

1508.3 Lightweight insulating concrete.

Material produced with or without aggregate additions to portland cement, water and air to form a hardened material possessing insulating qualities, which, when oven dried shall have a unit weight no greater than 50 pcf (801 kg/m^3).

1508.3.1 Aggregate lightweight insulating concrete.

Insulating concrete formulated predominantly with perlite or vermiculite aggregate having a minimum compressive strength of 125 psi (861.8 kPa) when tested in compliance with ASTM C 495.

1508.3.2 Cellular lightweight insulating concrete.

Insulating concrete formulated by mixing a hydrated cementitious matrix around non-interconnecting air cells created by the addition of preformed foam formed from hydrolyzed proteins or synthetic surfactants. The cured cellular lightweight insulating concrete shall have minimum compressive strength of 160 psi (1103 kPa) when tested in compliance with ASTM C 495 and C 796.

1508.3.3 Cellular/aggregate (hybrid) lightweight insulating concrete.

Insulated concrete formulated by combining preformed foam with low density aggregates to impart properties of both aggregate and cellular lightweight insulating concrete. It shall have a minimum compressive strength of 200 psi (1379 kPa) when tested in compliance with ASTM C 495 and C 796.

1508.4 Inspection.

1508.4.1

Application of all lightweight insulating concrete roof decks shall be by applicators approved by the lightweight insulating concrete deck manufacturer. Product Approval shall be required for all lightweight insulating concrete systems.

1508.4.2

The permit holder shall notify the building official 48 hours prior to the pouring of lightweight insulating concrete.

1508.4.3

The permit holder shall make available to the building official a job log with the following minimum items.

1. Cast density recordings/hour.

2. Product evaluation for application.

3. Date and job locations identified.

4. Results of any field test conducted.

1508.4.4

Once the roof deck system can support foot traffic, the building official shall have clear access and clear path at his option for inspection of lightweight insulating concrete.

1508.5 Testing.

The building official may require tests of the lightweight insulating concrete to confirm the fastener withdrawal resistance, compressive strength or drainage ability.

1508.5.1

Existing roof assemblies to receive lightweight insulating concrete other than galvanized G-90 steel deck or structural concrete deck shall be tested for uplift for adhesion to the substrate to confirm compliance with design pressure.

1508.6 Materials and limitations of use.

Lightweight insulating concrete, in conjunction with galvanized formed steel sheets, shall not be used as a roof deck in areas where highly corrosive chemicals are used or stored.

1508.6.1

Lightweight insulating concrete shall be poured over bottom slotted galvanized (G-90) steel decking as follows; cellular, 0.5 percent open; hybrid, 0.75 percent open, aggregate 1.5 percent open. No lightweight insulating concrete shall be poured over a painted or non-galvanized steel deck.

1. Lightweight insulating concrete over structural concrete slabs, twin tees, precast units or other non-venting substrates shall be vented to allow the escape of excess moisture.

1508.6.2

Minimum thickness of lightweight insulating concrete shall be 2 inches (51 mm) over the top plane of the substrate unless otherwise specified in the Product Approval. Lightweight insulating concrete shall be of sufficient thickness to receive the specified base ply fastener length.

1508.6.3

Galvanized coatings of formed steel sheets shall be in accordance with ASTM A 525 with a minimum coating designation of G-90. Base steel shall conform to ASTM A 446, Grade A, B, C, D or greater and ASTM A 611 C, D or E.

1508.6.4

Chemical admixtures shall be in compliance with ASTM C 494. Calcium chloride or any admixture containing chloride salts shall not be used in insulating concrete. Fiber reinforcement may be used to control cracking. Mineral admixtures shall conform to ASTM C 618.

1508.6.5

Vermiculite or perlite shall be in compliance with ASTM C 332, Group I. Foam concentrates shall be in compliance with ASTM C 796 and ASTM C 869.

1508.6.6

Mixing, placing and finishing shall be in compliance with the deck system Product Approval. Slurry coating, two-density casting and double casting shall be acceptable per the specific manufacturer's recommendations.

1508.6.7

If the lightweight insulating concrete deck is to receive Product Approval for a direct-adhered roofing system, the deck surface shall be prepared to the requirements set forth in the roof system Product Approval.

1508.6.8

All base ply fasteners for use in lightweight insulating concrete roof decks shall have a Product Approval for use with the specific lightweight insulating concrete roof system in compliance with manufacturer's recommendations and the design pressure of Section 1609.

1508.6.9

The lightweight insulating concrete fastener withdrawal shall have a minimum resistance for new pours of

1. 60 pounds (267 N) in 28 days when the fastener is installed and allowed to age in the concrete.

2. 40 pounds (178 N) at time of roofing.

1508.6.10
Insulation board with lightweight insulating concrete shall conform to Type I expanded polystyrene insulation as defined in ASTM C 578.

1. Packaged insulation board delivered to the job site shall comply with the provisions of Section 2603.2 or Section 2613.1.3.

2. Installation of insulating board in conjunction with lightweight insulating concrete shall comply with uplift requirements set forth in Section 1609. Insulation panels shall be placed in a minimum $^{1}/_{8}$-inch (3.2 mm) slurry of insulating concrete while the material is still in a plastic state. The insulating concrete shall be cast over the insulation boards according to the insulating concrete manufacturer's Product Approval. Insulation panels shall be provided with holes and/or slots for keying and venting.

1508.6.11

Reinforcing mesh shall be provided as required to meet fire-rating and/or special structural design requirements. Refer to a specific Product Approval for the specific requirements applicable to the product being installed.

1917.1 Lightweight insulating concrete.

Material produced with or without aggregate additions to portland cement, water and air to form a hardened material possessing insulating qualities, which, when oven dried shall have a unit weight no greater than 50 pcf (801 kg/m^3).

1917.1.1 Aggregate lightweight insulating concrete.

Insulating concrete formulated predominantly with perlite or vermiculite aggregate having a minimum compressive strength of 125 psi (861.8 kPa) when tested in compliance with ASTM C 495.

1917.1.2 Cellular lightweight insulating concrete.

Insulating concrete formulated by mixing a hydrated cementitious matrix around non-interconnecting air cells created by the addition of preformed foam formed from hydrolyzed proteins or synthetic surfactants. The cured cellular lightweight insulating concrete shall have minimum compressive strength of 160 psi (1103 kPa) when tested in compliance with ASTM C 495 and C 796.

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Insulated concrete formulated by combining preformed foam with low density aggregates to impart properties of both aggregate and cellular lightweight insulating concrete. It shall have a minimum compressive strength of 200 psi (1379 kPa) when tested in compliance with ASTM C 495 and C 796.

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Application of all lightweight insulating concrete roof decks shall be by applicators approved by the lightweight insulating concrete deck manufacturer. Product Approval shall be required for all lightweight insulating concrete systems.

1917.2.2

The permit holder shall notify the building official 48 hours prior to the pouring of lightweight insulating concrete.

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The permit holder shall make available to the building official a job log with the following minimum items.

1. Cast density recordings/hour.

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3. Date and job locations identified.

4. Results of any field test conducted.

1917.2.4

Once the roof deck system can support foot traffic, the building official shall have clear access and clear path at his option for inspection of lightweight insulating concrete.

1917.3 Testing.

The building official may require tests of the lightweight insulating concrete to confirm the fastener withdrawal resistance, compressive strength or drainage ability.

1917.3.1

Existing roof assemblies to receive lightweight insulating concrete other than galvanized G-90 steel deck or structural concrete deck shall be tested for uplift for adhesion to the substrate to confirm compliance with design pressure.

1917.4 Materials and limitations of use.

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Reinforcing mesh shall be provided as required to meet fire-rating and/or special structural design requirements. Refer to a specific Product Approval for the specific requirements applicable to the product being installed.

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Insulating concrete formulated by mixing a hydrated cementitious matrix around non-interconnecting air cells created by the addition of preformed foam formed from hydrolyzed proteins or synthetic surfactants. The cured cellular lightweight insulating concrete shall have minimum compressive strength of 160 psi (1103 kPa) when tested in compliance with ASTM C 495 and C 796.

1917.1.3 Cellular/aggregate (hybrid) lightweight insulating concrete.

Insulated concrete formulated by combining preformed foam with low density aggregates to impart properties of both aggregate and cellular lightweight insulating concrete. It shall have a minimum compressive strength of 200 psi (1379 kPa) when tested in compliance with ASTM C 495 and C 796.

1917.2 Inspection.

1917.2.1

Application of all lightweight insulating concrete roof decks shall be by applicators approved by the lightweight insulating concrete deck manufacturer. Product Approval shall be required for all lightweight insulating concrete systems.

1917.2.2

The permit holder shall notify the building official 48 hours prior to the pouring of lightweight insulating concrete.

1917.2.3

The permit holder shall make available to the building official a job log with the following minimum items.

1. Cast density recordings/hour.

2. Product evaluation for application.

3. Date and job locations identified.

4. Results of any field test conducted.

1917.2.4

Once the roof deck system can support foot traffic, the building official shall have clear access and clear path at his option for inspection of lightweight insulating concrete.

1917.3 Testing.

The building official may require tests of the lightweight insulating concrete to confirm the fastener withdrawal resistance, compressive strength or drainage ability.

1917.3.1

Existing roof assemblies to receive lightweight insulating concrete other than galvanized G-90 steel deck or structural concrete deck shall be tested for uplift for adhesion to the substrate to confirm compliance with design pressure.

1917.4 Materials and limitations of use.

Lightweight insulating concrete, in conjunction with galvanized formed steel sheets, shall not be used as a roof deck in areas where highly corrosive chemicals are used or stored.

1917.4.1

Lightweight insulating concrete shall be poured over bottom slotted galvanized (G-90) steel decking as follows; cellular, 0.5 percent open; hybrid, 0.75 percent open, aggregate 1.5 percent open. No lightweight insulating concrete shall be poured over a painted or non-galvanized steel deck.

1. Lightweight insulating concrete over structural concrete slabs, twin tees, precast units or other non-venting substrates shall be vented to allow the escape of excess moisture.

1917.4.2

Minimum thickness of lightweight insulating concrete shall be 2 inches (51 mm) over the top plane of the substrate unless otherwise specified in the Product Approval. Lightweight insulating concrete shall be of sufficient thickness to receive the specified base ply fastener length.

1917.4.3

Galvanized coatings of formed steel sheets shall be in accordance with ASTM A 525 with a minimum coating designation of G-90. Base steel shall conform to ASTM A 446, Grade A, B, C, D or greater and ASTM A 611 C, D or E.

1917.4.4

Chemical admixtures shall be in compliance with ASTM C 494. Calcium chloride or any admixture containing chloride salts shall not be used in insulating concrete. Fiber reinforcement may be used to control cracking. Mineral admixtures shall conform to ASTM C 618.

1917.4.5

Vermiculite or perlite shall be in compliance with ASTM C 332, Group I. Foam concentrates shall be in compliance with ASTM C 796 and ASTM C 869.

1917.4.6

Mixing, placing and finishing shall be in compliance with the deck system Product Approval. Slurry coating, two-density casting and double casting shall be acceptable per the specific manufacturer's recommendations.

1917.4.7

If the lightweight insulating concrete deck is to receive Product Approval for a direct-adhered roofing system, the deck surface shall be prepared to the requirements set forth in the roof system Product Approval.

1917.4.8

All base ply fasteners for use in lightweight insulating concrete roof decks shall have a Product Approval for use with the specific lightweight insulating concrete roof system in compliance with manufacturer's recommendations and the design pressure of Section 1609.

1917.4.9

The lightweight insulating concrete fastener withdrawal shall have a minimum resistance for new pours of

1. 60 pounds (267 N) in 28 days when the fastener is installed and allowed to age in the concrete.

2. 40 pounds (178 N) at time of roofing.

1917.4.10

Insulation board with lightweight insulating concrete shall conform to Type I expanded polystyrene insulation as defined in ASTM C 578.

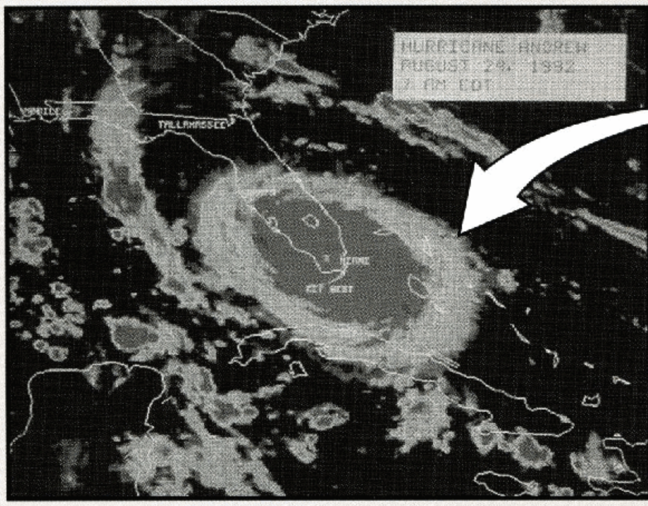
1. Packaged insulation board delivered to the job site shall comply with the provisions of Section 2603.2 or Section 2613.1.3.

2. Installation of insulating board in conjunction with lightweight insulating concrete shall comply with uplift requirements set forth in Section 1609. Insulation panels shall be placed in a minimum $^{1}/_{8}$-inch (3.2 mm) slurry of insulating concrete while the material is still in a plastic state. The insulating concrete shall be cast over the insulation boards according to the insulating concrete manufacturer's Product Approval. Insulation panels shall be provided with holes and/or slots for keying and venting.

1917.4.11

Reinforcing mesh shall be provided as required to meet fire-rating and/or special structural design requirements. Refer to a specific Product Approval for the specific requirements applicable to the product being installed.

Hurricane Andrew - August 24, 1992



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If your forecast shows one of these...

...you can rest assured, if you specified an Elastizell Roof Deck!

FILE FACTS

Elastizell Roof Deck Performance:

Some 110 Elastizell Roof Decks were in the path of Hurricane Andrew when it hit the area around Homestead, Florida. Maximum sustained wind speeds ranged from 80 to 148 mph. About 75% of the Elastizell Roof Decks experienced winds greater than 100 mph.

These Elastizell Roof Decks were identified and examined by our local Elastizell applicator. The projects were completed between 1984 and September, 1992.

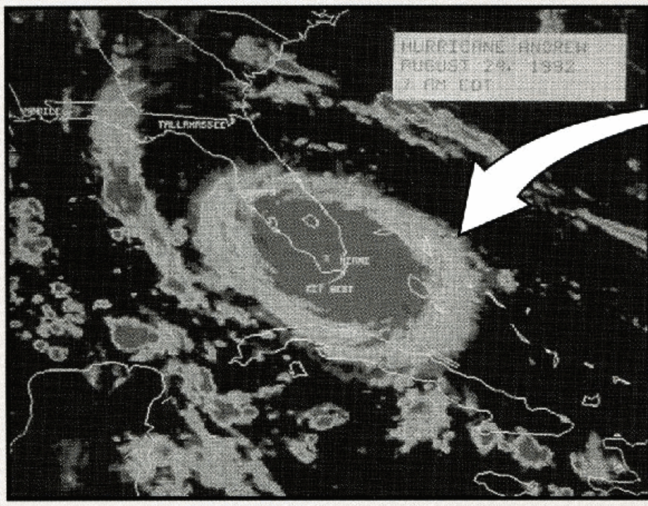
There were no reported damages to the integrity of the Elastizell Roof Decks (Elastizell & EPS Insulation) in any of these jobs.

Two projects suffered some minor distress:

- A project under construction had minor edge damage which caused minor membrane damage in an area where parapets were not yet installed.
- Another project suffered some damaged membrane from flying debris. The debris cut the membrane so that a small area of membrane was blown off. However, the Elastizell Roof Deck remained in place and was expeditiously reroofed.

For the decks which suffered membrane damage, the membrane was expeditiously replaced with no deck repair required.

Hurricane Andrew - August 24, 1992



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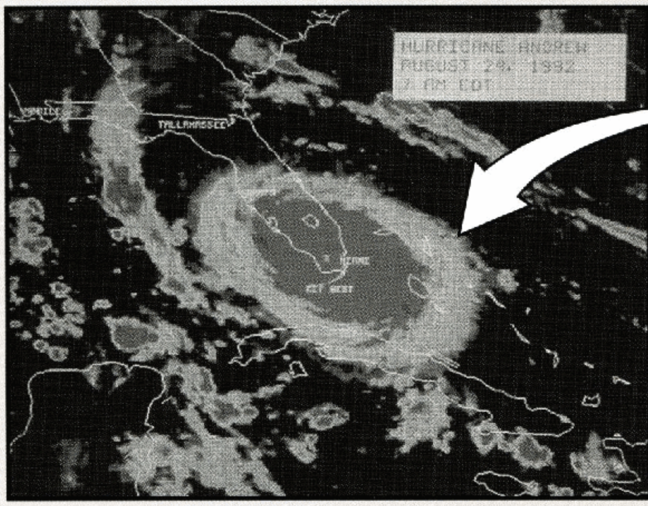
Page 330 of 589

Hurricane Andrew - August 24, 1992



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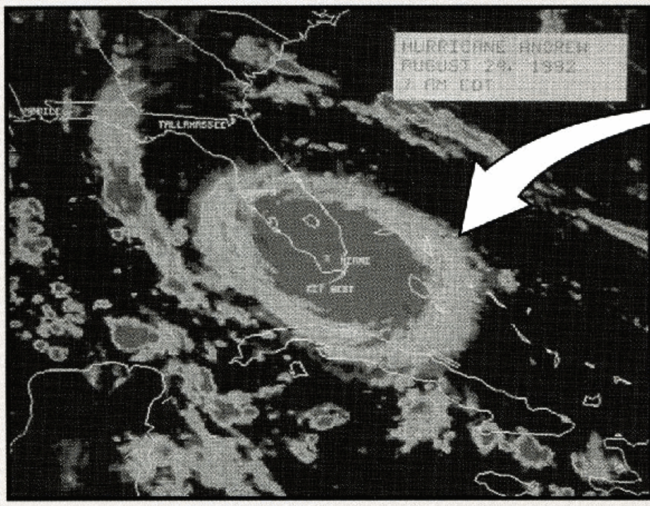
For the decks which suffered membrane damage, the membrane was expeditiously replaced with no deck repair required.

2013 Florida Building Code Development – Rationale for Inclusion of Florida-Specific Provisions for Lightweight Insulating Concrete Roof Decks

Although Lightweight Insulating Concrete (LWIC) Roof Decks are utilized throughout the world, Florida is by far the most substantial market for the material with proven performance of this roofing insulation product in Florida's climactic conditions due to its ability to wick moisture and fully adhere, providing excellent performance in High Wind Velocity Zones. The origin of Florida's existing LWIC code provisions is the former South Florida Building Code. The provisions were incorporated when the uniform Florida Building Code was created and are heavily relied upon by contractors, applicators, manufacturers, code officials and design professionals in Florida. Lightweight Insulating Concrete Roof Decks are not currently addressed in the International Building Code and to our knowledge, are not contained in any other state codes. Consequently, even other states look to Florida's provisions for guidance.

Hurricane Andrew - August 24, 1992



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For the decks which suffered membrane damage, the membrane was expeditiously replaced with no deck repair required.

R5612

Date Submitted	7/24/2012	**Section**	Table 1503.2	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

1503.2

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5612-A1

Proponent Mark Zehnal **Submitted** 11/27/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

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YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

TABLE 1503.2 METAL FLASHING MATERIAL

MATERIAL	MINIMUM THICKNESS (INCHES)	GAGE	WEIGHT (LBS PER SQ FT)
Copper	1 (16 oz)		
Aluminum	0.024		
Stainless Steel	28		
Galvanized Steel	0.0179	26 (zinc coated G90)	
Aluminum Zinc Coated Steel	0.0179	26 (AZ50 Alum Zinc)	
Zinc Alloy	0.027		
Lead	2.5 (40 oz)		
Painted Terne	-	1.25 (20 oz)	

TABLE 1503.2

METAL FLASHING MATERIAL

MATERIAL	MINIMUM THICKNESS (INCHES)	GAGE	WEIGHT (LBS PER SQ FT)
Copper	—	—	1 (16 oz)
Aluminum	0.024	—	—
Stainless Steel	—	28	—
Galvanized Steel	0.0179	26 (zinc coated G90)	—
Aluminum Zinc Coated Steel	0.0179	26 (AZ50 Alum Zinc)	—
Zinc Alloy	0.027	—	—
Lead	—	—	2.5 (40 oz)
Painted Terne	—	—	1.25 (20 oz)

R5414

Date Submitted	7/19/2012	**Section**	TABLE 1507.4.3(1) METAL ROOF	**Proponent**	Mark Zehnal
Chapter	15	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current 2010 Florida Building Code specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5414-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

This table has an additional column to separate standards from material making less complicated to read. To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language without any new requirements being established.

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

No impact. Current 2010 FBC code language without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5414-G1

Proponent	Andy Williams	Submitted	12/13/2012	Attachments	No

Comment:

My recommendation is that the minimum thicknesses for aluminum-zinc coated steel and galvanized steel be removed using the following rationale.

International Building Code, 2012 edition, Table 1507.4.3(1) defines metal roof coverings and does not provide a minimum thickness for either aluminum-zinc coated steel or galvanized steel. A similar code change proposal was submitted during the 2012/2013 ICC Code Development Cycle (Group A) to include a minimum thickness for these two metal roof coverings. The International Building Code Structural Committee recommended disapproval of this proposal (S39-12). The committee provided the following reason for disapproval: "The committee believes that the roof covering manufacturer should cover the minimum thickness required for metal roof coverings and the proposed values are not consistent with the source document mentioned in the reason (Table 6-1 of the SMACNA Architectural Sheet Metal Manual)."

The Florida Building Code, 2010 edition, Section 1504.3.2 Metal Panel Roof Systems requires that these metal roof coverings be tested to determine their structural capacity. This testing insures that the metal roof coverings are adequate for their intended use. Inclusion of a prescriptive requirement such as minimum thickness is unnecessary and may also limit the ability of the metal roof covering manufacturer to design economical metal roof coverings. The Florida Building Code should only deviate from the International Building Code where there is a Florida specific need. It does not seem reasonable that the minimum thickness for aluminum-zinc coated steel and galvanized steel metal roof coverings qualifies as a Florida specific need.

TABLE 1507.4.3(1) METAL ROOF COVERINGS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Aluminum~~	~~ASTM B 209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.~~
~~Aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Copper~~	~~16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.~~
~~Galvanized steel~~	~~ASTM A 653 G-90 zinc-coated[a].~~
~~Hard lead~~	~~2 lbs./sq. ft.~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Prepainted steel~~	~~ASTM A 755~~
~~Soft lead~~	~~3 lbs./sq. ft.~~
~~Stainless steel~~	~~ASTM A 240, 300 Series Alloys~~
~~Steel~~	~~ASTM A 924~~
~~Terne and terne-coated stainless~~	~~Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.~~
~~Zinc~~	~~0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.
Aluminum-zinc coated steel	ASTM A 792	0.013 inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz/sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz/sq. ft. for preformed metal shingle systems.
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013 inch minimum thickness, G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.	
Lead-coated copper	ASTM B 101	
Prepainted steel	ASTM A 755	

Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series Alloys
Steel	ASTM A 924/ ASTM A 924M	
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.	
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).	

For SI: 1 ounce per square foot = 0.0026 kg/m^2,
1 pound per square foot = 4.882 kg/m^2,
1 inch = 25.4 mm, 1 pound = 0.454 kg.
a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G-60.

TABLE 1507.4.3(1) METAL ROOF COVERINGS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Aluminum~~	~~ASTM B 209, 0.024 inch minimum thickness for roll-formed panels and 0.019 inch minimum thickness for press-formed shingles.~~
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~~Copper~~	~~16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.~~
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Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013 inch minimum thickness, G-90 zinc-coated[a].
Hard lead	2 lbs./sq. ft.	
Lead-coated copper	ASTM B 101	-
Prepainted steel	ASTM A 755	-
Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series Alloys

Steel	ASTM A 924/ ASTM A 924M	-
Terne and terne-coated stainless	-	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions.
Zinc	-	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).

For SI: 1 ounce per square foot = 0.0026 kg/m^2,
1 pound per square foot = 4.882 kg/m^2,
1 inch = 25.4 mm, 1 pound = 0.454 kg.
a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G-60.

R5241

Date Submitted	7/17/2012	**Section** 711		**Proponent**	Mark Zehnal
Chapter	7	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.No impact.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.No impact.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5241-G2

Proponent	Mark Zehnal	**Submitted**	12/7/2012	**Attachments**	No

Comment:

This Code Modification can be withdrawn

1st Comment Period History 08/09/2012 - 09/23/2012

R5241-G1

Proponent	BOAF CDC	**Submitted**	9/23/2012	**Attachments**	No

Comment:

The provision this is based upon has sunset with the other Florida Changes to the 2010 FBC

Because a code provision was in the 2010 FBC does not make it Florida specific.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

SECTION 711 REROOFING

-

711.1 General.

-

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential. Roof repairs to existing roofs and roof coverings shall comply with the provisions of this code.

-

Exception: Reroofing shall not be required to meet the minimum design slope requirement of 1/4:12 in Section 1507 of the Florida Building Code, Building for roofs that provide positive roof drainage (high-velocity hurricane zones shall comply with Sections 1515.2.2.1 and 1515.2.2.2 of the Florida Building Code, Building).

-

711.1.1

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 entire roofing system or roof section conforms to requirements of this code.

-

711.2 Structural and construction loads.

-

The structural roof components shall be capable of supporting the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.

-

711.3 Recovering versus replacement.

-

New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.

3. Where the existing roof has two or more applications of any type of roof covering.

4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining materials secured down before applying additional roofing.

5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section 1504.1 can not be met.

-

Exceptions:

1. Building and structures located within the High-Velocity Hurricane Zone shall comply with the provisions of Sections 1512 through 1525 of the Florida Building Code, Building.

2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

3. Reserved.

4. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

5. Roof Coating. Application of elastomeric and or maintenance coating systems over existing asphalt shingles shall be in accordance with the shingle manufacturer's approved installation instructions.

-

711.4 Roof recovering.

-

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

-

711.5 Reinstallation of materials.

-

Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counter flashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled (high-velocity hurricane zones shall comply with Sections 1512 through 1525 of the Florida Building Code, Building).

-

711.6 Flashings.

-

Flashings shall be reconstructed in accordance with roof covering manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation (high-velocity hurricane zones shall comply with Sections 1512 through 1525 of the Florida Building Code, Building).

-

711.7

When a roof covering on an existing site-built single- family residential structure is removed and replaced, the following procedures shall be permitted to be performed by the roofing contractor:

(a) Roof-decking attachment shall be as required by Section 711.7.1.

(b) A secondary water barrier shall be provided as required by Section 711.7.2.

-

Exception: Single family residential structures permitted subject to the Florida Building Code are not required to comply with this section.

-

711.7.1 Roof decking attachment for site-built single- family residential structures.

-

For site-built single-family residential structures the fastening shall be in accordance with Section 711.7.1.1 or 711.7.1.2 as appropriate for the existing construction. 8d nails shall be a minimum of 0.113 inch (2.9 mm) in diameter and shall be a minimum of 21/4 inch (57 mm) long to qualify for the provisions of this section for existing nails regardless of head shape or head diameter.

-

711.7.1.1

-

Roof decking consisting of sawn lumber or wood planks up to 12" wide and secured with at least two nails (minimum size 8d) to each roof framing member it crosses shall be deemed to be sufficiently connected. Sawn lumber or wood plank decking secured with smaller fasteners than 8d nails or with fewer than two nails (minimum size 8d) to each framing member it crosses shall be deemed sufficiently connected if fasteners are added such that two clipped head, round head, or ring shank nails (minimum size 8d) are in place on each framing member it crosses.

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711.7.1.2

-

For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table 711.7.1.2 are deemed to comply with the requirements of Section 706.3, Florida Building Code, Existing Building for the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to comply with the requirements of Section 606.3, Florida Building Code, Existing Building, provided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.

-

Supplemental fasteners as required by Table 711.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

1. 0.113-inch nominal shank diameter.

2. Ring diameter a minimum of 0.012-inch greater than shank diameter.

3. 16 to 20 rings per inch.

4. A minimum 0.280-inch full round head diameter.

5. Ring shank to extend a minimum of 11/2 inches from the tip of the nail.

6. Minimum 2-1/4 inch nail length.

-

TABLE 711.7.1.2 SUPPLEMENT FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

EXISTING FASTENERS	EXISTING SPACING	V_{asd} 110 MPH OR LESS SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN	V_{asd} GREATER THAN 110 MPH SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN
Staples or 6d	Any	6" o.c.[b]	6" o.c.[b]
8d clipped head, round head, smooth or ring shank	6? o.c. or less	None necessary	None necessary
8d clipped head, round head, smooth or ring shank	Greater than 6? o.c.	6" o.c.[a]	6" o.c.[a]

-

For SI: 1 inch = 25.4 mm.

a. Maximum spacing determined based on existing fasteners and supplemental fasteners.

b. Maximum spacing determined based on supplemental fasteners only.

c. Vasd shall be determined in accordance with Section 1609.3.1 of the Florida Building Code, Building or Section R301.2.1.3 of the Florida Building Code, Residential.

-

711.7.2 Roof secondary water barrier for site-built single family residential structures.

-

A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:

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1. In either HVHZ or Non-HVHZ regions:

a) All joints in structural panel roof sheathing or decking shall be covered with a minimum 4 inch (102 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The deck and self adhering 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 Sections R4402.7.2, R4402.7.3, or R4402.7.4 of the Florida Building Code, Residential. (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) The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions. No additional underlayment shall be required on top of this sheet for new installations.

b) An underlayment system approved for the particular roof covering shall be applied with the following modification:

(1) For roof slopes that require one layer of underlayment, a layer of approved asphalt impregnated ASTM D 226 Type I or Type II underlayment or approved synthetic underlayment shall be installed. The felt is to be fastened with 1 inch (25 mm) round plastic cap or metal cap nails, attached to a nailable deck in a grid pattern of 12 inches (305 mm) staggered between the overlaps, with 6-inch (152 mm) spacing at the overlaps. The synthetic underlayment shall be fastened in accordance with the manufacturer's recommendations.

(2) For roof slopes that require two layers of underlayment, an approved asphalt impregnated ASTM D 226 Type I or Type II underlayment shall be installed in a shingle–fashion and lapped 19 inch (483 mm) and fastened as described above. An approved synthetic underlayment shall be installed in accordance with the manufacturer's installation instruction. (No additional underlayment shall be required over the top of this sheet.)

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Exceptions:

1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section 711.7.2 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 711.7.2 for Secondary Water Barriers.

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711.8

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When a roof covering on an existing site-built-single-family residential structure is removed and replaced on a building that is located in the wind-borne debris region as defined in the Florida Building Code, Building and that has an insured value of $300,000 or more or, if the building is uninsured or for which documentation of insured value is not presented, has a just valuation for the structure for purposes of ad valorem taxation of $300,000 or more:

(a) Roof to wall connections shall be improved as required by Section 711.8.1

(b) Mandated retrofits of the roof-to-wall connection shall not be required beyond a 15 percent increase in the cost of re-roofing.

-

Exception: Single-family residential structures permitted subject to the Florida Building Code are not required to comply with this section.

-

711.8.1 Roof-to-wall connections for site-built single-family residential structures.

-

Where required by Section 711.8, the intersection of roof framing with the wall below shall provide sufficient resistance to meet the uplift loads specified in Table 711.8.1 either because of existing conditions or through retrofit measures. As an alternative to an engineered design, the prescriptive retrofit solutions provided in Sections 711.8.1.1 through 711.8.1.7 shall be accepted as meeting the mandated roof-to-wall retrofit requirements.

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Exceptions:

1. Where it can be demonstrated (by code adoption date documentation and permit issuance date) that roof-to-wall connections and/or roof-to-foundation continuous load path requirements were required at the time of original construction.

2. Roof-to-wall connections shall not be required unless evaluation and installation of connections at gable ends or all corners can be completed for 15 percent of the cost of roof replacement.

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TABLE 711.8.1 REQUIRED UPLIFT CAPACITIES FOR ROOF-TO-WALL CONNECTIONSa, b (POUNDS PER LINEAR FOOT)

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ULTIMATE DESIGN WIND SPEED, V_{ult}	ROOF SPAN (feet) 12	20	24	28	32	36	40	OVERHANGS	
Within 6 feet of building corner	85	-69.85	-116.42	-139.70	-162.99	-186.27	-209.55	-232.84	-27
	90	-82.67	-137.78	-165.34	-192.90	-220.45	-248.01	-275.57	-30.3
	100	-110.51	-184.18	-221.01	-257.85	-294.68	-331.52	-368.36	-37.4
	110	-141.27	-235.45	-282.55	-329.64	-376.73	-423.82	-470.91	-45.3
	120	-174.97	-291.62	-349.94	-408.26	-466.59	-524.91	-583.23	-53.9
	130	-211.60	-352.66	-423.19	-493.72	-564.26	-634.79	-705.32	-63.2
	140	-251.15	-418.59	-502.31	-586.02	-669.74	-753.46	-837.18	-73.3
	150	293.64	489.40	-587.28	685.16	783.04	880.92	978.80	-84.2
	170	-387.40	-645.67	-774.81	-903.94	-1033.08	-1162.21	-1291.35	-108
Greater than 6 feet from building corner	85	-39.10	-65.17	-78.20	-91.24	-104.27	-117.30	-130.34	-27
	90	-48.20	-80.33	-96.39	-112.46	-128.52	-144.59	-160.66	-30.3
	100	-67.95	-113.24	-135.89	-158.54	-181.19	-203.84	-226.49	-37.4
	110	-89.78	-149.63	-179.55	-209.48	-239.40	-269.33	-299.25	-45.3
	120	-113.68	-189.47	-227.37	-265.26	-303.16	-341.05	-378.94	-53.9
	130	-139.67	-232.78	-279.34	-325.90	-372.45	-419.01	-465.57	-63.2
	140	-167.74	-279.56	-335.47	-391.38	-447.29	-503.21	-559.12	-73.3
	150	-197.88	-329.80	-395.76	-461.72	-527.68	-593.64	-659.60	-84.2
	170	-264.41	-440.68	-528.81	-616.95	-705.08	-793.22	-881.35	-108

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For SI: 1 foot = 304.8 mm; 1 pound per linear foot = 1.488 kg/m; 1 mile per hour = 0.305 m/s.

a. The uplift loads are pounds per lineal foot of building length. For roof uplift connections multiply by 1.33 for framing spaced 16 inches on center and multiply by 2 for framing spaced 24 inches on center.

b. The uplift loads do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 12 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

c. For Ultimate design wind speeds, Vult, greater than 170 mph, wind uplift forces shall be determined in accordance with Florida Building Code, Residential, Section R802.3 or ASCE 7.

d. Ultimate Design Wind Speeds determined from Figure 1609A in the Florida Building Code,Building or Figure R301.2(4) in the Florida Building Code, Residential.

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711.8.1.1 Access for Retrofitting Roof to Wall Connections.

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These provisions are not intended to limit the means for gaining access to the structural elements of the roof and wall for the purposes of retrofitting the connection. The retrofit of roof to wall connections can be made by access through the area under the eave, from above through the roof, or from the interior of the house. Methods for above access include removal of roof panels or sections thereof or removal of portions of roof paneling at selected locations large enough for access, viewing, and installing the retrofit connectors and fasteners.

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Where panels or sections are removed, the removed portions shall not be reused. New paneling shall be used and fastened as in new construction.

-

Holes shall be deemed adequately repaired if a patch of paneling is installed with no gap greater than 1/2 inch (13 mm) between the patch and the existing sheathing and if the patch is supported using one of the following methods.

a) Solid 11/2 inch lumber shall fully support the patch and shall be secured to the existing sheathing with #8 by 11/4 inch screws spaced a minimum of 3 inches (76 mm) around the perimeter with screws a minimum of 3/4 inch from the near edge of the hole. The patch shall be secured to the lumber with #8 × 1-1/4 inch screws spaced on a grid no greater than 6 inches by 6 inches (152 mm × 152 mm) with no fewer than 2 screws.

b) Holes that extend horizontally from roof framing member to adjacent roofing framing member that are less than or equal to 7 inches (178 mm) wide along the slope of the roof shall be supported by minimum of 2 × 4 lumber whose face is attached to each roofing framing members using a minimum of 2 each 3-inch (76 mm) long fasteners (#8 screws or 10d common nails) connecting the two. The patch shall have attached to its bottom, running horizontally, a minimum 2 × 4 either flat wise or on edge secured with #8 × 11/4 inch screws a maximum of 4 inches (102 mm) on center and no more distant from the end of the added lumber than 3 inches (76 mm). The patch shall be secured with two #8 × 1-11/4 inch screws to each support member.

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711.8.1.2 Partially inaccessible straps.

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Where part of a strap is inaccessible, if the portion of the strap that is observed is fastened in compliance with these requirements, the inaccessible portion of the strap shall be presumed to comply with these requirements.

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711.8.1.3 Prescriptive method for gable roofs on a wood frame wall.

-

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below. Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the rafter or truss to the wall stud below shall be allowed as an alternate provided the two members align with no more than 11/2 inches (38 mm) offset.

-

711.8.1.4 Prescriptive method for gable roofs on a masonry wall.

-

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least a 21/2 inch (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch diameter masonry screws, each with supplementary 1/4-inch washer, having sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

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711.8.1.5 Prescriptive method for hip roofs on a wood frame wall.

-

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the top plate below using a strap or a right angle gusset bracket having a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the hip rafter, hip girder or adjacent rafters/trusses to the wall stud below shall be allowed as an alternate provided the two members align with no more than 11/2 inch (38 mm) offset.

-

711.8.1.6 Prescriptive method for hip roofs on a masonry wall.

-

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least 21/2 inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch (6 mm) diameter masonry screws, each with supplementary 1/4-inch (6 mm) washer, with sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

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711.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.

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Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.

611.8.1.6 Prescriptive method for hip roofs on a masonry wall.

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least 21/2 inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing 1/4-inch (6 mm) diameter masonry screws, each with supplementary 1/4-inch (6 mm) washer, with sufficient length to develop a 21/2 inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

611.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.

Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.

R5472

Date Submitted	7/21/2012	**Section**	R902.1 Roofing covering materials	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current 2010 FBC Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

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Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5472-G1

Proponent	Mark Zehnal	Submitted	12/7/2012	Attachments	Yes

Comment:

The exceptions in the ICC Residential Code are not consistant with UL Cerifications found for copper roof systems. An additional fire barrier is required to meet the Class A Fire Rating. Additionally the Florida Forest Service Web Page suggests that the roof is one of the two most vulnerable parts of a home (attached).

R902.1 Roofing covering materials.

Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a lot line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

~~1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.~~

~~2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.~~

~~3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.~~

Brick, masonry, slate, clay or concrete roof tile; ferrous and copper shingles and shakes; and exposed concrete roof deck are considered to meet Class A roof covering provisions without testing. Metal sheets and shingles are considered to meet Class B roof covering provisions without testing.

Florida Department of Agriculture and Consumer Services

Florida Forest Service

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Watch the Video:
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Florida Forest Service HOME > Wildland Fire > Fire Prevention > Firewise Communities >

IsYourHome Firewise?

Much of what is known about protecting homes from wildland fire is based upon the work of Jack Cohen, a Fire Research Scientist at the U.S. Forest Service Fire Lab in Missoula, Montana. Jack has been studying wildfires for almost 30 years. His research and field investigations support some interesting explanations for home losses associated with wildland/urban interface fires.

Help Prevent Wildfire in Your Community

Our Wildfire Mitigation Specialists present Firewise Workshops and other information about how you can lower your wildfire risk and help prevent wildfires. **Contact the Wildfire Mitigation Specialist in your area.**

Cohen has found that most wildland/urban interface homes are lost because of ignitions associated with the two most vulnerable parts of a home:

1. the roof
2. the area immediately surrounding the structure

Cohen's research results indicate that home ignitions usually occur over relatively short distances---tens of yards, not hundreds of feet from little things associated with either:

Fire brands landing on and around the structure, or

Flames from slow-moving, low-intensity surface fires contacting flammable portions of the structure.

This means that the homeowner can play a significant role in reducing home losses from wildfires by reducing fuels and through careful landscaping in what Cohen calls the "home ignition zone', an area that extends outward from the home 100 - 200 feet in all directions. Research has shown that the home ignition zone principally determines the potential for home ignitions during severe wildfires.

Case studies indicate that the most critical area is a zone of "defensible space" within 30 feet of the structure.

Maintaining a **lean, clean and green*** landscape within 30 feet of a structure can make a significant difference in whether it survives a wildfire. The important thing is that action must be taken before wildfire threatens.

* **Lean-** small amounts of flammable vegetation
* **Clean-** no accumulations of dead vegetation
* **Green-** plants are healthy and green; lawn is well irrigated

Reducing fuel within the defensible space means creating a landscape that breaks up the continuity of brush and other vegetation that could bring wildfire in contact with any flammable portion of the structure.

This may involve:

eliminating any flammable vegetation in contact with the structure

thinning out trees and shrubs so there is 10 to15 feet between the tree crowns

pruning tree limbs to a height of 6 to10 feet

replacing highly-flammable landscape material with plant materials having a higher water content

replacing flammable mulch adjacent the structure with gravel or rock

eliminating "ladder fuels" near the structure that might carry a surface fire to the roof or eaves

Fire is a natural part of our Florida ecosystems. It is not a matter of if we are going to have wildfires, but when will we have wildfires and at what intensity. Homeowners must assume a major role in wildfire protection by taking action to reduce the ignitability of their homes before the threat of a wildfire.

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R5298

Date Submitted	7/18/2012	**Section**	R902	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5298-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

ICC Residential Code exemptions are not in compliance with UL Certifications found for copper roofing panels that require fire barrier for Class A Rating.
Florida Forest Service Web Page for a Fire Wise home (attached)
“Cohen has found that most wildland/urban interface homes are lost because of ignitions associated with the two most vulnerable parts of a home:

1. the roof
2. the area immediately surrounding the structure “

R902.1 Roofing covering materials.
Roofs shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a lot line. Classes A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

~~1. Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.~~

~~2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.~~

~~3. Class A roof assemblies include minimum 16 oz/ft^2 copper sheets installed over combustible decks.~~

Brick, masonry, slate, clay or concrete roof tile; ferrous and copper shingles and shakes; and exposed concrete roof deck are considered to meet Class A roof covering provisions without testing. Metal sheets and shingles are considered to meet Class B roof covering provisions without testing.

R902.2 Fire-retardant-treated shingles and shakes.
Fire-retardant-treated wood shakes and shingles shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall also be labeled to identify the classification of the material in accordance with the testing required in Section R902.1, the treating company and the quality control agency.

Adam H. Putnam, Commissioner - James R. Karels, Director

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Florida Forest Service HOME > Wildland Fire > Fire Prevention > Firewise Communities >

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Flames from slow-moving, low-intensity surface fires contacting flammable portions of the structure.

This means that the homeowner can play a significant role in reducing home losses from wildfires by reducing fuels and through careful landscaping in what Cohen calls the "home ignition zone', an area that extends outward from the home 100 - 200 feet in all directions. Research has shown that the home ignition zone principally determines the potential for home ignitions during severe wildfires.

Case studies indicate that the most critical area is a zone of "defensible space" within 30 feet of the structure.

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This may involve:

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R5474

Date Submitted	7/21/2012	**Section**	R903.2.2 Crickets and saddles.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5474-G2

Proponent	Mark Zehnal	**Submitted**	12/7/2012	**Attachments**	Yes

Comment:

Section R903 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section “R1003.20 Chimney crickets”. Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

2nd Comment Period 10/31/2012 - 12/14/2012

R5474-G3

Proponent	Dwight Wilkes	**Submitted**	12/13/2012	**Attachments**	No

Comment:

This Modification weakens the 2012 ICC Base Codes. This Modification has not been adequately demonstrated by the Proponent to represent a Florida Specific Need.

There has been no evidence presented denying the proven effectiveness of flashing saddles designed and provided by the unit skylight manufacturer as a matched set, and no recognition of skylights that carry warranties against leakage. For products qualifying for this exception requires the installer to attach a cricket or saddle on unit skylights that may damage the skylight's own matched flashing/drainage system and risks unintended consequences.

This Modification is not part of any Proposal submitted during the 2015 IBC code development process. This code language addressing Unit Skylights is currently in the 2012 Base Code and received support from the National Roofing Contractors Association during the 2012 IBC and 2012 IRC Code Hearings.

The proponent also states that this modification "Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities"; however this does discriminate against manufacturers of unit skylights.

Therefore, AAMA requests restoration of the Exception language, for consistency with the Base Codes.

1st Comment Period History 08/09/2012 - 09/23/2012

R5474-G1

Proponent	Roger LeBrun	**Submitted**	9/20/2012	**Attachments**	No

Comment:

This modification is not justified as a Florida-specific need. Also, there has been no evidence presented denying the proven effectiveness of flashing saddles designed and provided by the skylight manufacturer as a matched set, and no recognition of skylights that carry warranties against leakage.
The proposal should be disapproved. Also affects R5260 and R5347.

R903.2.2 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~**Exception:** Unit skylights installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.~~

Code Modification 5474

R902.2.2 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~**Exception:** Unit skylights installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle~~

Section R903 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section “R1003.20 Chimney crickets”. Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

Rain map Reference

National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

1. South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota average 55.77 inches per year (18 cities)
2. Central Florida Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia average 51.24 inches per year (8 cities).
3. North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee average 51.26 inches per year (10 cities).
4. Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton average 62.22 inches per year (8 cities).

R5476

Date Submitted	7/21/2012	**Section**	R903.4.1	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

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Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

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Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5476-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

Same language as approved in Building mod 5343. This is a life safety issue. As shown in the rainfall information below the possibility of structural failure due to inadequate drainage should be a major concern. Rain map Reference(attached) National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

1. South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota average 55.77 inches per year (18 cities)
2. Central Florida Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia average 51.24 inches per year (8 cities).
3. North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee average 51.26 inches per year (10 cities).
4. Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton average 62.22 inches per year (8 cities).

R903.4.1 ~~**Secondary (emergency overflow) drains or scuppers.**~~ **Overflow drains andscuppers.**
~~Where roof drains are required, secondary emergency overflow roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. Overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches (51 mm) above the low point of the roof, or overflow scuppers having three times the size of the roof drains and having a minimum opening height of 4 inches (102 mm) shall be installed in the adjacent parapet walls with the inlet flow located 2 inches (51 mm) above the low point of the roof served. The installation and sizing of overflow drains, leaders and conductors shall comply with Sections 1106 and 1108 as applicable of the International Plumbing Code.~~ When other means of drainage of overflow water is not provided, overflow scuppers shall be placed in walls or parapets not less than 2 inches (51 mm) nor more than 4 inches (102 mm) above the finished roof covering and shall be located as close as practical to required vertical leaders or downspouts or wall and parapet scuppers. An overflow scupper shall be sized in accordance with the Florida Building Code, Plumbing.

Overflow drains shall discharge to an approved location and shall not be connected to roof drain lines.

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National Climatic Data Center.

You can jump to separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual precipitation

Days	Place	Inches	Millimetres
91	Arcadia	52.2	1327
106	Avon Park	50.8	1290
128	Big Cypress National Preserve	58.2	1479
108	Bradenton	56.2	1427
132	Everglades Park, Royal Palm	55.0	1396
145	Ft. Lauderdale	66.5	1690
111	Ft. Myers	55.9	1421
124	Ft. Pierce	53.8	1368
138	Hialeah	70.4	1788
106	Key West	39.8	1012
135	Miami	61.9	1572
120	Miami Beach	51.7	1314
129	Naples	55.6	1413
–	Pompano Beach	60.0	1524
97	Tavernier (Key Largo)	46.0	1167
102	Venice	50.5	1282

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130	Vero Beach	56.9	1444
136	West Palm Beach	62.3	1583

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Total average annual rainfall

Days	Place	Inches	Millimetres
104	Bartow	52.1	1323
115	Daytona Beach	49.6	1260
115	Lakeland	54.8	1392
116	Melbourne	52.0	1321
117	Orlando	50.7	1289
119	Plant City	53.6	1360
97	St. Petersburg	50.8	1291
105	Tampa	46.3	1176

North Florida

North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Average amount of rain in a year

Days	Place	Inches	Millimetres
114	Gainesville	51.1	1297
101	Glen St. Mary	51.2	1299
114	Jacksonville	52.4	1331
113	Jacksonville Beach	50.0	1269

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98	Jasper	51.5	1307
124	Lake City	52.6	1337
84	Live Oak	51.5	1309
98	Madison	52.5	1334
117	Ocala	50.8	1290
113	St. Augustine	49.0	1245

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Yearly average rainfall

Days	Place	Inches	Millimetres
93	Apalachicola	57.7	1466
117	Crestview	62.9	1598
111	DeFuniak Springs	63.7	1618
116	Monticello	56.8	1443
114	Niceville	71.0	1803
105	Panama City	61.1	1551
109	Pensacola	65.3	1658
111	Tallahassee	59.2	1504

Reference

National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

R5477

Date Submitted	7/21/2012	**Section**	R903.4.2 One and two family dwel	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria

Rationale

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Requirements

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

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Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5477-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

For safe installation of approved components that are used to divert non-contaminated rain water, stay attached during wind events and effectively direct rain water away from the building that otherwise may cause structural erosion and promote termites infestation. see attached rain records.

R903.4.2 One and two family dwellings, and private garages.

When gutters and leaders are placed on the outside of buildings, the gutters and leaders shall be constructed of metal or approved plastic for outdoor exposure with lapped, soldered or caulked joints and shall be securely fastened to the building with a corrosion resistant fastening device of similar or compatible material to the gutters and downspouts.

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National Climatic Data Center.

You can jump to separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual precipitation

Days	Place	Inches	Millimetres
91	Arcadia	52.2	1327
106	Avon Park	50.8	1290
128	Big Cypress National Preserve	58.2	1479
108	Bradenton	56.2	1427
132	Everglades Park, Royal Palm	55.0	1396
145	Ft. Lauderdale	66.5	1690
111	Ft. Myers	55.9	1421
124	Ft. Pierce	53.8	1368
138	Hialeah	70.4	1788
106	Key West	39.8	1012
135	Miami	61.9	1572
120	Miami Beach	51.7	1314
129	Naples	55.6	1413
–	Pompano Beach	60.0	1524
97	Tavernier (Key Largo)	46.0	1167
102	Venice	50.5	1282

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130	Vero Beach	56.9	1444
136	West Palm Beach	62.3	1583

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Total average annual rainfall

Days	Place	Inches	Millimetres
104	Bartow	52.1	1323
115	Daytona Beach	49.6	1260
115	Lakeland	54.8	1392
116	Melbourne	52.0	1321
117	Orlando	50.7	1289
119	Plant City	53.6	1360
97	St. Petersburg	50.8	1291
105	Tampa	46.3	1176

North Florida

North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Average amount of rain in a year

Days	Place	Inches	Millimetres
114	Gainesville	51.1	1297
101	Glen St. Mary	51.2	1299
114	Jacksonville	52.4	1331
113	Jacksonville Beach	50.0	1269

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98	Jasper	51.5	1307
124	Lake City	52.6	1337
84	Live Oak	51.5	1309
98	Madison	52.5	1334
117	Ocala	50.8	1290
113	St. Augustine	49.0	1245

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Yearly average rainfall

Days	Place	Inches	Millimetres
93	Apalachicola	57.7	1466
117	Crestview	62.9	1598
111	DeFuniak Springs	63.7	1618
116	Monticello	56.8	1443
114	Niceville	71.0	1803
105	Panama City	61.1	1551
109	Pensacola	65.3	1658
111	Tallahassee	59.2	1504

Reference

National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

R5299

Date Submitted	7/18/2012	**Section**	R903	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

R5299-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

The exception in 903.2.2 needs to be removed. Section 1503 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section “R1003.20 Chimney crickets”. Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

2nd Comment Period 10/31/2012 - 12/14/2012

R5299-G2

Proponent Dwight Wilkes **Submitted** 12/13/2012 **Attachments** No

Comment:

This Modification weakens the 2012 ICC Base Codes. This Modification has not been adequately demonstrated by the Proponent to represent a Florida Specific Need.

There has been no evidence presented denying the proven effectiveness of flashing saddles designed and provided by the unit skylight manufacturer as a matched set, and no recognition of skylights that carry warranties against leakage. For products qualifying for this exception requires the installer to attach a cricket or saddle on unit skylights that may damage the skylight's own matched flashing/drainage system and risks unintended consequences.

This Modification is not part of any Proposal submitted during the 2015 IBC code development process. This code language addressing Unit Skylights is currently in the 2012 Base Code and received support from the National Roofing Contractors Association during the 2012 IBC and 2012 IRC Code Hearings.

The proponent also states that this modification "Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities"; however this does discriminate against manufacturers of unit skylights.

Therefore, AAMA requests restoration of the Exception language, for consistency with the Base Codes.

SECTION R903 WEATHER PROTECTION

R903.1 General.
Roof decks shall be covered with approved roof coverings secured to the building or structure in accordance with the provisions of this chapter. Roof assemblies shall be designed and installed in accordance with this code and the approved manufacturer's installation instructions such that the roof assembly shall serve to protect the building or structure.

R903.2 Flashing.
Flashings shall be installed in a manner that prevents moisture from entering the wall and roof through joints in copings, through moisture permeable materials and at intersections with parapet walls and other penetrations through the roof plane.

R903.2.1 Locations.
Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings~~. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall.~~ Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than ~~0.019 inch (0.5 mm) (No. 26 galvanized sheet)~~ provided in Table R903.2.1.

Exception: Flashing is not required at hip and ridge junctions.

TABLE R903.2.1 METAL FLASHING MATERIAL

MATERIAL	GAGE MINIMUM THICKNESS (INCHES)	GAGE	WEIGHT (lbs per sq ft)
Copper	0.024	1 (16 oz)	
Aluminum	0.024		
Stainless steel	28		
Galvanized steel	0.0179	26 (zinc coated G90)	26 (zinc coated G90)
Aluminum zinc coated steel	0.0179	26 (AZ50 alum zinc)	26 (AZ50 alum zinc)
Zinc alloy	0.027		
Lead	2.5 (40 oz)		
Painted terne	1.25 (20 oz)		

R903.2.2 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~Exception: Unit skylights installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.~~

R903.2.3 Membrane flashings.
All membrane flashing shall be installed according to the roof assembly manufacturer's published literature.

R903.3 Coping.
Parapet walls shall be properly coped with noncombustible, weatherproof materials of a width no less than the thickness of the parapet wall.

R903.4 Roof drainage.
Unless roofs are sloped to drain over roof edges, roof drains shall be installed at each low point of the roof. Where required for roof drainage, scuppers shall be placed level with the roof surface in a wall or parapet. The scupper shall be located as determined by the roof slope and contributing roof area.

R903.4.1 ~~Secondary (emergency overflow) drains or scuppers.~~ Overflow drains and scuppers.
~~Where roof drains are required, secondary emergency overflow roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. Overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches (51 mm) above the low point of the roof, or overflow scuppers having three times the size of the roof drains and having a minimum opening height of 4 inches (102 mm) shall be installed in the adjacent parapet walls with the inlet flow located 2 inches (51 mm) above the low point of the roof served. The installation and sizing of overflow drains, leaders and conductors shall comply with Sections 1106 and 1108 as applicable of the International Plumbing Code.~~ When other means of drainage of overflow water is not provided, overflow scuppers shall be placed in walls or parapets not less than 2 inches (51 mm) nor more than 4 inches (102 mm) above the finished roof covering and shall be located as close as practical to required vertical leaders or downspouts or wall and parapet scuppers. An overflow scupper shall be sized in accordance with the Florida Building Code, Plumbing.

Overflow drains shall discharge to an approved location and shall not be connected to roof drain lines.

R903.4.2 One and two family dwellings, and private garages.
When gutters and leaders are placed on the outside of buildings, the gutters and leaders shall be constructed of metal or approved plastic for outdoor exposure with lapped, soldered or caulked joints and shall be securely fastened to the building with a corrosion resistant fastening device of similar or compatible material to the gutters and downspouts.

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Code Modification 5474

R902.2.2 Crickets and saddles.
A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

~~**Exception:** Unit skylights installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle~~

Section R903 Weather Protection requires that roof decks shall be covered with approved roof coverings. Keeping the exception would mean that the Florida Building Code provides preferential treatment for skylight units and discriminates against chimneys, exhaust fans, roof vents. The exception invalidates good roofing practice as required in the residential code section “R1003.20 Chimney crickets”. Removing the exception supports the protection of the roofing system by promoting positive drainage of water and accumulated debris around the projection and further protects from premature failure of the roofing system from accumulating moisture laden debris insuring that the roof covering shall serve to protect the building or structure. Additional debris is possibly accumulated due to local or State protection for foliage and tree canopy.

Rain map Reference

National Climatic Data Center. NOAA's 1981-2010 Climate Normals.

1. South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota average 55.77 inches per year (18 cities)
2. Central Florida Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia average 51.24 inches per year (8 cities).
3. North Florida rainfall amounts are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee average 51.26 inches per year (10 cities).
4. Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton average 62.22 inches per year (8 cities).

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The exception references section 2405.5 (see below) which requires that “Unit skylights shall be tested and labeled as complying with AAMA/WDMA/CSA 101/ I.S.2/A440.”(see below). Compliance with AAMA/WDMA/CSA 101/ I.S.2/A440 does not include roofing system protection or integrity.

2405.5 Unit skylights.

Unit skylights shall be tested and labeled as complying with AAMA/WDMA/CSA 101/ I.S.2/A440. The label shall state the name of the manufacturer, the approved labeling agency, the product designation and the performance grade rating as specified in AAMA/WDMA/CSA 101/I.S.2/A440. If the product manufacturer has chosen to have the performance grade of the skylight rated separately for positive and negative design pressure, then the label shall state both performance grade ratings as specified in AAMA/WDMA/CSA 101/I.S.2/A440 and the skylight shall comply with Section 2405.5.2. If the skylight is not rated separately for positive and negative pressure, then the performance grade rating shown on the label shall be the performance grade rating determined in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 for both positive and negative design pressure and the skylight shall conform to Section 2405.5.1.

AAMA/WDMA/CSA 101/I.S.2/A440-08 - NAFS - North American Fenestration Standard / Specification for Windows, Doors, and Skylights

1. Scope

1.1 General This fenestration Standard/Specification applies to both operating and fixed, prime and replacement windows, doors, TDDs, and unit skylights installed into exterior building envelopes. This fenestration Standard/Specification establishes material-neutral, minimum, and optional performance requirements for windows, doors, TDDs, and unit skylights. This Standard/Specification concerns itself with the determination of performance grade (PG), design pressure (DP), and related performance ratings for windows, doors, TDDs, and unit skylights.

R5306

Date Submitted	7/18/2012	**Section**	R905.10 Metal roof panels.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5306-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.10 Metal roof panels.
The installation of metal roof panels shall comply with the provisions of this section.

R905.10.1 Deck requirements.
Metal roof panel roof coverings shall be applied to solid or spaced sheathing, except where the roof covering is specifically designed to be applied to spaced supports.

R905.10.2 Slope.
Minimum slopes for metal roof panels shall comply with the following:

1. The minimum slope for lapped, nonsoldered-seam metal roofs without applied lap sealant shall be three units vertical in 12 units horizontal (25-percent slope).

2. The minimum slope for lapped, nonsoldered-seam metal roofs with applied lap sealant shall be one-half vertical unit in 12 units horizontal (4-percent slope). Lap sealants shall be applied in accordance with the approved manufacturer's installation instructions.

3. The minimum slope for standing-seam roof systems shall be one-quarter unit vertical in 12 units horizontal (2-percent slope).

R905.10.2.1 Underlayment
Underlayment shall be installed as per manufacturer's installation guidelines

R905.10.3 Material standards.
Metal-sheet roof covering systems that incorporate supporting structural members shall be designed in accordance with the ~~International Building Code~~ Florida Building Code, Building. Metal-sheet roof coverings installed over structural decking shall comply with Table R905.~~10.3(1)~~ 4.4. The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table R905.~~10.3(2)~~ 4.4.

TABLE R905.10.3(1) METAL ROOF COVERING STANDARDS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Galvanized steel~~	~~ASTM A 653 G90 Zinc coated~~
~~Stainless steel~~	~~ASTM A 240, 300 Series alloys~~
~~Steel~~	~~ASTM A 924~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz/sq ft and 12 oz/sq ft high-yield copper for metal-sheet roof-covering systems; 12 oz/sq ft for preformed metal shingle systems.~~
~~Hard lead~~	~~2 lb/sq ft~~
~~Soft lead~~	~~3 lb/sq ft~~
~~Aluminum~~	~~ASTM B 209, 0.024 minimum thickness for roll-formed panels and 0.019-inch minimum thickness for pressformed shingles.~~

~~Terne (tin) and terne-coated stainless~~	~~Terne coating of 40 lb per double base box, field painted where applicable in accordance with manufacturer's installation instructions.~~
~~Zinc~~	~~0.027 inch minimum thickness: 99.995% electrolytic high-grade zinc with alloy additives of copper (0.08 - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

~~For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.214 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.~~ Reserved.

TABLE R905.10.3(2) MINIMUM CORROSION RESISTANCE

~~55% aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~5% aluminum alloy-coated steel~~	~~ASTM A 875 GF60~~
~~Aluminum-coated steel~~	~~ASTM A 463 T2 65~~
~~Galvanized steel~~	~~ASTM A 653 G-90~~
~~Prepainted steel~~	~~ASTM A 755[a]~~

~~a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM A 875, ASTM A 463, or ASTM A 653.~~ Reserved.

R905.10.4 Attachment.
Metal roof panels shall be secured to the supports in accordance with this chapter and the manufacturer's installation instructions. Metal roofing fastened directly to steel framing shall be attached by approved fasteners. ~~In the absence of manufacturer's installation instructions, t~~The following fasteners shall be used:

1. Galvanized fasteners shall be used for galvanized roofs.

2. Hard ~~C~~ copper ~~,brass, bronze,~~ or copper alloy or 300 series stainless steel fasteners shall be used for copper roofs.

3. Stainless steel fasteners are acceptable for all types of metal roofs.

4. Aluminum-zinc coated fasteners are acceptable for aluminum-zinc coated roofs.

R905.10.5 ~~Underlayment~~ Application.
~~Underlayment shall be installed in accordance with the manufacturer's installation instructions~~ Metal roof panels shall be installed in accordance with this chapter and the manufacturer's installation instructions. The installation's instruction shall state the allowable uplift resistance for the attachment system. The installation of metal roof panels shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R905.10.5.1 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted~~.
Reserved. -

R905.10 Metal roof panels.
The installation of metal roof panels shall comply with the provisions of this section.

R905.10.1 Deck requirements.
Metal roof panel roof coverings shall be applied to solid or spaced sheathing, except where the roof covering is specifically designed to be applied to spaced supports.

R905.10.2 Slope.
Minimum slopes for metal roof panels shall comply with the following:

1. The minimum slope for lapped, nonsoldered-seam metal roofs without applied lap sealant shall be three units vertical in 12 units horizontal (25-percent slope).

2. The minimum slope for lapped, nonsoldered-seam metal roofs with applied lap sealant shall be one-half vertical unit in 12 units horizontal (4-percent slope). Lap sealants shall be applied in accordance with the *approved* manufacturer's installation instructions.

3. The minimum slope for standing-seam roof systems shall be one-quarter unit vertical in 12 units horizontal (2-percent slope).

R905.10.3 Material standards.
Metal-sheet roof covering systems that incorporate supporting structural members shall be designed in accordance with the ~~*International Building Code*~~ Florida Building Code, Building. Metal-sheet roof coverings installed over structural decking shall comply with Table R905.~~10.3(1)~~ 4.4. The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table R905.~~10.3(2)~~ 4.4.

TABLE R905.10.3(1) METAL ROOF COVERING STANDARDS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Galvanized steel~~	~~ASTM A 653 G90 Zinc coated~~
~~Stainless steel~~	~~ASTM A 240, 300 Series alloys~~
~~Steel~~	~~ASTM A 924~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz/sq ft and 12 oz/sq ft high-yield copper for metal-sheet roof-covering systems; 12 oz/sq ft for preformed metal shingle systems.~~
~~Hard lead~~	~~2 lb/sq ft~~
~~Soft lead~~	~~3 lb/sq ft~~
~~Aluminum~~	~~ASTM B 209, 0.024 minimum thickness for roll-formed panels and 0.019-inch minimum thickness for pressformed shingles.~~
~~Terne (tin) and terne-coated stainless~~	~~Terne coating of 40 lb per double base box, field painted where applicable in accordance with manufacturer's installation instructions.~~
~~Zinc~~	~~0.027 inch minimum thickness: 99.995% electrolytic high-grade zinc with alloy additives of copper (0.08 - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

~~For SI: 1 ounce per square foot = 0.305 kg/m², 1 pound per square foot = 4.214 kg/m², 1 inch = 25.4 mm, 1 pound = 0.454 kg.~~ **Reserved**.

TABLE R905.10.3(2) MINIMUM CORROSION RESISTANCE

~~55% aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~5% aluminum alloy-coated steel~~	~~ASTM A 875 GF60~~
~~Aluminum-coated steel~~	~~ASTM A 463 T2 65~~
~~Galvanized steel~~	~~ASTM A 653 G-90~~
~~Prepainted steel~~	~~ASTM A 755[a]~~

~~a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM A 875, ASTM A 463, or ASTM A 653.~~ **Reserved**.

R905.10.4 Attachment.
Metal roof panels shall be secured to the supports in accordance with this chapter and the manufacturer's installation instructions. Metal roofing fastened directly to steel framing shall be attached by approved fasteners. ~~In the absence of manufacturer's installation instructions, t~~ The following fasteners shall be used:

1. Galvanized fasteners shall be used for galvanized roofs.

2. Hard ~~C~~ copper ~~, brass, bronze,~~ or copper alloy or 300 series stainless steel fasteners shall be used for copper roofs.

3. Stainless steel fasteners are acceptable for all types of metal roofs.

4. Aluminum-zinc coated fasteners are acceptable for aluminum-zinc coated roofs.

R905.10.5 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

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R905.10.5.1 Underlayment and high winds.

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ **Reserved**.

R905.10.5.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R5541

Date Submitted	7/21/2012	**Section**	R905.10.2.1 Underlayment	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5541-G1

Proponent	Mark Zehnal	Submitted	12/7/2012	Attachments	No

Comment:

This Code Modification can be withdrawn

R905.10.2.1 Underlayment

Underlayment shall be installed as per manufacturer's installation guidelines.

R5542

Date Submitted	7/21/2012	**Section**	R905.10.3 Material standards.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5542-G1

Proponent	Mark Zehnal	**Submitted**	12/7/2012	**Attachments**	No

Comment:

This table in R905.4.4 has an additional column to separate standards from material making less complicated to read than the ICC version.

R905.10.3 Material standards.

Metal-sheet roof covering systems that incorporate supporting structural members shall be designed in accordance with the ~~International Building Code~~ Florida Building Code, Building. Metal-sheet roof coverings installed over structural decking shall comply with Table R905.~~10.3(1)~~ 4.4. The materials used for metal-sheet roof coverings shall be naturally corrosion resistant or provided with corrosion resistance in accordance with the standards and minimum thicknesses shown in Table R905.~~10.3(2)~~ 4.4.

TABLE R905.10.3(1) METAL ROOF COVERING STANDARDS

~~ROOF COVERING TYPE~~	~~STANDARD APPLICATION RATE/THICKNESS~~
~~Galvanized steel~~	~~ASTM A 653 G90 Zinc coated~~
~~Stainless steel~~	~~ASTM A 240, 300 Series alloys~~
~~Steel~~	~~ASTM A 924~~
~~Lead-coated copper~~	~~ASTM B 101~~
~~Cold-rolled copper~~	~~ASTM B 370 minimum 16 oz/sq ft and 12 oz/sq ft high-yield copper for metal-sheet roof-covering systems; 12 oz/sq ft for preformed metal shingle systems.~~
~~Hard lead~~	~~2 lb/sq ft~~
~~Soft lead~~	~~3 lb/sq ft~~
~~Aluminum~~	~~ASTM B 209, 0.024 minimum thickness for roll-formed panels and 0.019-inch minimum thickness for pressformed shingles.~~
~~Terne (tin) and terne-coated stainless~~	~~Terne coating of 40 lb per double base box, field painted where applicable in accordance with manufacturer's installation instructions.~~
~~Zinc~~	~~0.027 inch minimum thickness: 99.995% electrolytic high-grade zinc with alloy additives of copper (0.08 - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%).~~

~~For SI: 1 ounce per square foot = 0.305 kg/m^2, 1 pound per square foot = 4.214 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.~~ **Reserved**.

TABLE R905.10.3(2) MINIMUM CORROSION RESISTANCE

~~55% aluminum-zinc alloy coated steel~~	~~ASTM A 792 AZ 50~~
~~5% aluminum alloy-coated steel~~	~~ASTM A 875 GF60~~
~~Aluminum-coated steel~~	~~ASTM A 463 T2 65~~
~~Galvanized steel~~	~~ASTM A 653 G-90~~
~~Prepainted steel~~	~~ASTM A 755[a]~~

~~a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM~~

~~A 875, ASTM A 463, or ASTM A 653.~~ **Reserved**.

R5487

Date Submitted	7/21/2012	**Section**	R905.2.6.1 Wind Resistance of As	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5487-G1

Proponent	Mark Zehnal	Submitted	12/7/2012	Attachments	No

Comment:

Remove Classification A from TABLE R905.2.6.1 due to none compliance with minimum 1609 Wind Maps
Designation: D3161/D3161M – 12
4.1 Shingles are of three classes:
4.1.1 Class A—Pass at a test velocity of 97 km/h [60 mph].
4.1.2 Class D—Pass at a test velocity of 145 km/h [90 mph].
4.1.3 Class F—Pass at a test velocity of 177 km/h [110 mph].

R905.2.6.1 Wind Resistance of Asphalt Shingles.
Asphalt Shingles shall be classified in accordance with ASTM D 3161, TAS 107 or ASTM D 7158 to resist the basic wind speed per Figure R301.2(4). Shingles classified as ASTM D 3161 Class D or classified as ASTM D 7158 Class G are acceptable for use in the 100-mph wind zone. Shingles classified as ASTM D 3161 Class F, TAS107 or ASTM D 7158 Class H are acceptable for use in all wind zones. Asphalt shingle wrappers shall indicate compliance with one of the required classifications as shown in Table R905.2.6.1.

TABLE R905.2.6.1 WIND RESISTANCE OF ASPHALT SHINGLES

Classification of Asphalt Shingles			
Maximum Basic Wind Speed, V_{ult}, From Figure R301.2(4)	**V_{asd} as determined in accordance with Section R301.2.1.3**	**ASTM D 7158**	**ASTM D 3161**
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

R5490

Date Submitted	7/21/2012	**Section**	R905.2.7 Underlayment applicatio	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific slope criteria addressed in DEC Statement DCA08-DEC-331 and removes unnecessary language.

Rationale

To simplify intent and carry forward previous Commission approved DEC Statement DCA08-DEC-331. Remove unnecessary language found in manufacturers specifications. To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5490-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

R905.2.7 Underlayment application.
For roof slopes from two units vertical in 12 units horizontal (17-percent slope), ~~up to~~ and less than four units vertical in 12 units horizontal (33-percent slope), two layers of underlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be ~~two layers~~ applied in the following manner.

1. Apply a 19-inch (483 mm) strip of underlayment felt parallel ~~to~~ with and starting at the eaves~~, fastened sufficiently to hold in place.~~

2. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm)~~, and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

3. End laps shall be offset by 6 feet (1829 mm).

4. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, one layer of underlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be ~~one layer~~ applied in the following manner.

1. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm) ~~fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

2. End laps shall be offset by 6 feet (1829 mm).

3. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

R5304

Date Submitted	7/18/2012	Section	R905.3 Clay and concrete tile.	Proponent	Mark Zehnal
Chapter	9	Affects HVHZ	No	Attachments	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5304-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3 Clay and concrete tile.
The installation of clay and concrete shall ~~comply with the provisions of this section~~ be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.1 Deck requirements.
Concrete and clay tile shall be installed only over solid sheathing ~~or~~, except where the roof covering is specifically designed and tested in accordance with Chapter 16, Florida Building Code, Building to be applied over spaced structural sheathing boards.

R905.3.2 Deck slope.
Clay and concrete roof tile shall be installed on roof slopes ~~of two and one-half units vertical in 12 units horizontal (2^1/2:12) or greater. For roof slopes from two and one-half units vertical in 12 units horizontal (2^1/2:12) to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.3.3.~~ in accordance with the recommendations of FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3 Underlayment.
~~Unless otherwise noted, r~~ Required underlayment shall conform ~~to~~ with ASTM D 226, Type II; ASTM D 2626, Type ~~I~~ II; ASTM D 1970 or ASTM D 6380, Class M mineral surfaced roll roofing and shall be installed in accordance with FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3.1 ~~Low s-~~Slope and underlayment requirements ~~roofs~~.
~~For roof slopes from two and one-half units vertical in 12 units horizontal (2^1/2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~ Refer to FRSA/TRI 07320 where the V_{asd} 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.

R905.3.3.2 High slope roofs.
~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm), fastened sufficiently in place.~~ Reserved

R905.3.3.3 Underlayment and high winds.
~~Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

Exception: ~~As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.3.4 Clay tile.
Clay roof tile shall comply with ASTM C 1167.

R905.3.5 Concrete tile.
Concrete roof tile shall comply with ASTM C 1492.

R905.3.6 Fasteners.
Nails shall be corrosion-resistant and not less than 11 gage, $^5/_{16}$-inch (7.95 mm) head, and of sufficient length to penetrate the deck a minimum of $^3/_4$ inch (19.1 mm) or through the thickness of the deck, whichever is less, or in accordance with the FRSA/TRI 07320 where the V_{asd} 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). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

R905.3.7 Application.
Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, or recommendations of the FRSA/TRI 07320 based on the following:

Attachment. Clay and concrete roof tiles shall be fastened in accordance with FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3.

~~based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

~~Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m^2) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds 100 miles per~~

~~hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above grade. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.~~

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

~~SHEATHING~~	~~ROOF SLOPE~~	~~NUMBER OF FASTENERS~~
~~Solid without battens~~	~~All~~	~~One per tile~~
~~Spaced or solid with battens and slope < 5:12~~	~~Fasteners not required~~	—
~~Spaced sheathing without battens~~	~~5:12 ≤ slope < 12:12~~	~~One per tile/every other row~~
	~~12:12 ≤ slope < 24:12~~	~~One per tile~~

Reserved.

R905.3.7.1 Hip and ridge tiles.
Hip and ridge tiles shall be installed in accordance with FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3.

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 ~~and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and greater, valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.~~ instructions or recommendations of the FRSA/TRI 07320 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

Text of Modification:

SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.3 Clay and concrete tile.

The installation of clay and concrete shall ~~comply with the provisions of this section~~ be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Editionwhere the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.1 Deck requirements.

Concrete and clay tile shall be installed only over solid sheathing ~~or~~, except where the roof covering is specifically designed and tested in accordance with Chapter 16, *Florida Building Code, Building* to be applied over spaced structural sheathing boards.

R905.3.2 Deck slope.

Clay and concrete roof tile shall be installed on roof slopes ~~of two and one-half units vertical in 12 units horizontal ($2\frac{1}{2}$:12) or greater. For roof slopes from two and one-half units vertical in 12 units horizontal ($2\frac{1}{2}$:12) to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.3.3.~~ in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3 Underlayment.

~~Unless otherwise noted, r~~ Required underlayment shall conform ~~to~~ with ASTM D 226, Type II; ASTM D 2626, Type ~~I~~ II; ASTM D 1970 or ASTM D 6380, Class M mineral surfaced roll roofing and shall be installed in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3.1 ~~Low~~ ~~s~~ Slope and underlayment requirements ~~roofs~~.

~~For roof slopes from two and one-half units vertical in 12 units horizontal ($2\frac{1}{2}$:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~ Refer to FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} 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.

R905.3.3.2 High slope roofs.
~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm), fastened sufficiently in place.~~ Reserved

R905.3.3.3 Underlayment and high winds.
~~Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$-inch (19 mm) into the roof sheathing.~~
Exception: ~~As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.3.4 Clay tile.
Clay roof tile shall comply with ASTM C 1167.

R905.3.5 Concrete tile.
Concrete roof tile shall comply with ASTM C 1492.

R905.3.6 Fasteners.
Nails shall be corrosion-resistant and not less than 11 gage, $^{5}/_{16}$-inch (7.95 mm) head, and of sufficient length to penetrate the deck a minimum of $^{3}/_{4}$ inch (19.1 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, Fifth Edition where the V_{asd} 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). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

R905.3.7 Application.
Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, or recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition based on the following:

Attachment. Clay and concrete roof tiles shall be fastened in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is

determined in accordance with Section R301.2.1.3.
~~based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

~~Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m²) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds 100 miles per hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above *grade*. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.~~

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

~~**SHEATHING**~~	~~**ROOF SLOPE**~~	~~**NUMBER OF FASTENERS**~~
~~Solid without battens~~	~~All~~	~~One per tile~~
~~Spaced or solid with battens and slope < 5:12~~	~~Fasteners not required~~	—
~~Spaced sheathing without battens~~	~~5:12 ≤ slope < 12:12~~	~~One per tile/every other row~~
	~~12:12 ≤ slope < 24:12~~	~~One per tile~~

Reserved.

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, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3.

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 ~~and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way~~

~~and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and greater, valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.~~ instructions or recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

Summary of Modification: Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale: To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida’s unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

R5602

Date Submitted	7/23/2012	**Section**	R905.3 Clay and concrete tile.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3.2, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5602-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3 Clay and concrete tile.
The installation of clay and concrete shall ~~comply with the provisions of this section~~ be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI ~~07320~~ 04-12where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3 Clay and concrete tile.

The installation of clay and concrete shall ~~comply with the provisions of this section~~ be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R5601

Date Submitted	7/23/2012	**Section**	R905.3.2	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5601-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.2 Deck slope.

Clay and concrete roof tile shall be installed on roof slopes ~~of two and one-half units vertical in 12 units horizontal (2$\frac{1}{2}$:12) or greater. For roof slopes from two and one-half units vertical in 12 units horizontal (2$\frac{1}{2}$:12) to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.3.3.~~ in accordance with the recommendations of FRSA/TRI ~~07320~~ 04-12where the V_{asd} 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 ~~of two and one-half units vertical in 12 units horizontal ($2^1/_2$:12) or greater. For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12) to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.3.3.~~ in accordance with the recommendations of FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R5599

Date Submitted	7/23/2012	**Section**	R905.3.3.1	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.6, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5599-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.3.1 ~~Low~~ ~~s~~ Slope and underlayment requirements ~~roofs~~.

~~For roof slopes from two and one-half units vertical in 12 units horizontal (2 1/2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~ Refer to FRSA/TRI ~~07320~~ 04-12 where the V_{asd} 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.

R905.3.3.1 ~~Low~~ ~~s~~ Slope and underlayment requirements ~~roofs~~.

~~For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~ Refer to FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} 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.

R5499

Date Submitted	7/21/2012	**Section**	R905.3.3.3 Underlayment and hig	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5499-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and updated standards without any new requirements being established.

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

No impact. Current 2010 FBC code language and updated standards without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and updated standards without any new requirements being established.

Requirements

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

Current 2010 FBC code language and updated standards without any new requirements being established.

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

Current 2010 FBC code language and updated standards without any new requirements being established.

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

Does not discriminate. Current 2010 FBC code language and updated standards without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current 2010 FBC code language and updated standards without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.3.3 Underlayment and high winds.

~~Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

Exception: ~~As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.3.3.3 Underlayment and high winds.

~~Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$-inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

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R5600

Date Submitted	7/23/2012	**Section**	R905.3.3	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3.1, R905.3.6, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5600-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.3 Underlayment.

~~Unless otherwise noted, r~~ Required underlayment shall conform ~~to~~ with ASTM D 226, Type II; ASTM D 2626, Type ~~I~~ II; ASTM D 1970 or ASTM D 6380, Class M mineral surfaced roll roofing and shall be installed in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3 Underlayment.
~~Unless otherwise noted, r~~ Required underlayment shall conform ~~to~~ with ASTM D 226, Type II; ASTM D 2626, Type ~~I~~ II; ASTM D 1970 or ASTM D 6380, Class M mineral surfaced roll roofing and shall be installed in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R5598

Date Submitted	7/23/2012	**Section**	R905.3.6	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.3.1, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5598-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.6 Fasteners.

Nails shall be corrosion-resistant and not less than 11 gage, $^5/_{16}$-inch (7.95 mm) head, and of sufficient length to penetrate the deck a minimum of $^3/_4$ inch (19.1 mm) or through the thickness of the deck, whichever is less, or in accordance with the FRSA/TRI ~~07320~~ 04-12 where the V_{asd} 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). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

R905.3.6 Fasteners.

Nails shall be corrosion-resistant and not less than 11 gage, $^5/_{16}$-inch (7.95 mm) head, and of sufficient length to penetrate the deck a minimum of $^3/_4$ inch (19.1 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, Fifth Edition where the V_{asd} 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). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

R5596

Date Submitted	7/23/2012	**Section**	R905.3.7.1	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida’s unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5596-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.7.1 Hip and ridge tiles.

Hip and ridge tiles shall be installed in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3.

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, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3.

R5597

Date Submitted	7/23/2012	**Section**	R905.3.7	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5597-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.3.7 Application.
Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, or recommendations of the FRSA/TRI ~~07320~~ 04-12 based on the following:

Attachment. Clay and concrete roof tiles shall be fastened in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3.
~~based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

~~Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m²) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds 100 miles per hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above grade. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.~~

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

~~SHEATHING~~	~~ROOF SLOPE~~	~~NUMBER OF FASTENERS~~
~~Solid without battens~~	~~All~~	~~One per tile~~
~~Spaced or solid with battens and slope < 5:12~~	~~Fasteners not required~~	—
~~Spaced sheathing without battens~~	~~5:12 = slope < 12:12~~	~~One per tile/every other row~~
	~~12:12 = slope < 24:12~~	~~One per tile~~

Reserved.

R905.3.7 Application.

Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, or recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition based on the following:

Attachment. Clay and concrete roof tiles shall be fastened in accordance with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3.
~~based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

~~Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m^2) require a minimum of one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds 100 miles per hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above *grade*. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.~~

. **TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT**

~~SHEATHING~~	~~ROOF SLOPE~~	~~NUMBER OF FASTENERS~~
~~Solid without battens~~	~~All~~	~~One per tile~~
~~Spaced or solid with battens and slope < 5:12~~	~~Fasteners not required~~	—
~~Spaced sheathing without battens~~	~~5:12 ≤ slope < 12:12~~	~~One per tile/every other row~~
	~~12:12 ≤ slope < 24:12~~	~~One per tile~~

Reserved.

R5595

Date Submitted	7/23/2012	**Section**	R905.3.8	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7, R905.3.7.1

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5595-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events. To provide the correct reference standard that will apply to high wind roof tile installation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

Requirements

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Current 2010 FBC code language compliant with ASCE 7-10 without any new requirements being established.

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

Does not discriminate. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current Commission approved 2010 FBC requirement compliant with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

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 ~~and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and greater, valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.~~ instructions or recommendations of the FRSA/TRI ~~07320~~ 04-12 where the V_{asd} 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 ~~and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and greater, valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.~~ instructions or recommendations of the FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Fifth Edition where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R5603

Date Submitted	7/23/2012	**Section**	R905.3	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

R905.3, R905.3.2, R905.3.3, R905.3.3.1, R905.3.6, R905.3.7, R905.3.7.1, R905.3.8

Summary of Modification

Provides current Florida-specific criteria including update to previous Commission approved code referenced standard.

Rationale

To carry forward previous Commission approved code language and tables including the updated version of referenced standard designed in compliance with ASCE 7-10 providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

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

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language and tables including updated code standard designed in compliance with ASCE 7-10.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language including updated code referenced standard designed in compliance with ASCE 7-10.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5603-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

SECTION R905 REQUIREMENTS FOR ROOF COVERINGS

R905.3 Clay and concrete tile.
The installation of clay and concrete shall ~~comply with the provisions of this section~~ be in accordance with the manufacturer's installation instructions, or recommendations of FRSA/TRI ~~07320~~ 04-12where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.1 Deck requirements.
Concrete and clay tile shall be installed only over solid sheathing ~~or~~, except where the roof covering is specifically designed and tested in accordance with Chapter 16, Florida Building Code, Building to be applied over spaced structural sheathing boards.

R905.3.2 Deck slope.
Clay and concrete roof tile shall be installed on roof slopes ~~of two and one-half units vertical in 12 units horizontal ($2^1/_2$:12) or greater. For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12) to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.3.3.~~ in accordance with the recommendations of FRSA/TRI ~~07320~~ 04-12where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3 Underlayment.
~~Unless otherwise noted, r~~ Required underlayment shall conform ~~to~~ with ASTM D 226, Type II; ASTM D 2626, Type ~~I~~ II; ASTM D 1970 or ASTM D 6380, Class M mineral surfaced roll roofing and shall be installed in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R905.3.3.1 ~~Low s~~ Slope and underlayment requirements ~~roofs~~.
~~For roof slopes from two and one-half units vertical in 12 units horizontal ($2^1/_2$:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be a minimum of two layers underlayment applied as follows:~~

~~1. Starting at the eave, a 19-inch (483 mm) strip of underlayment shall be applied parallel with the eave and fastened sufficiently in place.~~

~~2. Starting at the eave, 36-inch-wide (914 mm) strips of underlayment felt shall be applied, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently in place.~~ Refer to FRSA/TRI ~~07320~~ 04-12 where the V_{asd} 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.

R905.3.3.2 High slope roofs.
~~For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be a minimum of one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches (51 mm), fastened sufficiently in place.~~ Reserved

R905.3.3.3 Underlayment and high winds.
~~Underlayment applied in areas subject to high wind [above 110 miles per hour (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's~~

~~installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4-inch (19 mm) into the roof sheathing.~~

Exception: ~~As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.3.4 Clay tile.
Clay roof tile shall comply with ASTM C 1167.

R905.3.5 Concrete tile.
Concrete roof tile shall comply with ASTM C 1492.

R905.3.6 Fasteners.
Nails shall be corrosion-resistant and not less than 11 gage, 5/16-inch (7.95 mm) head, and of sufficient length to penetrate the deck a minimum of 3/4 inch (19.1 mm) or through the thickness of the deck, whichever is less, or in accordance with the FRSA/TRI ~~07320~~ 04-12 where the V_{asd} 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). ~~Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.~~

R905.3.7 Application.
Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, or recommendations of the FRSA/TRI ~~07320~~ 04-12 based on the following:

Attachment. Clay and concrete roof tiles shall be fastened in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3.
~~based on the following:~~

~~1. Climatic conditions.~~

~~2. Roof slope.~~

~~3. Underlayment system.~~

~~4. Type of tile being installed.~~

~~Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m²) require a minimum of one fastener per tile~~

~~regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the wind speed exceeds 100 miles per hour (45 m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above grade. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.~~

TABLE R905.3.7 CLAY AND CONCRETE TILE ATTACHMENT

~~SHEATHING~~	~~ROOF SLOPE~~	~~NUMBER OF FASTENERS~~
~~Solid without battens~~	~~All~~	~~One per tile~~
~~Spaced or solid with battens and slope < 5:12~~	~~Fasteners not required~~	—
~~Spaced sheathing without battens~~	~~5:12 ≤ slope < 12:12~~	~~One per tile/every other row~~
	~~12:12 ≤ slope < 24:12~~	~~One per tile~~

Reserved.

R905.3.7.1 Hip and ridge tiles.
Hip and ridge tiles shall be installed in accordance with FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3.

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 ~~and, where of metal, shall not be less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and greater, valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of Type I underlayment running the full length of the valley, in addition to other required underlayment. In areas where the average daily temperature in January is 25°F (-4°C) or less, metal valley flashing underlayment shall be solid-cemented to the roofing underlayment for slopes less than seven units vertical in 12 units horizontal (58-percent slope) or be of self-adhering polymer modified bitumen sheet.~~ instructions or recommendations of the FRSA/TRI ~~07320~~ 04-12 where the V_{asd} is determined in accordance with Section R301.2.1.3 or the recommendations of RAS 118, 119 or 120.

R5307

Date Submitted	7/18/2012	**Section**	R905.4 Metal roof shingles.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5307-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5307-G1

Proponent	Andy Williams	Submitted	12/13/2012	Attachments	No

Comment:

My recommendation is that the minimum thicknesses for aluminum-zinc coated steel and galvanized steel be deleted using the following rationale.

International Building Code, 2012 edition, Table 1507.4.3(1) defines metal roof coverings and does not provide a minimum thickness for either aluminum-zinc coated steel or galvanized steel. A similar code change proposal was submitted during the 2012/2013 ICC Code Development Cycle (Group A) to include a minimum thickness for these two metal roof coverings. The International Building Code Structural Committee recommended disapproval of this proposal (S39-12). The committee provided the following reason for disapproval: “The committee believes that the roof covering manufacturer should cover the minimum thickness required for metal roof coverings and the proposed values are not consistent with the source document mentioned in the reason (Table 6-1 of the SMACNA Architectural Sheet Metal Manual).”

The Florida Building Code, 2010 edition, Section 1504.3.2 Metal Panel Roof Systems requires that these metal roof coverings be tested to determine their structural capacity. This testing insures that the metal roof coverings are adequate for their intended use. Inclusion of a prescriptive requirement such as minimum thickness is unnecessary and may also limit the ability of the metal roof covering manufacturer to design economical metal roof coverings. The Florida Building Code should only deviate from the International Building Code where there is a Florida specific need. It does not seem reasonable that the minimum thickness for aluminum-zinc coated steel and galvanized steel metal roof coverings qualifies as a Florida specific need.

R905.4 Metal roof shingles.
The installation of metal roof shingles shall comply with the provisions of this section.

R905.4.1 Deck requirements.
Metal roof shingles shall be applied to a solid or closely fitted deck, except where the roof covering is specifically designed to be applied to spaced sheathing.

R905.4.2 Deck slope.
Metal roof shingles shall not be installed on roof slopes below three units vertical in 12 units horizontal (25-percent slope).

R905.4.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 4869, Type I or Type II or ASTM D 1970. Underlayment shall be installed in accordance with the manufacturer's installation instructions

R905.4.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.4.3.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32 gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved.

R905.4.4 Material standards.

Metal roof shingle roof coverings shall comply with Table ~~R905.10.3(1)~~ R905.4.4. The materials used for metal roof shingle roof coverings shall be naturally corrosion resistant or ~~be made~~ provided with corrosion ~~resistant~~ resistance in accordance with the standards and minimum thicknesses specified in the standards listed in Table R905.4.4.

TABLE 905.4.4 METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024-inch minimum thickness for roll-formed panels and 0.019-inch minimum thickness for press-formed shingles
Aluminum-zinc coated steel	ASTM A 792	0.013-inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013-inch minimum thickness, G-90 zinc-coated[a]
Hard lead	2 lbs./sq. ft.	
Lead-coated copper	ASTM B 101	
Prepainted steel	ASTM A 755	0.0142 inch minimum thickness
Soft lead	3 lbs./sq. ft.	
Stainless steel	ASTM A 240	300 Series alloys
Steel	ASTM A 924/ ASTM A 924M	
Terne and terne-coated stainless	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions	
Zinc	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%)	

For SI: 1 ounce per square foot = 0.0026 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G.

R905.4.5 Application.

Metal roof shingles shall ~~be secured to the roof in accordance with this chapter and the approved manufacturer's installation instructions~~ installed in accordance with the approved manufacturer's installation instructions. The product approval shall state the allowable uplift resistance for the attachment system. The installation of metal roof shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R905.4.6 Flashing.

Roof valley flashing shall be of corrosion-resistant metal of the same material as the roof covering or shall comply with the standards in Table ~~R905.10.3(1)~~ R905.4.4.. ~~The~~ ~~v~~Valley flashing shall extend at least 8 inches (203 mm) from the centerline each way and shall have a splash diverter rib not less than $^{3}/_{4}$ inch (19 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). The metal valley flashing shall have a 36-inch-wide (914 mm) underlayment directly under it consisting of one layer of underlayment running the full length of the valley, in addition to underlayment required for metal roof shingles. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for roof slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer modified bitumen sheet.~~

R905.4 Metal roof shingles.
The installation of metal roof shingles shall comply with the provisions of this section.

R905.4.1 Deck requirements.
Metal roof shingles shall be applied to a solid or closely fitted deck, except where the roof covering is specifically designed to be applied to spaced sheathing.

R905.4.2 Deck slope.
Metal roof shingles shall not be installed on roof slopes below three units vertical in 12 units horizontal (25-percent slope).

R905.4.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type ~~I~~ II or Type ~~II~~ IV or ASTM D 1970 or ASTM D 6757. ~~Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

R905.4.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached *accessory structures* that contain no *conditioned floor area.*~~ Reserved.

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R905.4.3.2 Underlayment and high winds.

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.**~~
Reserved.

R905.4.3.3 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. **Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.**

2. **One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).**

3. **As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.**

R905.4.4 Material standards.
Metal roof shingle roof coverings shall comply with Table ~~R905.10.3(1)~~ R905.4.4. The materials used for metal roof shingle roof coverings shall be naturally corrosion resistant or ~~be made~~ provided with corrosion ~~resistant~~ resistance in accordance with the standards and minimum thicknesses specified in the standards listed in Table ~~R905.10.3(2)~~ R905.4.4.

TABLE 905.4.4 METAL ROOF COVERINGS

ROOF COVERING TYPE	STANDARD	STANDARD APPLICATION RATE/THICKNESS
Aluminum	ASTM B 209	0.024-inch minimum thickness for roll-formed

		panels and 0.019-inch minimum thickness for press-formed shingles
Aluminum-zinc coated steel	ASTM A 792	0.013-inch minimum thickness, AZ 50 (coated minimum application rate)
Cold-rolled copper	ASTM B 370	Minimum 16 oz./sq. ft. and 12 oz./sq. ft. high yield copper for metal-sheet roof covering systems: 12 oz./sq. ft. for preformed metal shingle systems
Copper	ASTM B 370	16 oz./sq. ft. for metal-sheet roof-covering systems; 12 oz./sq. ft. for preformed metal shingle systems.
Galvanized steel	ASTM A 653	0.013-inch minimum thickness, G-90 zinc-coated[a]
Hard lead	-	2 lbs./sq. ft.
Lead-coated copper	ASTM B 101	-
Prepainted steel	ASTM A 755	0.0142 inch minimum thickness
Soft lead	-	3 lbs./sq. ft.
Stainless steel	ASTM A 240	300 Series alloys
Steel	ASTM A 924/ ASTM A 924M	-
Terne and terne-coated stainless	-	Terne coating of 40 lbs. per double base box, field painted where applicable in accordance with manufacturer's installation instructions
Zinc	-	0.027 inch minimum thickness; 99.995% electrolytic high grade zinc with alloy additives of copper (0.08% - 0.20%), titanium (0.07% - 0.12%) and aluminum (0.015%)

For SI: 1 ounce per square foot = 0.0026 kg/m^2, 1 pound per square foot = 4.882 kg/m^2, 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. For Group U buildings, the minimum coating thickness for ASTM A 653 galvanized steel roofing shall be G.

R905.4.5 Application.

Metal roof shingles shall ~~be secured to the roof in accordance with this chapter and the *approved* manufacturer's installation instructions~~ installed in accordance with the approved manufacturer's installation instructions. The product approval shall state the allowable uplift resistance for the attachment system. The installation of metal roof shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R905.4.6 Flashing.

Roof valley flashing shall be of corrosion-resistant metal of the same material as the roof covering or shall comply with the standards in Table ~~R905.10.3(1)~~ R905.4.4.. ~~The~~ V~~v~~alley flashing shall extend at least 8 inches

(203 mm) from the centerline each way and shall have a splash diverter rib not less than $^{3}/_{4}$ inch (19 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). The metal valley flashing shall have a 36-inch-wide (914 mm) underlayment directly under it consisting of one layer of underlayment running the full length of the valley, in addition to underlayment required for metal roof shingles. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less, the metal valley flashing underlayment shall be solid cemented to the roofing underlayment for roof slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer modified bitumen sheet.~~

R5507

Date Submitted	7/21/2012	**Section**	R905.4.3.2 Underlayment and hig	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5507-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

R905.4.3.2 Underlayment and high winds.

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 1970. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R5308

Date Submitted	7/18/2012	**Section**	R905.5 Mineral-surfaced roll roofing	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5308-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.5 Mineral-surfaced roll roofing.
The installation of mineral-surfaced roll roofing shall comply with this section.

R905.5.1 Deck requirements.
Mineral-surfaced roll roofing shall be fastened to solidly sheathed roofs.

R905.5.2 Deck slope.
Mineral-surfaced roll roofing shall not be applied on roof slopes below one unit vertical in 12 units horizontal (8-percent slope).

R905.5.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or Type II, ASTM D 1970 orASTM D 4869, Type I or Type II.

R905.5.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~**Exception:** Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.5.3.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.5.4 Material standards.
Mineral-surfaced roll roofing shall conform to ASTM D 3909 or ASTM D 6380, Class M or Class WS.

R905.5.5 Application.
Mineral-surfaced roll roofing shall be installed in accordance with this chapter and the manufacturer's installation instructions.

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R905.5 Mineral-surfaced roll roofing.
The installation of mineral-surfaced roll roofing shall comply with this section.

R905.5.1 Deck requirements.
Mineral-surfaced roll roofing shall be fastened to solidly sheathed roofs.

R905.5.2 Deck slope.
Mineral-surfaced roll roofing shall not be applied on roof slopes below one unit vertical in 12 units horizontal (8-percent slope).

R905.5.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757.

R905.5.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached *accessory structures* that contain no *conditioned floor area.*~~ Reserved.

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~~**R905.5.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.5.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.5.4 Material standards.
Mineral-surfaced roll roofing shall conform to ASTM D 3909 or ASTM D 6380, Class M or Class WS.

R905.5.5 Application.
Mineral-surfaced roll roofing shall be installed in accordance with this chapter and the manufacturer's installation instructions.

R5312

Date Submitted	7/18/2012	**Section**	R905.6 Slate and slate-type shing	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5312-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.6 Slate and slate-type shingles.
The installation of slate and slate-type shingles shall comply with the provisions of this section.

R905.6.1 Deck requirements.
Slate shingles shall be fastened to solidly sheathed roofs.

R905.6.2 Deck slope.
Slate shingles shall be used only on slopes of four units vertical in 12 units horizontal (33-percent slope) or greater.

R905.6.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I, ASTM D 4869, Type I or Type II. Underlayment shall be installed in accordance with the manufacturer's installation instructions

R905.6.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.6.3.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved.

R905.6.4 Material standards.
Slate shingles shall comply with ASTM C 406.

R905.6.5 Application.
Minimum headlap for slate shingles shall be in accordance with Table R905.6.5. Slate shingles shall be secured to the roof with two fasteners per slate. Slate shingles shall be installed in accordance with this chapter and the manufacturer's installation instructions.

TABLE R905.6.5 SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 = slope < 8:12	4
8:12 = slope < 20:12	3
Slope = 20:12	2

For SI: 1 inch = 25.4 mm.

R905.6.6 Flashing.
Flashing and counter flashing shall be made with sheet metal. Valley flashing shall be a minimum of ~~15~~ 16 inches (~~381~~ 406 mm) wide. Valley and flashing metal shall be a minimum ~~uncoated~~ thickness ~~of 0.0179-inch (0.5 mm) zinc-coated G90~~ as provided in Table R903.2.1 for nonferrous metal or stainless steel. Chimneys, stucco or brick walls shall have a minimum of two plies of felt for a cap flashing consisting of a 4-inch-wide (102 mm) strip of felt set in plastic cement and extending 1 inch (25 mm) above the first felt and a top coating of plastic cement. The felt shall extend over the base flashing 2 inches (51 mm).

R905.6.7
Slate and slate-type shingles shall be installed in accordance with this chapter and the manufacturer's installation instructions. The product approval shall state the allowable uplift resistance for the attachment system. The installation of slate and slate-type shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R905.6 Slate and slate-type shingles.
The installation of slate and slate-type shingles shall comply with the provisions of this section.

R905.6.1 Deck requirements.
Slate shingles shall be fastened to solidly sheathed roofs.

R905.6.2 Deck slope.
Slate shingles shall be used only on slopes of four units vertical in 12 units horizontal (33-percent slope) or greater.

R905.6.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869,Type ~~I~~ II or Type ~~II~~ IV or ASTM D 1970 or ASTM D 6757. Underlayment shall be installed in accordance with the manufacturer's installation instructions.

R905.6.3.1 Ice barrier.
~~**In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.**~~

~~**Exception: Detached *accessory structures* that contain no *conditioned floor area.***~~ **Reserved.**

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R905.6.3.2 Underlayment and high winds.

~~**Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.**~~

~~**Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.**~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.6.3.3 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. **Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.**

2. **One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).**

3. **As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.**

R905.6.4 Material standards.
Slate shingles shall comply with ASTM C 406.

R905.6.5 Application.
Minimum headlap for slate shingles shall be in accordance with Table R905.6.5. Slate shingles shall be secured to the roof with two fasteners per slate. Slate shingles shall be installed in accordance with this chapter and the manufacturer's installation instructions.

TABLE R905.6.5 SLATE SHINGLE HEADLAP

SLOPE	HEADLAP (inches)
4:12 = slope < 8:12	4
8:12 = slope < 20:12	3
Slope = 20:12	2

For SI: 1 inch = 25.4 mm.

R905.6.6 Flashing.
Flashing and counter flashing shall be made with sheet metal. Valley flashing shall be a minimum of ~~15~~ 16 inches (~~381~~ 406 mm) wide. Valley and flashing metal shall be a minimum ~~uncoated~~ thickness ~~of 0.0179-inch (0.5 mm) zinc coated G90~~ as provided in Table R903.2.1 for nonferrous metal or stainless steel. Chimneys, stucco or brick walls shall have a minimum of two plies of felt for a cap flashing consisting of a 4-inch-wide (102 mm) strip of felt set in plastic cement and extending 1 inch (25 mm) above the first felt and a top coating of plastic cement. The felt shall extend over the base flashing 2 inches (51 mm).

R905.6.7
Slate and slate-type shingles shall be installed in accordance with this chapter and the manufacturer's installation instructions. The product approval shall state the allowable uplift resistance for the attachment system. The installation of slate and slate-type shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R5558

Date Submitted	7/21/2012	**Section**	R905.6.3 Underlayment.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5558-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The original proposal is recommended for approval with the modifications shown in this comment. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

R5558-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

TAC comment about R905.6.3.1 Ice Barrier was an issue in FLorida however removing language not an issue with other systems.
US National Climatic Data Center
Average temperatures for the year for places in Florida are listed below. You'll find separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.
The tables give the normal maximum and minimum temperatures based on weather data collected from 1981 to 2010 by the US National Climatic Data Center.
See attached US National Climatic Data Center information.

~~**R905.6.3 Underlayment.**~~
~~Underlayment shall comply with ASTM D 226, Type I, or ASTM D 4869, Type I or II. Underlayment shall be installed in accordance with the manufacturer's installation instructions.~~

R905.6.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 1970 or ASTM D 6757. Underlayment shall be installed in accordance with the manufacturer's installation instructions.

R905.6.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

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~~**R905.6.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.6.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3. As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

R905.6.3 Underlayment

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 1970 or ASTM D 6757. Underlayment shall be installed in accordance with the manufacturer's installation instructions.

R905.6.3.1 Ice barrier. Reserved.

R905.6.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV or ASTM D 6757: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV or ASTM D 6757: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing. Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations End laps shall be offset by 6 feet (1829 mm).

3.As an alternative, the entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions.

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US National Climatic Data Center

Average temperatures for the year for places in Florida are listed below. You'll find separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.
The tables give the normal maximum and minimum temperatures based on weather data collected from 1981 to 2010 by the US National Climatic Data Center.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual temperatures

High °F	Low °F	Place	High °C	Low °C
84	60	Arcadia	29	16
85	61	Avon Park	29	16
87	65	Big Cypress National Preserve	30	18
82	64	Bradenton	28	18
89	65	Everglades Park, Royal Palm	32	18
83	68	Ft. Lauderdale	29	20
85	66	Ft. Myers	29	19
82	65	Ft. Pierce	28	18
83	69	Hialeah	28	21
83	73	Key West	28	23
84	70	Miami	29	21

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81	71	Miami Beach	27	22
85	65	Naples	30	18
82	69	Pompano Beach	28	21
83	72	Tavernier (Key Largo)	29	22
82	64	Venice	28	18
81	64	Vero Beach	27	18
83	68	West Palm Beach	28	20

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Average yearly temperatures

High °F	Low °F	Place	High °C	Low °C
84	63	Bartow	29	17
80	62	Daytona Beach	27	17
83	63	Lakeland	28	17
82	63	Melbourne	28	17
83	63	Orlando	28	17
83	62	Plant City	28	17
82	67	St. Petersburg	28	19

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82	65	Tampa	28	18

North Florida

North Florida temperatures are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Normal annual temperatures

High °F	Low °F	Place	High °C	Low °C
81	56	Gainesville	27	14
80	55	Glen St. Mary	26	13
79	58	Jacksonville	26	14
78	62	Jacksonville Beach	26	17
79	55	Jasper	26	13
80	58	Lake City	26	14
82	57	Live Oak	28	14
79	55	Madison	26	13
84	59	Ocala	29	15
80	61	St. Augustine	26	16

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Annual temperature averages

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High °F	Low °F	Place	High °C	Low °C
78	59	Apalachicola	26	15
78	53	Crestview	26	12
78	56	DeFuniak Springs	26	13
79	55	Monticello	26	13
77	55	Niceville	25	13
78	59	Panama City	26	15
77	59	Pensacola	25	15
80	56	Tallahassee	26	13

R5516

Date Submitted	7/21/2012	**Section**	R905.6.3.2 Underlayment and hig	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides and carries forward current 2010 FBC Florida-specific criteria.

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5516-G1

Proponent	Mark Zehnal	Submitted	12/7/2012	Attachments	Yes

Comment:

The was no reason given other than Ice Barriers for this mod to recieve an NAR and all other revised underlayment code modifications were approved. This mod needs to be approved to be consistant with all other underlayment approved mods.

R905.6.3.2 Underlayment and high winds.

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12-gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

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US National Climatic Data Center

Average temperatures for the year for places in Florida are listed below. You'll find separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.
The tables give the normal maximum and minimum temperatures based on weather data collected from 1981 to 2010 by the US National Climatic Data Center.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual temperatures

High °F	Low °F	Place	High °C	Low °C
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87	65	Big Cypress National Preserve	30	18
82	64	Bradenton	28	18
89	65	Everglades Park, Royal Palm	32	18
83	68	Ft. Lauderdale	29	20
85	66	Ft. Myers	29	19
82	65	Ft. Pierce	28	18
83	69	Hialeah	28	21
83	73	Key West	28	23
84	70	Miami	29	21

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81	71	Miami Beach	27	22
85	65	Naples	30	18
82	69	Pompano Beach	28	21
83	72	Tavernier (Key Largo)	29	22
82	64	Venice	28	18
81	64	Vero Beach	27	18
83	68	West Palm Beach	28	20

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Average yearly temperatures

High °F	Low °F	Place	High °C	Low °C
84	63	Bartow	29	17
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83	63	Lakeland	28	17
82	63	Melbourne	28	17
83	63	Orlando	28	17
83	62	Plant City	28	17
82	67	St. Petersburg	28	19

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82	65	Tampa	28	18

North Florida

North Florida temperatures are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Normal annual temperatures

High °F	Low °F	Place	High °C	Low °C
81	56	Gainesville	27	14
80	55	Glen St. Mary	26	13
79	58	Jacksonville	26	14
78	62	Jacksonville Beach	26	17
79	55	Jasper	26	13
80	58	Lake City	26	14
82	57	Live Oak	28	14
79	55	Madison	26	13
84	59	Ocala	29	15
80	61	St. Augustine	26	16

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Annual temperature averages

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High °F	Low °F	Place	High °C	Low °C
78	59	Apalachicola	26	15
78	53	Crestview	26	12
78	56	DeFuniak Springs	26	13
79	55	Monticello	26	13
77	55	Niceville	25	13
78	59	Panama City	26	15
77	59	Pensacola	25	15
80	56	Tallahassee	26	13

R5315

Date Submitted	7/18/2012	**Section**	R905.7 Wood shingles.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5315-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.7 Wood shingles.
The installation of wood shingles shall comply with the provisions of this section.

R905.7.1 Deck requirements.
Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25.4 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

R905.7.1.1 Solid sheathing required.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less, solid sheathing is required on that portion of the roof requiring the application of an ice barrier.~~ Reserved.

R905.7.2 Deck slope.
Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (25-percent slope) or greater.

R905.7.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.

R905.7.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.7.3.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all Head laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm)~~

~~into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~ Reserved.

R905.7.4 Material standards.
Wood shingles shall be of naturally durable wood and comply with the requirements of Table R905.7.4.

TABLE R905.7.4 WOOD SHINGLE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shingles of naturally durable wood	1, 2 or 3	Cedar Shake and Shingle Bureau

R905.7.5 ~~Application~~ Attachment.
Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. ~~Wood shingles shall be laid with a side lap not less than $1\frac{1}{2}$ inches (38 mm) between joints in courses, and no two joints in any three adjacent courses shall be in direct alignment. Spacing between shingles shall not be less than $\frac{1}{4}$ inch to $\frac{3}{8}$ inch (6 mm to 10 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5. Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of $\frac{1}{2}$ inch (13 mm) into the sheathing. For sheathing less than $\frac{1}{2}$ inch (13 mm) in thickness, the fasteners shall extend through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned no more than $\frac{3}{4}$ inch (19 mm) from each edge and no more than 1 inch (25 mm) above the exposure line.~~ Attachment in accordance with Table R905.7.5 shall be used for roofs with a mean roof height of 40 feet or less and in regions with a V_{asd} as determined in accordance with Section R301.2.1.3 to be 100 mph or less

TABLE R905.7.5 WOOD SHINGLE ~~WEATHER EXPOSURE AND ROOF SLOPE~~ AND SHAKE INSTALLATION

~~ROOFING MATERIAL~~	~~LENGTH (inches)~~	~~GRADE~~	~~EXPOSURE (inches)~~	
			~~3:12 pitch to~~	~~4:12 pitch or steeper~~
~~Shingles of naturally durable wood~~	~~16~~	~~No. 1~~	~~$3\frac{3}{4}$~~	~~5~~
		~~No. 2~~	~~$3\frac{1}{2}$~~	~~4~~
		~~No. 3~~	~~3~~	~~$3\frac{1}{2}$~~
	~~18~~	~~No. 1~~	~~$4\frac{1}{4}$~~	~~$5\frac{1}{2}$~~
		~~No. 2~~	~~4~~	~~$4\frac{1}{2}$~~
		~~No. 3~~	~~$3\frac{1}{2}$~~	~~4~~
	~~24~~	~~No. 1~~	~~$5\frac{3}{4}$~~	~~$7\frac{1}{2}$~~
		~~No. 2~~	~~$5\frac{1}{2}$~~	~~$6\frac{1}{2}$~~
		~~No. 3~~	~~5~~	~~$5\frac{1}{2}$~~

~~For SI: 1 inch = 25.4 mm.~~

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ROOF ITEM	WOOD SHINGLES	WOOD SHAKES
1. Deck Requirements	Shingles shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be 4 less than 1?× 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners.	Shakes shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners. When 1? × 4? spaced sheathing is installed at 10 inches, boards must be installed between the sheathing boards.
2. Interlayment	No requirements.	Interlayment shall comply with ASTM D 226, Type 1.
3. Underlayment	Underlayment shall comply with ASTM D 226, Type 1.	No requirements.
4. Application	—	—
Attachment	Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of $^3/_4$ inch into the sheathing. For sheathing less than $^1/_2$ inch thick, the fasteners shall extend through the sheathing a minimum of $^3/_8$ inch.	Fasteners for wood shakes shall be corrosion resistant with a minimum penetration of $^3/_4$ inch into the sheathing. For sheathing less than $^1/_2$ inch thick, the fasteners shall extend through the sheathing a minimum of $^3/_8$ inch.
No. of fasteners	Wood shingles shall be attached to the roof with two fasteners per shingle, positioned no more than $^3/_4$ inch (19.1 mm) from each edge and no more than $1^1/_2$ inch (38.1 mm) above the exposure line.	Wood shakes shall be attached to the roof with two fasteners per shake, positioned no more than 1 inch (25.4 mm) from each edge and no more than $1^1/_2$ inches (38.1 mm) above the exposure line.

For SI: 1 inch = 25.4 mm

R905.7.6 ~~Valley flashing~~ Attachment for V_{asd} as determined in accordance with Section R301.2.1.3 greater than 100 mph.

~~Roof flashing shall be not less than No. 26 gage [0.019 inches (0.5 mm)] corrosion-resistant sheet metal and shall extend 10 inches (254 mm) from the centerline each way for roofs having slopes less than 12 units vertical in 12 units horizontal (100-percent slope), and 7 inches (178 mm) from the centerline each way for slopes of 12 units vertical in 12 units horizontal and greater. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).~~ Wood shingles installed in accordance with Table R905.7.5 and the requirements of R905.7.6 have an allowable uplift resistance of 45 psf. The installation of wood shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

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R905.7.6.1 Fasteners.

R905.7.6.1.1 Nails.
Nails to attach the wood shakes shall be 3d stainless-steel ring-shank nails. The nails shall have sufficient length to penetrate through the wood shakes and shall penetrate through the sheathing.

R905.7.6.1.2 Screws.
Screws to attach the battens to the framing shall be No. 8 by $2^1/_2$ inches (64 mm) long corrosion resistant wood screws. Wood screws shall be corrosion resistant screw s conforming to ANSI/ASME B 18.6.1. The corrosion resistance shall meet ASTM A 641, Class 1 or an equal corrosion resistance by coating, electro galvanization, mechanical galvanization, stainless steel, nonferrous metal or other suitable corrosion resistant material.

R905.7.6.1.3 Wood battens.
1 Ã— 4 wood battens shall be attached to the wood joists with 2 screws per joist. The first batten shall be located 6 inches (152 mm) from the outer edge of the wood joist. Second batten shall be spaced 1-$^1/_4$ inches (32 mm) from the first batten. The remaining battens shall be spaced a maximum 2 inches (51 mm) apart, except the last one which shall be spaced no greater than $^3/_4$ inches (19 mm) from the previous batten.

R905.7.6.1.4 Shingles.
Shingles shall be attached to the battens with 2 nails for each shingle placed $1^1/_2$ inch (38 mm) above the exposure line. The nails shall be $^3/_4$ to 1 inch (19 to 25 mm) from the shingle edges.

R905.7.7 ~~Label required~~ Application
~~Each bundle of shingles shall be identified by a label of an approved grading or inspection bureau or agency.~~
Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. Weather exposure for wood shingles shall not exceed those set in Table R905.7.7.

TABLE R905.7.7 WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	$3^3/_4$	5
		No. 2	$3^1/_2$	4
		No. 3	3	$3^1/_2$
	18	No. 1	$4^1/_4$	$5^1/_2$
		No. 2	4	$4^1/_2$
		No. 3	$3^1/_2$	4
	24	No. 1	$5^3/_4$	$7^1/_2$
		No. 2	$5^1/_2$	$6^1/_2$
		No. 3	5	$5^1/_2$

For SI: 1 inch = 25.4 mm.

R905.7.8 Flashing.

At the juncture of the roof and vertical surfaces, flashing and counter flashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, shall not be less than 0.017-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal.

R905.7.8.1 Valley flashing.

Roof flashing shall be not less than No. 26 gage [0.017 inches (0.48 mm)] corrosion-resistant sheet metal and shall extend 10 inches (254 mm) from the centerline each way for roofs having slopes less than 12 units vertical in 12 units horizontal (100-percent slope), and 7 inches (178 mm) from the centerline each way for slopes of 12 units vertical in 12 units horizontal and greater. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).

R905.7.9 Label required.

Each bundle of shingles shall be identified by a label of an approved grading or inspection bureau or agency.

R905.7 Wood shingles.
The installation of wood shingles shall comply with the provisions of this section.

R905.7.1 Deck requirements.
Wood shingles shall be installed on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25.4 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners.

R905.7.1.1 Solid sheathing required.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less, solid sheathing is required on that portion of the roof requiring the application of an ice barrier.~~ Reserved.

R905.7.2 Deck slope.
Wood shingles shall be installed on slopes of three units vertical in 12 units horizontal (25-percent slope) or greater.

~~**R905.7.3 Underlayment.**~~
~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.7.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

R905.7.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached *accessory structures* that contain no *conditioned floor area*.~~ Reserved.

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~~**R905.7.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D~~

~~226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

R905.7.4 Material standards.
Wood shingles shall be of naturally durable wood and comply with the requirements of Table R905.7.4.

TABLE R905.7.4 WOOD SHINGLE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shingles of naturally durable wood	1, 2 or 3	Cedar Shake and Shingle Bureau

R905.7.5 ~~Application~~ Attachment.
Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. ~~Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and no two joints in~~

~~any three adjacent courses shall be in direct alignment. Spacing between shingles shall not be less than 1/4 inch to 3/8 inch (6 mm to 10 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5. Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of 1/2 inch (13 mm) into the sheathing. For sheathing less than 1/2 inch (13 mm) in thickness, the fasteners shall extend through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned no more than 3/4 inch (19 mm) from each edge and no more than 1 inch (25 mm) above the exposure line.~~ Attachment in accordance with Table R905.7.5 shall be used for roofs with a mean roof height of 40 feet or less and in regions with a V_{asd} as determined in accordance with Section R301.2.1.3 to be 100 mph or less

TABLE R905.7.5 WOOD SHINGLE ~~WEATHER EXPOSURE AND ROOF SLOPE~~ AND SHAKE INSTALLATION

~~ROOFING MATERIAL~~	~~LENGTH (inches)~~	~~GRADE~~	~~EXPOSURE (inches)~~	
			~~3:12 pitch to~~	~~4:12 pitch or steeper~~
~~Shingles of naturally durable wood~~	~~16~~	~~No. 1~~	~~3 3/4~~	~~5~~
		~~No. 2~~	~~3 1/2~~	~~4~~
		~~No. 3~~	~~3~~	~~3 1/2~~
	~~18~~	~~No. 1~~	~~4 1/4~~	~~5 1/2~~
		~~No. 2~~	~~4~~	~~4 1/2~~
		~~No. 3~~	~~3 1/2~~	~~4~~
	~~24~~	~~No. 1~~	~~5 3/4~~	~~7 1/2~~
		~~No. 2~~	~~5 1/2~~	~~6 1/2~~
		~~No. 3~~	~~5~~	~~5 1/2~~

~~For SI: 1 inch = 25.4 mm.~~

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ROOF ITEM	WOOD SHINGLES	WOOD SHAKES
1. Deck Requirements	Shingles shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be 4 less than 1?× 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners.	Shakes shall be applied to roofs with solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1? × 4? nominal dimensions and shall be spaced on center equal to the weather exposure to coincide with the placement of fasteners. When 1? × 4? spaced sheathing is installed at 10 inches, boards must be installed between the sheathing boards.
2. Interlayment	No requirements.	Interlayment shall comply with ASTM D 226, Type 1.

3. Underlayment	Underlayment shall comply with ASTM D 226, Type 1.	No requirements.
4. Application	—	—
Attachment	Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of $^3/_4$ inch into the sheathing. For sheathing less than $^1/_2$ inch thick, the fasteners shall extend through the sheathing a minimum of $^3/_8$ inch.	Fasteners for wood shakes shall be corrosion resistant with a minimum penetration of $^3/_4$ inch into the sheathing. For sheathing less than $^1/_2$ inch thick, the fasteners shall extend through the sheathing a minimum of $^3/_8$ inch.
No. of fasteners	Wood shingles shall be attached to the roof with two fasteners per shingle, positioned no more than $^3/_4$ inch (19.1 mm) from each edge and no more than $1^1/_2$ inch (38.1 mm) above the exposure line.	Wood shakes shall be attached to the roof with two fasteners per shake, positioned no more than 1 inch (25.4 mm) from each edge and no more than $1^1/_2$ inches (38.1 mm) above the exposure line.

For SI: 1 inch = 25.4 mm

R905.7.6 ~~Valley flashing~~ Attachment for V_{asd} as determined in accordance with Section R301.2.1.3 greater than 100 mph.

~~Roof flashing shall be not less than No. 26 gage [0.019 inches (0.5 mm)] corrosion-resistant sheet metal and shall extend 10 inches (254 mm) from the centerline each way for roofs having slopes less than 12 units vertical in 12 units horizontal (100-percent slope), and 7 inches (178 mm) from the centerline each way for slopes of 12 units vertical in 12 units horizontal and greater. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).~~ Wood shingles installed in accordance with Table R905.7.5 and the requirements of R905.7.6 have an allowable uplift resistance of 45 psf. The installation of wood shingles shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

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R905.7.6.1 Fasteners.

R905.7.6.1.1 Nails.

Nails to attach the wood shakes shall be 3d stainless-steel ring-shank nails. The nails shall have sufficient length to penetrate through the wood shakes and shall penetrate through the sheathing.

R905.7.6.1.2 Screws.

Screws to attach the battens to the framing shall be No. 8 by $2^{1}/_{2}$ inches (64 mm) long corrosion resistant wood screws. Wood screws shall be corrosion resistant screw s conforming to ANSI/ASME B 18.6.1. The corrosion resistance shall meet ASTM A 641, Class 1 or an equal corrosion resistance by coating, electro galvanization, mechanical galvanization, stainless steel, nonferrous metal or other suitable corrosion resistant material.

R905.7.6.1.3 Wood battens.

1 Ã— 4 wood battens shall be attached to the wood joists with 2 screws per joist. The first batten shall be located 6 inches (152 mm) from the outer edge of the wood joist. Second batten shall be spaced $1\text{-}^{1}/_{4}$ inches (32 mm) from the first batten. The remaining battens shall be spaced a maximum 2 inches (51 mm) apart, except the last one which shall be spaced no greater than $^{3}/_{4}$ inches (19 mm) from the previous batten.

R905.7.6.1.4 Shingles.

Shingles shall be attached to the battens with 2 nails for each shingle placed $1^{1}/_{2}$ inch (38 mm) above the exposure line. The nails shall be $^{3}/_{4}$ to 1 inch (19 to 25 mm) from the shingle edges.

R905.7.7 ~~Label required~~ Application

~~Each bundle of shingles shall be identified by a *label* of an *approved* grading or inspection bureau or agency.~~ Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. Weather exposure for wood shingles shall not exceed those set in Table R905.7.7.

TABLE R905.7.7 WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches)	
			3:12 pitch to < 4:12	4:12 pitch or steeper
Shingles of naturally durable wood	16	No. 1	$3^{3}/_{4}$	5
		No. 2	$3^{1}/_{2}$	4
		No. 3	3	$3^{1}/_{2}$
	18	No. 1	$4^{1}/_{4}$	$5^{1}/_{2}$
		No. 2	4	$4^{1}/_{2}$
		No. 3	$3^{1}/_{2}$	4
	24	No. 1	$5^{3}/_{4}$	$7^{1}/_{2}$
		No. 2	$5^{1}/_{2}$	$6^{1}/_{2}$
		No. 3	5	$5^{1}/_{2}$

For SI: 1 inch = 25.4 mm.

R905.7.8 Flashing.

At the juncture of the roof and vertical surfaces, flashing and counter flashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, shall not be less than 0.017-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal.

R905.7.8.1 Valley flashing.

Roof flashing shall be not less than No. 26 gage [0.017 inches (0.48 mm)] corrosion-resistant sheet metal and shall extend 10 inches (254 mm) from the centerline each way for roofs having slopes less than 12 units vertical in 12 units horizontal (100-percent slope), and 7 inches (178 mm) from the centerline each way for slopes of 12 units vertical in 12 units horizontal and greater. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).

R905.7.9 Label required.

Each bundle of shingles shall be identified by a label of an approved grading or inspection bureau or agency.

R5559

Date Submitted	7/21/2012	Section	R905.7.3 Underlayment..	Proponent	Mark Zehnal
Chapter	9	Affects HVHZ	No	Attachments	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** Yes

Related Modifications

Summary of Modification

Incorporates intent of foundation code for attachment of underlayment in high wind section and unifies installation guidelines of underlayment with current Florida-specific criteria.

Rationale

This code modification unites the intent of the foundation code for enhanced attachment and types of underlayment in the high wind section with the 2010 FBC Florida specific code language. The subsequent foundation code solution for the ASCE 7-10 increased wind speeds to enhance attachment and upgrade types of underlayment is consistent with the 2010 FBC code language and has been performance proven in Florida's unique environment including enduring high wind tropical rains and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

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

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Impact to industry relative to the cost of compliance with code

No impact. Will incorporate the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC code language.

Requirements

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

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

Does not discriminate. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Does not degrade the effectiveness of the code

Does not degrade. Strengthens and unifies the code by incorporating the intent of the foundation code for enhanced attachment and types of underlayment used in high wind section with current commission approved 2010 FBC performance proven code language.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

YES

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5559-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The original proposal is recommended for approval with the modifications shown in this comment. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

R5559-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

Cold weather and possible ice was the reason for the TAC to give this mod an NAR. All other revised underlayment code modifications approved. Attach Cedar Shake & Shingle Bureau Technical Bulletin and US National Climatic Data Center average temperatures for the year for places in Florida.

~~**R905.7.3 Underlayment.**~~
~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.7.3 Underlayment.

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

R905.7.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

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~~**R905.7.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails

and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

R905.7.3 Underlayment.

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV.

R905.7.3.1 Ice barrier. Reserved.

R905.7.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

TECHNICAL BULLETIN

Cedar Shake & Shingle Bureau

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Overview

This product is used as part of cedar roofing and wall systems. It enhances a system's water shedding ability and helps prevent the intrusion of wind driven snow which can cause ice damming. Sheathing and roofing systems are separate systems; both systems are required by building code and need to be properly designed and installed. Three main types of products need to be considered:
1) underlayment 2) interlayment and 3) eave production.

Correct Specifications

The CSSB's **New Roof Construction Manual** shows how to install these products:

Underlayment/Interlayment

Many of the segments in the market use a general term when ordering or specifying a particular type of product. Asphalt-Saturated Organic Felt Underlayment ("felt") is most commonly stated as '30 pound felt' or 'Type 30 felt'. These 'terms' may allow for inappropriate or substandard products to be used; further definitions are becoming necessary to follow current industry developments. Ensure the most detailed specifications are used to maintain the integrity of a project and compliance with local building codes.

The American Society for Testing Materials Standards ("ASTM") for Asphalt-Saturated Organic Felt Definitions:

ASTM Designation 226 (ASTM D 226) is the "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing"

ASTM Designation 4869 (ASTM D 4869) is the "Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing"

ASTM notes that:

1) Type 30 felt is more of a name today than a weight reference.

2) The specification in jobs would be ASTM Designation 226 ("ASTM" D 226) or ASTM Designation 4869 ("ASTM" D 4869). Check www.astm.org for the most current information.

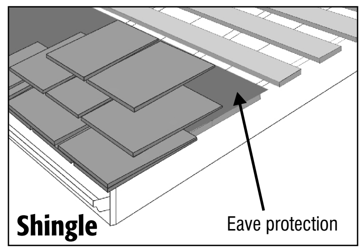
There are differences in the asphalt content and composition of the felt within ASTM Designations. It is important to check with local building code requirements when specifying the ASTM Designation number as some codes require the use of a specific ASTM Designation for roof and sidewall application.

Manufacturers of these products still use a "Type 15" or "Type 30" identifier on the product identification bands but also will state ASTM Designation 226 or ASTM Designation 4869 when the product meets ASTM standards. The CSSB recommends specifiers always state a **No.30 ASTM D 226** or **No.30 ASTM D 4869** felt in addition to the "Type 30" referred to in the CSSB's New Roof Construction Manual and the CSSB's Exterior and Interior Wall Manual.

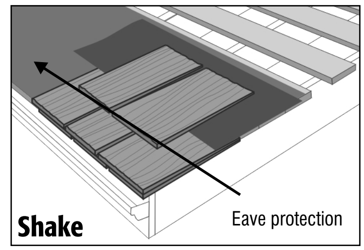
Self-Adhesive Eave Protection

Self adhesive eave protection is a rubberized type of asphalt material used at the bottom of the roof near the gutter area. It is in place to prevent ice damming and water intrusion from the eaves.

It may be used at the eaves and valleys in geographical areas prone to ice damming, on both cedar shake and cedar shingle roofs (consult local building codes for more details).



Underlayment



Interlaid/Interwoven Felt

Caution Areas

- There is a trend where some installers are putting rubberized eave protection over the entire roofing deck. Contact the rubberized eave manufacturer for complete installation instructions and information on how to prevent condensation and moisture issues.
- Current CSSB policy is to only apply this rubberized eave protection at the eaves and valleys.
- Interlay shakes with 18" wide felt and ensure to check with local building code for ASTM Designation 226 requirements
- Never interlay shingles with felt (it is already a 3-ply system) UNLESS absolutely required by local building code
- Do not position felt lower than double the exposure of the product. If the felt does extend below this line it is commonly referred to as 'rot felting' since the felt is susceptible to deterioration from the sun's UV rays. Rot felting can also prevent proper drying of shakes and shingles, thus shortening their life.

Type 30 ASTM Felt

Self-adhesive eave protection (do not confuse with Type 30 ASTM felt)

TEL: 604-820-7700 FAX: 604-820-0266 www.cedarbureau.org info@cedarbureau.com

Cedar Shake & Shingle Bureau

TECHNICAL BULLETIN PAGE 2

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Frequently Asked Questions:

Current Industry Trends

- Vapor permeable banner wrap type products have made inroads in house design and construction in the recent past. Use of this type of product should only be considered if the local building official approves of this variation from the installation methods recommended by the CSSB. Also consider the data at www.umass.edu/bmatwt/publications, Housewraps/Felt and Weather Penetration Barriers - author Paul Fisette
- Modern homes are built more air tight, and this means that proper ventilation of the structure is even more crucial. The CSSB recommends venting no less than 1:150 with compensation made for screens over vent apperatures. In the case of a balanced system 1 square foot per 300 square feet of floor area may be adequate ventilation. Check with the local building official for more information.

Do I have to use a continuous ventilation product on my installation?
Not necessarily. The continuous ventilation product is an option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

Can I use a continuous ventilation product instead of felt?
No. Felt is a must. The continuous ventilation product is an additional option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options. Remember: do not interlay shingles with felt unless required by local code.

Can I use a continuous ventilation product immediately on top of felt?
No. If you elect to use a continuous ventilation product, it should be installed between the sheathing (deck) and the felt. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

When I hear "30 pound felt" does it mean the same thing as "Type 30 felt"?
In the construction and roofing trades, it is common for people to use the terms interchangeably. Type 30 felt comes in many varieties. Ensure you also write in the correct ASTM Designation in your detailed specification to guarantee that you are obtaining quality materials.

The information in this bulletin is not intended to supercede local building codes. Check with your local building official for final approval. The CSSB assumes no liability for any application non-conformance.

This bulletin only provides a short overview of this technical topic. For additional details consult:
1) CSSB's New Roof Construction Manual &
2) CSSB's Exterior and Interior Wall Manual; these are recommended reading materials.

For additional industry information:

Cedar Shake & Shingle Bureau	www.cedarbureau.org
American Forest and Paper Association	www.afandpa.org
American Society for Testing and Materials	www.astm.org
American Wood Council	www.awc.org
Canadian Wood Council	www.cwc.ca
Federation of Societies for Coatings Technology	www.coatingstech.org
Forintek Canada	www.forintek.ca
International Staple, Nail & Tool Association	www.isanta.org
University of Massachusetts	www.umass.edu/bmatwt/publications
USDA Forest Products Laboratory	www.fpl.fs.fed.us

Known as the recognized industry authority since 1915, the Cedar Shake and Shingle Bureau ("CSSB") is a successful, integrated and global trade association, offering a full range of services including technical assistance, building code updates, and weather resistant product details. Contact the CSSB for more information.

TEL: 604-820-7700 **www.cedarbureau.org**
FAX: 604-820-0266 **info@cedarbureau.com**

Production assistance provided by: Forestry Innovation Investment

Printed in Canada 03/07

5559 G1

US National Climatic Data Center

Average temperatures for the year for places in Florida are listed below. You'll find separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.
The tables give the normal maximum and minimum temperatures based on weather data collected from 1981 to 2010 by the US National Climatic Data Center.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual temperatures

High °F	Low °F	Place	High °C	Low °C
84	60	Arcadia	29	16
85	61	Avon Park	29	16
87	65	Big Cypress National Preserve	30	18
82	64	Bradenton	28	18
89	65	Everglades Park, Royal Palm	32	18
83	68	Ft. Lauderdale	29	20
85	66	Ft. Myers	29	19
82	65	Ft. Pierce	28	18
83	69	Hialeah	28	21
83	73	Key West	28	23
84	70	Miami	29	21

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81	71	Miami Beach	27	22
85	65	Naples	30	18
82	69	Pompano Beach	28	21
83	72	Tavernier (Key Largo)	29	22
82	64	Venice	28	18
81	64	Vero Beach	27	18
83	68	West Palm Beach	28	20

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Average yearly temperatures

High °F	Low °F	Place	High °C	Low °C
84	63	Bartow	29	17
80	62	Daytona Beach	27	17
83	63	Lakeland	28	17
82	63	Melbourne	28	17
83	63	Orlando	28	17
83	62	Plant City	28	17
82	67	St. Petersburg	28	19

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82	65	Tampa	28	18

North Florida

North Florida temperatures are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Normal annual temperatures

High °F	Low °F	Place	High °C	Low °C
81	56	Gainesville	27	14
80	55	Glen St. Mary	26	13
79	58	Jacksonville	26	14
78	62	Jacksonville Beach	26	17
79	55	Jasper	26	13
80	58	Lake City	26	14
82	57	Live Oak	28	14
79	55	Madison	26	13
84	59	Ocala	29	15
80	61	St. Augustine	26	16

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Annual temperature averages

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High °F	Low °F	Place	High °C	Low °C
78	59	Apalachicola	26	15
78	53	Crestview	26	12
78	56	DeFuniak Springs	26	13
79	55	Monticello	26	13
77	55	Niceville	25	13
78	59	Panama City	26	15
77	59	Pensacola	25	15
80	56	Tallahassee	26	13

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US National Climatic Data Center

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5559 G1

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5559 G1

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78	56	DeFuniak Springs	26	13
79	55	Monticello	26	13
77	55	Niceville	25	13
78	59	Panama City	26	15
77	59	Pensacola	25	15
80	56	Tallahassee	26	13

R5314

Date Submitted	7/18/2012	**Section**	R905.8 Wood shakes.	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5314-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

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Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R905.8 Wood shakes.
The installation of wood shakes shall comply with the provisions of this section.

R905.8.1 Deck requirements.
Wood shakes shall be used only on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

R905.8.1.1 Solid sheathing required.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less, solid sheathing is required on that portion of the roof requiring an ice barrier~~ Reserved.

R905.8.2 Deck slope.
Wood shakes shall only be used on slopes of ~~three~~ four (4) units vertical in twelve (12) units horizontal (~~25~~ 33-percent slope) or greater.

R905.8.3 Underlayment.
Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.

R905.8.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.8.3.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II or ASTM D 4869 Type IV. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch~~

~~(25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~**Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.**~~
Reserved.

R905.8.~~4~~ 3.3 Interlayment.
Interlayment shall comply with ASTM D 226, Type I.

R905.8.4 ~~Interlayment~~ Attachment.
~~**Interlayment shall comply with ASTM D 226, Type I.**~~

Attachment in accordance with Table R905.7.5 shall be used for roofs with a mean roof height of 40 feet or less and in regions with a V_{asd}, as determined in accordance with Section R301.2.1.3, of 100 mph or less.

R905.8.5 Material standards.
Wood shakes shall comply with the requirements of Table R905.8.5.

TABLE R905.8.5 WOOD SHAKE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shakes of naturally durable wood	1	Cedar Shake and Shingle Bureau
Taper sawn shakes of naturally durable wood	1 or 2	Cedar Shake and Shingle Bureau
Preservative-treated shakes and shingles of naturally durable wood	1	Cedar Shake and Shingle Bureau
Fire-retardant-treated shakes and shingles of naturally durable wood	1	Cedar Shake and Shingle Bureau
Preservative-treated taper sawn shakes of Southern pine treated in accordance with AWPA Standard U1 (Commodity Specification A, Use Category 3B and Section 5.6)	1 or 2	Forest Products Laboratory of the Texas Forest Services

R905.8.6 Application.
~~**Wood shakes shall be installed according to this chapter and the manufacturer's installation instructions.**~~

~~Wood shakes shall be laid with a side lap not less than 1 1/2 inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be 3/8 inch to 5/8 inch (9.5 mm to 15.9 mm) for shakes and tapersawn shakes of naturally durable wood and shall be 3/8 inch to 5/8 inch (9.5 mm to 15.9 mm) for preservative-treated taper sawn shakes. Weather exposure for wood shakes shall not exceed those set forth in Table R905.8.6. Fasteners for wood shakes shall be corrosion-resistant, with a minimum penetration of 1/2 inch (12.7 mm) into the sheathing. For sheathing less than 1/2 inch (12.7 mm) thick, the fasteners shall extend through the sheathing. Wood shakes shall be attached to the roof with two fasteners per shake, positioned no more than 1 inch (25 mm) from each edge and no more than 2 inches (51 mm) above the exposure line.~~ **Reserved.**

~~**TABLE R905.8.6 WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE**~~

~~ROOFING MATERIAL~~	~~LENGTH (inches)~~	~~GRADE~~	~~EXPOSURE (inches) 4:12 pitch or steeper~~
~~Shakes of naturally durable wood~~	~~18~~	~~No. 1~~	~~7 1/2~~
	~~24~~	~~No. 1~~	~~10[a]~~
~~Preservative-treated taper sawn shakes of Southern Yellow Pine~~	~~18~~	~~No. 1~~	~~7 1/2~~
	~~24~~	~~No. 1~~	~~10~~
	~~18~~	~~No. 2~~	~~5 1/2~~
	~~24~~	~~No. 2~~	~~7 1/2~~
~~Taper-sawn shakes of naturally durable wood~~	~~18~~	~~No. 1~~	~~7 1/2~~
	~~24~~	~~No. 1~~	~~10~~
	~~18~~	~~No. 2~~	~~5 1/2~~
	~~24~~	~~No. 2~~	~~7 1/2~~

~~For SI: 1 inch = 25.4 mm.~~
~~a. For 24-inch by 3/8-inch handsplit shakes, the maximum exposure is 7 1/2 inches.~~

R905.8.7 ~~Shake placement~~ Attachment for V_{asd} as determined in accordance with Section R301.2.1.3 greater than 100 mph.
~~**The starter course at the eaves shall be doubled and the bottom layer shall be either 15-inch (381 mm), 18-inch (457 mm) or 24-inch (610 mm) wood shakes or wood shingles. Fifteen-inch (381 mm) or 18-inch (457 mm) wood shakes may be used for the final course at the ridge. Shakes shall be interlaid with 18-inch-wide (457 mm) strips of not less than No. 30 felt shingled between each course in such a manner that no felt is exposed to the weather by positioning the lower edge of each felt strip above the butt end of the shake it covers a distance equal to twice the weather exposure.**~~ **Wood shakes installed in accordance with Table R905.7.5 and the requirements of R905.8.7 have an allowable uplift resistance of 90 psf. The installation of wood shakes shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).**

R905.8.7.1 Fasteners.

R905.8.7.1.1 Nails.
Nails to attach the wood shakes shall be 6d stainless-steel ring-shank nails. The nails shall have sufficient length to penetrate through the wood shakes and shall penetrate through the sheathing.

R905.8.7.1.2 Screws.
Screws to attach the battens to the framing shall be No. 8 by 2 $^{1}/_{2}$ inches long corrosion resistant wood screws. Wood screws shall be corrosion resistant screws conforming to ANSI/ASME B 18.6.1. The corrosion resistance shall meet ASTM A 641, Class 1 or an equal corrosion resistance by coating, electro galvanization, mechanical galvanization, stainless steel, nonferrous metal or other suitable corrosion resistant material.

R905.8.7.1.3 Wood battens.
1 × 6 wood battens shall be attached to the wood joists with 2 screws per joist. The first batten shall be located 6 inches from the outer edge of the wood joist. The second batten shall be spaced 1-$^{1}/_{4}$ inches from the first batten. The remaining battens shall be spaced a maximum 2 inches apart, except the last one, which shall be spaced no greater than $^{3}/_{4}$ inches from the previous batten.

R905.8.7.1.4 Shakes.
Shakes shall be attached to the battens with 2 nails for each shake placed 1$^{1}/_{2}$ inch above the exposure line. The nails shall be $^{3}/_{4}$ to 1 inch from the shake edges.

R905.8.8 ~~Valley flashing~~ Application.
~~Roof valley flashing shall not be less than No. 26 gage [0.019 inch (0.5 mm)] corrosion-resistant sheet metal and shall extend at least 11 inches (279 mm) from the centerline each way. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).~~

Wood shakes shall be laid with a side lap not less than 1$^{1}/_{2}$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^{3}/_{8}$ to $^{5}/_{8}$ inches (9.5 to 15.9 mm) for shakes and taper sawn shakes of naturally durable wood and shall be $^{1}/_{4}$ to $^{3}/_{8}$ inch (6.4 to 9.5 mm) for preservative taper sawn shakes. Weather exposure for wood shakes shall not exceed those set in Table R905.8.8.

TABLE R905.8.8 WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches) 4:12 pitch or steeper
Shakes of naturally durable wood	18	No. 1	7$^{1}/_{2}$
	24	No. 1	10[a]
Preservative-treated taper sawn shakes of Southern Yellow Pine	18	No. 1	7$^{1}/_{2}$
	24	No. 1	10
	18	No. 2	5$^{1}/_{2}$
	24	No. 2	7$^{1}/_{2}$

Taper-sawn shakes of naturally durable wood	18	No. 1	$7^1/_2$
	24	No. 1	10
	18	No. 2	$5^1/_2$
	24	No. 2	$7^1/_2$

For SI: 1 inch = 25.4 mm.
a. For 24-inch by $^3/_8$-inch handsplit shakes, the maximum exposure is $7^1/_2$ inches.

R905.8.9 Label required.
Each bundle of shakes shall be identified by a label of an approved grading or inspection bureau or agency.

R905.8.10 Flashing.
At the juncture of the roof and vertical surfaces, flashing and counter flashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, shall not be less than 0.017-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal.

R905.8.10.1 Valley flashing.
Valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of four (4) units vertical in twelve (12) units horizontal (33-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of ASTM D 226 Type I underlayment running the full length of the valley, in addition to other required underlayment per Table R903.2.1 Valley flashing and flashing metal shall be a minimum thickness as provided in Table R903.2.1 for nonferrous metal or stainless steel.

R905.8 Wood shakes.
The installation of wood shakes shall comply with the provisions of this section.

R905.8.1 Deck requirements.
Wood shakes shall be used only on solid or spaced sheathing. Where spaced sheathing is used, sheathing boards shall not be less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards.

R905.8.1.1 Solid sheathing required.
~~In areas where the average daily temperature in January is 25°F (-4°C) or less, solid sheathing is required on that portion of the roof requiring an ice barrier~~ Reserved.

R905.8.2 Deck slope.
Wood shakes shall only be used on slopes of ~~three~~ four (4) units vertical in twelve (12) units horizontal (~~25~~ 33-percent slope) or greater.

~~**R905.8.3 Underlayment.**~~

~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.8.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

R905.8.3.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached *accessory structures* that contain no *conditioned floor area*.~~ Reserved.

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~~**R905.8.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^{3}/_{4}$ inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

R905.8.~~4~~ 3.3 Interlayment.
Interlayment shall comply with ASTM D 226, Type I.

R905.8.4 ~~Interlayment~~ Attachment.
~~Interlayment shall comply with ASTM D 226, Type I.~~

Attachment in accordance with Table R905.7.5 shall be used for roofs with a mean roof height of 40 feet or less and in regions with a V_{asd}, as determined in accordance with Section R301.2.1.3, of 100 mph or less.

R905.8.5 Material standards.
Wood shakes shall comply with the requirements of Table R905.8.5.

TABLE R905.8.5 WOOD SHAKE MATERIAL REQUIREMENTS

MATERIAL	MINIMUM GRADES	APPLICABLE GRADING RULES
Wood shakes of naturally durable wood	1	Cedar Shake and Shingle Bureau
Taper sawn shakes of naturally durable wood	1 or 2	Cedar Shake and Shingle Bureau
Preservative-treated shakes and shingles of naturally durable wood	1	Cedar Shake and Shingle Bureau
Fire-retardant-treated shakes and shingles of naturally durable wood	1	Cedar Shake and Shingle Bureau
Preservative-treated taper sawn shakes of Southern pine treated in accordance with AWPA Standard U1 (Commodity Specification A, Use Category 3B and Section 5.6)	1 or 2	Forest Products Laboratory of the Texas Forest Services

R905.8.6 Application.
~~Wood shakes shall be installed according to this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1\frac{1}{2}$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $\frac{3}{8}$ inch to $\frac{5}{8}$ inch (9.5 mm to 15.9 mm) for shakes and tapersawn shakes of naturally durable wood and shall be $\frac{3}{8}$ inch to $\frac{5}{8}$ inch (9.5 mm to 15.9 mm) for preservative-treated taper sawn shakes. Weather exposure for wood shakes shall not exceed those set forth in Table R905.8.6. Fasteners for wood shakes shall be corrosion-resistant, with a minimum penetration of $\frac{1}{2}$ inch (12.7 mm) into the sheathing. For sheathing less than $\frac{1}{2}$ inch (12.7 mm) thick, the fasteners shall extend through the sheathing. Wood shakes shall be attached to the roof with two fasteners per shake, positioned no more than 1 inch (25 mm) from each edge and no more than 2 inches (51 mm) above the exposure line.~~ Reserved.

~~**TABLE R905.8.6 WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE**~~

~~ROOFING MATERIAL~~	~~LENGTH (inches)~~	~~GRADE~~	~~EXPOSURE (inches) 4:12 pitch or steeper~~
~~Shakes of naturally durable wood~~	~~18~~	~~No. 1~~	~~$7\frac{1}{2}$~~
	~~24~~	~~No. 1~~	~~10[a]~~
~~Preservative-treated taper sawn shakes of~~	~~18~~	~~No. 1~~	~~$7\frac{1}{2}$~~
	~~24~~	~~No. 1~~	~~10~~
	~~18~~	~~No. 2~~	~~$5\frac{1}{2}$~~

~~Southern Yellow Pine~~	~~24~~	~~No. 2~~	~~$7\frac{1}{2}$~~
~~Taper-sawn shakes of naturally durable wood~~	~~18~~	~~No. 1~~	~~$7\frac{1}{2}$~~
	~~24~~	~~No. 1~~	~~10~~
	~~18~~	~~No. 2~~	~~$5\frac{1}{2}$~~
	~~24~~	~~No. 2~~	~~$7\frac{1}{2}$~~

~~For SI: 1 inch = 25.4 mm.~~
~~a. For 24-inch by $\frac{3}{8}$-inch handsplit shakes, the maximum exposure is $7\frac{1}{2}$ inches.~~

R905.8.7 ~~Shake placement~~ Attachment for V_{asd} as determined in accordance with Section R301.2.1.3 greater than 100 mph.
~~The starter course at the eaves shall be doubled and the bottom layer shall be either 15-inch (381 mm), 18-inch (457 mm) or 24-inch (610 mm) wood shakes or wood shingles. Fifteen-inch (381 mm) or 18-inch (457 mm) wood shakes may be used for the final course at the ridge. Shakes shall be interlaid with 18-inch-wide (457 mm) strips of not less than No. 30 felt shingled between each course in such a manner that no felt is exposed to the weather by positioning the lower edge of each felt strip above the butt end of the shake it covers a distance equal to twice the weather exposure~~. Wood shakes installed in accordance with Table R905.7.5 and the requirements of R905.8.7 have an allowable uplift resistance of 90 psf. The installation of wood shakes shall be limited to roofs where the allowable uplift resistance is equal to or greater than the design uplift pressure for the roof listed in Table R301.2(2).

R905.8.7.1 Fasteners.

R905.8.7.1.1 Nails.
Nails to attach the wood shakes shall be 6d stainless-steel ring-shank nails. The nails shall have sufficient length to penetrate through the wood shakes and shall penetrate through the sheathing.

R905.8.7.1.2 Screws.
Screws to attach the battens to the framing shall be No. 8 by $2\frac{1}{2}$ inches long corrosion resistant wood screws. Wood screws shall be corrosion resistant screws conforming to ANSI/ASME B 18.6.1. The corrosion resistance shall meet ASTM A 641, Class 1 or an equal corrosion resistance by coating, electro galvanization, mechanical galvanization, stainless steel, nonferrous metal or other suitable corrosion resistant material.

R905.8.7.1.3 Wood battens.
1 × 6 wood battens shall be attached to the wood joists with 2 screws per joist. The first batten shall be located 6 inches from the outer edge of the wood joist. The second batten shall be spaced 1-$\frac{1}{4}$ inches from the first batten. The remaining battens shall be spaced a maximum 2 inches apart, except the last one, which shall be spaced no greater than $\frac{3}{4}$ inches from the previous batten.

R905.8.7.1.4 Shakes.
Shakes shall be attached to the battens with 2 nails for each shake placed $1^{1}/_{2}$ inch above the exposure line. The nails shall be $^{3}/_{4}$ to 1 inch from the shake edges.

R905.8.8 ~~Valley flashing~~ Application.
~~Roof valley flashing shall not be less than No. 26 gage [0.019 inch (0.5 mm)] corrosion-resistant sheet metal and shall extend at least 11 inches (279 mm) from the centerline each way. Sections of flashing shall have an end lap of not less than 4 inches (102 mm).~~

Wood shakes shall be laid with a side lap not less than $1^{1}/_{2}$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^{3}/_{8}$ to $^{5}/_{8}$ inches (9.5 to 15.9 mm) for shakes and taper sawn shakes of naturally durable wood and shall be $^{1}/_{4}$ to $^{3}/_{8}$ inch (6.4 to 9.5 mm) for preservative taper sawn shakes. Weather exposure for wood shakes shall not exceed those set in Table R905.8.8.

TABLE R905.8.8 WOOD SHAKE WEATHER EXPOSURE AND ROOF SLOPE

ROOFING MATERIAL	LENGTH (inches)	GRADE	EXPOSURE (inches) 4:12 pitch or steeper
Shakes of naturally durable wood	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10[a]
Preservative-treated taper sawn shakes of Southern Yellow Pine	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10
	18	No. 2	$5^{1}/_{2}$
	24	No. 2	$7^{1}/_{2}$
Taper-sawn shakes of naturally durable wood	18	No. 1	$7^{1}/_{2}$
	24	No. 1	10
	18	No. 2	$5^{1}/_{2}$
	24	No. 2	$7^{1}/_{2}$

For SI: 1 inch = 25.4 mm.
a. For 24-inch by $^{3}/_{8}$-inch handsplit shakes, the maximum exposure is $7^{1}/_{2}$ inches.

R905.8.9 Label required.
Each bundle of shakes shall be identified by a *label* of an *approved* grading or inspection bureau or agency.

R905.8.10 Flashing.
At the juncture of the roof and vertical surfaces, flashing and counter flashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, shall not be less than 0.017-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal.

R905.8.10.1 Valley flashing.

Valley flashing shall extend at least 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of four (4) units vertical in twelve (12) units horizontal (33-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) underlayment of one layer of ASTM D 226 Type I underlayment running the full length of the valley, in addition to other required underlayment per Table R903.2.1 Valley flashing and flashing metal shall be a minimum thickness as provided in Table R903.2.1 for nonferrous metal or stainless steel.

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5560-A1

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The original proposal is recommended for approval with the modifications shown in this comment. The comment proposes that underlayment used in Florida be of a type that is equivalent to 30# felt or ASTM D 226 Type II. Observations of roof underlayment performance following Hurricane Ike in Texas and in two sets of tests conducted at the University of Florida and Florida International University demonstrated that relatively new and new ASTM 226 Type I underlayments performed very poorly when subjected to wind speeds over about 110 mph. In the laboratory tests, specimens covered with ASTM 226 Type I and Type II underlayments performed dramatically different. ASTM Type I felt (15#) material completely blew off some portions of the specimen as winds exceeded 110 mph and pulled over the plastic caps on other parts of the specimen. In contrast, the ASTM 226 Type II (30#) material remained in place and showed very few signs of distress. The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.oo for a double layer system for a roof size of 20 squares.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact local entities relative to enforcement of the code.

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

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Impact to industry relative to the cost of compliance with code

The cost increase associated with using 30# felt as opposed to 15# felt is approximately $100.00 for a single layer system for a roof size of 20 squares and approximately $200.00 for a double layer system for a roof size of 20 squares.

Requirements

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

This code change will provide greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

This proposal will strengthen the code by providing greater resistance to water penetration in the event the roof covering is blown off during a design wind event.

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

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

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

R5560-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Comment:

TAC comment was concern with ice and covering the substrate with peel and stick underlayment. All other revised underlayment code modifications approved. Attach Cedar Shake & Shingle Bureau Technical Bulletin and US National Climatic Data Center average temperatures for the year for places in Florida.

~~**R905.8.3 Underlayment.**~~

~~Underlayment shall comply with ASTM D 226, Type I or ASTM D 4869, Type I or II.~~

R905.8.3 Underlayment

Underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV.

R905.8.3.1 Ice barrier.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

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~~**R905.8.3.2 Underlayment and high winds.**~~

~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.~~

~~**Exception:** As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~

R905.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1. Two layer underlayment shall comply with ASTM D 226, Type I or Type II or ASTM D 4869, Type II or Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm).

2. One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm).

R905.8.3 Underlayment

Underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV.

R905.8.3.1 Ice barrier. Reserved.

R905.8.3.2 Underlayment Application.

Underlayment shall be installed using one of the following methods:

1.Two layer underlayment shall comply with ASTM D 226~~, Type I or~~ Type II or ASTM D 4869~~, Type II or~~ Type IV: 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), and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

2.One layer underlayment shall comply with ASTM D 226, Type II or ASTM D 4869, Type IV: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 ~~2~~ inches (51 mm), fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). End laps shall be offset by 6 feet (1829 mm). The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of 3/4 inch (19 mm) into the roof sheathing.

Cedar Shake & Shingle Bureau

TECHNICAL BULLETIN

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Overview

This product is used as part of cedar roofing and wall systems. It enhances a system's water shedding ability and helps prevent the intrusion of wind driven snow which can cause ice damming. Sheathing and roofing systems are separate systems; both systems are required by building code and need to be properly designed and installed. Three main types of products need to be considered:
1) underlayment 2) interlayment and 3) eave production.

Correct Specifications

The CSSB's **New Roof Construction Manual** shows how to install these products:

Underlayment/Interlayment

Many of the segments in the market use a general term when ordering or specifying a particular type of product. Asphalt-Saturated Organic Felt Underlayment ("felt") is most commonly stated as '30 pound felt' or 'Type 30 felt'. These 'terms' may allow for inappropriate or substandard products to be used; further definitions are becoming necessary to follow current industry developments. Ensure the most detailed specifications are used to maintain the integrity of a project and compliance with local building codes.

The American Society for Testing Materials Standards ("ASTM") for Asphalt-Saturated Organic Felt Definitions:

ASTM Designation 226 (ASTM D 226) is the "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing"

ASTM Designation 4869 (ASTM D 4869) is the "Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing"

ASTM notes that:

1) Type 30 felt is more of a name today than a weight reference.

2) The specification in jobs would be ASTM Designation 226 ("ASTM" D 226) or ASTM Designation 4869 ("ASTM" D 4869). Check www.astm.org for the most current information.

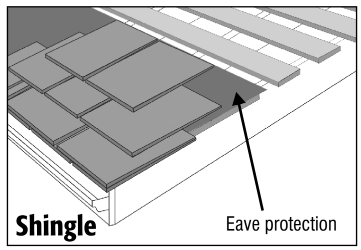
There are differences in the asphalt content and composition of the felt within ASTM Designations. It is important to check with local building code requirements when specifying the ASTM Designation number as some codes require the use of a specific ASTM Designation for roof and sidewall application.

Manufacturers of these products still use a "Type 15" or "Type 30" identifier on the product identification bands but also will state ASTM Designation 226 or ASTM Designation 4869 when the product meets ASTM standards. The CSSB recommends specifiers always state a **No.30 ASTM D 226** or **No.30 ASTM D 4869** felt in addition to the "Type 30" referred to in the CSSB's New Roof Construction Manual and the CSSB's Exterior and Interior Wall Manual.

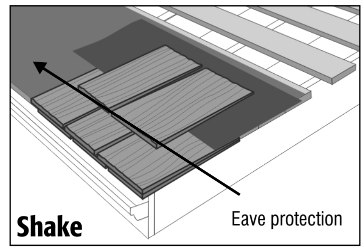
Self-Adhesive Eave Protection

Self adhesive eave protection is a rubberized type of asphalt material used at the bottom of the roof near the gutter area. It is in place to prevent ice damming and water intrusion from the eaves.

It may be used at the eaves and valleys in geographical areas prone to ice damming, on both cedar shake and cedar shingle roofs (consult local building codes for more details).



Underlayment



Interlaid/Interwoven Felt

Caution Areas

- There is a trend where some installers are putting rubberized eave protection over the entire roofing deck. Contact the rubberized eave manufacturer for complete installation instructions and information on how to prevent condensation and moisture issues.
- Current CSSB policy is to only apply this rubberized eave protection at the eaves and valleys.
- Interlay shakes with 18" wide felt and ensure to check with local building code for ASTM Designation 226 requirements
- Never interlay shingles with felt (it is already a 3-ply system) UNLESS absolutely required by local building code
- Do not position felt lower than double the exposure of the product. If the felt does extend below this line it is commonly referred to as 'rot felting' since the felt is susceptible to deterioration from the sun's UV rays. Rot felting can also prevent proper drying of shakes and shingles, thus shortening their life.

Type 30 ASTM Felt

Self-adhesive eave protection (do not confuse with Type 30 ASTM felt)

Cedar Shake & Shingle Bureau

TECHNICAL BULLETIN

Asphalt-Saturated Organic Felt:

Cedar Roof Underlayment, Interlayment and Eave Protection

Frequently Asked Questions:

Current Industry Trends

- Vapor permeable banner wrap type products have made inroads in house design and construction in the recent past. Use of this type of product should only be considered if the local building official approves of this variation from the installation methods recommended by the CSSB. Also consider the data at www.umass.edu/bmatwt/publications, Housewraps/Felt and Weather Penetration Barriers - author Paul Fisette
- Modern homes are built more air tight, and this means that proper ventilation of the structure is even more crucial. The CSSB recommends venting no less than 1:150 with compensation made for screens over vent apperatures. In the case of a balanced system 1 square foot per 300 square feet of floor area may be adequate ventilation. Check with the local building official for more information.

Do I have to use a continuous ventilation product on my installation?
Not necessarily. The continuous ventilation product is an option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

Can I use a continuous ventilation product instead of felt?
No. Felt is a must. The continuous ventilation product is an additional option, especially in high humidity areas. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options. Remember: do not interlay shingles with felt unless required by local code.

Can I use a continuous ventilation product immediately on top of felt?
No. If you elect to use a continuous ventilation product, it should be installed between the sheathing (deck) and the felt. Consult the CSSB's **New Roof Construction Manual** for information about roofing application options.

When I hear "30 pound felt" does it mean the same thing as "Type 30 felt"?
In the construction and roofing trades, it is common for people to use the terms interchangeably. Type 30 felt comes in many varieties. Ensure you also write in the correct ASTM Designation in your detailed specification to guarantee that you are obtaining quality materials.

The information in this bulletin is not intended to supercede local building codes. Check with your local building official for final approval. The CSSB assumes no liability for any application non-conformance.

This bulletin only provides a short overview of this technical topic. For additional details consult:
1) CSSB's New Roof Construction Manual &
2) CSSB's Exterior and Interior Wall Manual; these are recommended reading materials.

For additional industry information:

Cedar Shake & Shingle Bureau	www.cedarbureau.org
American Forest and Paper Association	www.afandpa.org
American Society for Testing and Materials	www.astm.org
American Wood Council	www.awc.org
Canadian Wood Council	www.cwc.ca
Federation of Societies for Coatings Technology	www.coatingstech.org
Forintek Canada	www.forintek.ca
International Staple, Nail & Tool Association	www.isanta.org
University of Massachusetts	www.umass.edu/bmatwt/publications
USDA Forest Products Laboratory	www.fpl.fs.fed.us

Known as the recognized industry authority since 1915, the Cedar Shake and Shingle Bureau ("CSSB") is a successful, integrated and global trade association, offering a full range of services including technical assistance, building code updates, and weather resistant product details. Contact the CSSB for more information.

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US National Climatic Data Center

Average temperatures for the year for places in Florida are listed below. You'll find separate tables for each region: South Florida (including the Florida Keys), Central Florida, North Florida and the Florida Panhandle.
The tables give the normal maximum and minimum temperatures based on weather data collected from 1981 to 2010 by the US National Climatic Data Center.

South Florida

South Florida weather records include the counties of Broward, Collier, DeSoto, Highlands, Indian River, Lee, Manatee, Miami-Dade, Monroe, Palm Beach, St Lucie and Sarasota.

Average annual temperatures

High °F	Low °F	Place	High °C	Low °C
84	60	Arcadia	29	16
85	61	Avon Park	29	16
87	65	Big Cypress National Preserve	30	18
82	64	Bradenton	28	18
89	65	Everglades Park, Royal Palm	32	18
83	68	Ft. Lauderdale	29	20
85	66	Ft. Myers	29	19
82	65	Ft. Pierce	28	18
83	69	Hialeah	28	21
83	73	Key West	28	23
84	70	Miami	29	21

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81	71	Miami Beach	27	22
85	65	Naples	30	18
82	69	Pompano Beach	28	21
83	72	Tavernier (Key Largo)	29	22
82	64	Venice	28	18
81	64	Vero Beach	27	18
83	68	West Palm Beach	28	20

Central Florida

Climate records for the central Florida region include cities in the counties of Brevard, Hillsborough, Orange, Pinellas, Polk and Volusia.

Average yearly temperatures

High °F	Low °F	Place	High °C	Low °C
84	63	Bartow	29	17
80	62	Daytona Beach	27	17
83	63	Lakeland	28	17
82	63	Melbourne	28	17
83	63	Orlando	28	17
83	62	Plant City	28	17
82	67	St. Petersburg	28	19

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82	65	Tampa	28	18

North Florida

North Florida temperatures are for weather stations in the counties of Alachua, Baker, Columbia, Duval, Hamilton, Madison, Marion, St Johns and Suwannee.

Normal annual temperatures

High °F	Low °F	Place	High °C	Low °C
81	56	Gainesville	27	14
80	55	Glen St. Mary	26	13
79	58	Jacksonville	26	14
78	62	Jacksonville Beach	26	17
79	55	Jasper	26	13
80	58	Lake City	26	14
82	57	Live Oak	28	14
79	55	Madison	26	13
84	59	Ocala	29	15
80	61	St. Augustine	26	16

Florida Panhandle

Florida Panhandle weather data come from the counties of Bay, Escambia, Franklin, Jefferson, Leon, Okaloosa and Walton.

Annual temperature averages

5560 G1

High °F	Low °F	Place	High °C	Low °C
78	59	Apalachicola	26	15
78	53	Crestview	26	12
78	56	DeFuniak Springs	26	13
79	55	Monticello	26	13
77	55	Niceville	25	13
78	59	Panama City	26	15
77	59	Pensacola	25	15
80	56	Tallahassee	26	13

R5301

Date Submitted	7/18/2012	**Section**	R905	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5301-G1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** No

Comment:

This Code Modification can be withdrawn

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 R301.2(3).

R905.2 Asphalt shingles.
The installation of asphalt shingles shall comply with the provisions of this section.

R905.2.1 Sheathing requirements.
Asphalt shingles shall be fastened to solidly sheathed decks.

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) up to four units vertical in 12 units horizontal (4:12), double underlayment application is required in accordance with Section R905.2.7.

R905.2.3 Underlayment.
Unless otherwise noted, required underlayment shall conform ~~to~~ <u>with</u> ASTM D 226 Type I or <u>Type II</u>, ASTM D 4869, Type I or <u>Type II</u>, or ASTM D 6757.

Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.

R905.2.4 Asphalt shingles.
Asphalt shingles shall comply with ASTM D 225 or D 3462.

R905.2.4.1 Wind resistance of asphalt shingles.
Asphalt shingles shall be ~~tested in accordance with ASTM D 7158. Asphalt shingles shall meet the classification requirements of Table R905.2.4.1(1) for the appropriate maximum basic wind speed. Asphalt shingle packaging shall bear a label to indicate compliance with ASTM D 7158 and the required classification in Table R905.2.4.1(1)~~ installed in accordance with Section R905.2.6. and R905.2.6.1.

~~Exception: Asphalt shingles not included in the scope of ASTM D 7158 shall be tested and labeled to indicate compliance with ASTM D 3161 and the required classification in Table R905.2.4.1(2).~~

TABLE R905.2.4.1(1) ~~CLASSIFICATION OF ASPHALT ROOF SHINGLES PER ASTM D 7158~~

~~MAXIMUM BASIC WIND SPEED FROM FIGURE 301.2(4)A (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~D, G or H~~
~~90~~	~~D, G or H~~
~~100~~	~~G or H~~
~~110~~	~~G or H~~
~~120~~	~~G or H~~

~~130~~	~~H~~
~~140~~	~~H~~
~~150~~	~~H~~

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

Reserved.

TABLE R905.2.4.1(2) ~~CLASSIFICATION OF ASPHALT SHINGLES PER ASTM D 3161~~

~~MAXIMUM BASIC WIND SPEED FROM FIGURE 301.2(4)A (mph)~~	~~CLASSIFICATION REQUIREMENT~~
~~85~~	~~A, D or F~~
~~90~~	~~A, D or F~~
~~100~~	~~A, D or F~~
~~110~~	~~F~~
~~120~~	~~F~~
~~130~~	~~F~~
~~140~~	~~F~~
~~150~~	~~F~~

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

Reserved.

R905.2.5 Fasteners.

Fasteners for asphalt shingles shall be galvanized steel, stainless steel, aluminum or copper roofing nails, minimum 12 gage [0.105 inch (3 mm)] shank with a minimum $^3/_8$ -inch-diameter (10 mm) head, ASTM F 1667, of a length to penetrate through the roofing materials and a minimum of $^3/_4$ inch (19 mm) into the roof sheathing. Where the roof sheathing is less than $^3/_4$ inch (19 mm) thick, the fasteners shall penetrate through the sheathing. Fasteners shall comply with ASTM F 1667.

R905.2.6 Attachment.

Asphalt shingles shall have the minimum number of fasteners required by the manufacturer, but not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 21 units vertical in 12 units horizontal (21:12, 175-percent slope), shingles shall be installed as required by the manufacturer.

R905.2.6.1 Wind Resistance of Asphalt Shingles.

Asphalt Shingles shall be classified in accordance with ASTM D 3161, TAS 107 or ASTM D 7158 to resist the basic wind speed per Figure R301.2(4). Shingles classified as ASTM D 3161 Class D or classified as ASTM D

7158 Class G are acceptable for use in the 100-mph wind zone. Shingles classified as ASTM D 3161 Class F, TAS107 or ASTM D 7158 Class H are acceptable for use in all wind zones. Asphalt shingle wrappers shall indicate compliance with one of the required classifications as shown in Table R905.2.6.1.

TABLE R905.2.6.1 WIND RESISTANCE OF ASPHALT SHINGLES

Classification of Asphalt Shingles			
Maximum Basic Wind Speed, V_{ult}, From Figure R301.2(4)	V_{asd} as determined in accordance with Section R301.2.1.3	ASTM D 7158	ASTM D 3161
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

R905.2.7 Underlayment application.
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), two layers of underlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be ~~two layers~~ applied in the following manner.

1. Apply a 19-inch (483 mm) strip of underlayment felt parallel ~~to~~ with and starting at the eaves~~, fastened sufficiently to hold in place~~.

2. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm)~~, and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

3. End laps shall be offset by 6 feet (1829 mm).

4. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, one layer of underlayment complying with ASTM D 226 Type I or Type II, ASTM D 4869 Type I or Type II, or ASTM D 6757 shall be ~~one layer~~ applied in the following manner.

1. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm) ~~fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.~~

2. End laps shall be offset by 6 feet (1829 mm).

3. Corrosion resistant fasteners are to be applied along the overlap at a maximum spacing of 36 inches (914 mm) on center.

R905.2.7.1 Ice barrier.
~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~

~~Exception: Detached accessory structures that contain no conditioned floor area.~~ Reserved.

R905.2.7.2 Underlayment and high winds.
~~Underlayment applied in areas subject to high winds [above 110 mph (49 m/s) in accordance with Figure R301.2(4)A] shall be applied with corrosion-resistant fasteners in accordance with manufacturer's installation instructions. Fasteners are to be applied along the overlap not farther apart than 36 inches (914 mm) on center.~~

~~Underlayment installed where the basic wind speed equals or exceeds 120 mph (54 m/s) shall comply with ASTM D 226 Type II, ASTM D 4869 Type IV, or ASTM D 6757. The underlayment shall be attached in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at the side laps. Underlayment shall be applied in accordance with Section R905.2.7 except all laps shall be a minimum of 4 inches (102 mm). Underlayment shall be attached using metal or plastic cap nails with a head diameter of not less than 1 inch (25.4 mm) with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge (0.105 inches) with a length to penetrate through the roof sheathing or a minimum of $^3/_4$ inch (19 mm) into the roof sheathing.~~

~~Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.~~
Reserved.

R905.2.8 Flashing.
Flashing for asphalt shingles shall comply with this section.

R905.2.8.1 Base and ~~cap~~ counter flashing.
Base and ~~cap~~ counter flashing shall be installed ~~in accordance with manufacturer's installation instructions. Base flashing shall be of either corrosion-resistant metal of minimum nominal 0.019-inch (0.5 mm) thickness or mineral surface roll roofing weighing a minimum of 77 pounds per 100 square feet (4 kg/m^2). Cap flashing shall be corrosion-resistant metal of minimum nominal 0.019-inch (0.5 mm) thickness~~ as follows:

1. In accordance with manufacturer's installation instructions, or

2. A continuous metal minimum 4 inch by 4 inch "L" flashing shall be set in approved flashing cement and set flush to base of wall and over the underlayment. Both horizontal and vertical metal flanges shall be fastened 6

inches (152 mm) on center with approved fasteners. All laps shall be a minimum of 4 inches (102 mm) fully sealed in approved flashing cement. Flashing shall start at the lower portion of roof to ensure water-shedding capabilities of all metal laps. The entire edge of the horizontal flange shall be sealed covering all nail penetrations with approved flashing cement and membrane. Shingles shall overlap the horizontal flange and shall be set in approved flashing cement.

Base flashing shall be of either corrosion-resistant metal provided in Section R905.2.8.1 or mineral surface roll roofing weighing a minimum of 77 pounds per 100 square feet (3.76 kg/m^2). Counter flashing shall be corrosion-resistant metal with a minimum thickness provided in Table R903.2.1.

R905.2.8.2 Valleys.
Valley linings shall be installed in accordance with the manufacturer's installation instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be at least ~~24~~ 16 inches (~~610~~ 406 mm) wide and of any of the corrosion-resistant metals in Table ~~R905.2.8.2~~ R903.2.1 .

2. For open valleys, valley lining of two plies of mineral surfaced roll roofing, complying with ASTM D 3909 or ASTM D 6380 Class M, shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer a minimum of 36 inches (914 mm) wide.

3. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D 6380 Class S and at least 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 shall be permitted in lieu of the lining material.

TABLE R905.2.8.2 VALLEY LINING MATERIAL

~~MATERIAL~~	~~MINIMUM THICKNESS (inches)~~	~~GAGE~~	~~WEIGHT (pounds)~~
~~Cold-rolled copper~~	~~0.0216 nominal~~	—	~~ASTM B 370, 16 oz. per square foot~~
~~Lead-coated copper~~	~~0.0216 nominal~~	—	~~ASTM B 101, 16 oz. per square foot~~
~~High-yield copper~~	~~0.0162 nominal~~	—	~~ASTM B 370, 12 oz. per square foot~~
~~Lead-coated high-yield copper~~	~~0.0162 nominal~~	—	~~ASTM B 101, 12 oz. per square foot~~
~~Aluminum~~	~~0.024~~	—	—
~~Stainless steel~~	—	~~28~~	—
~~Galvanized steel~~	~~0.0179~~	~~26 (zinc coated G90)~~	—
~~Zinc alloy~~	~~0.027~~	—	—
~~Lead~~	—	—	~~$2^1/_2$~~
~~Painted terne~~	—	—	~~20~~

~~For SI: 1 inch = 25.4 mm, 1 pound = 0.454 kg.~~ Reserved.

R905.2.8.3 Sidewall flashing.

~~Base f~~ Flashing against a vertical sidewall shall be by the step-flashing method or continuous "L" flashing method. ~~continuous or step flashing and shall be a minimum of 4 inches (102 mm) in height and 4 inches (102 mm) in width and shall direct water away from the vertical sidewall onto the roof and/or into the gutter. Where siding is provided on the vertical sidewall, the vertical leg of the flashing shall be continuous under the siding. Where anchored masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and counterflashing shall be provided in accordance with Section R703.7.2.2. Where exterior plaster or adhered masonry veneer is provided on the vertical sidewall, the base flashing shall be provided in accordance with this section and Section R703.6.3~~.

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 according to the asphalt shingle manufacturer's printed instructions.

R905.2.8.5 Drip edge.

~~A drip edge shall be provided at eaves and gables of shingle roofs. Adjacent pieces of drip edge shall be overlapped a minimum of 2 inches (51 mm). Drip edges shall extend a minimum of 0.25 inch (6.4 mm) below the roof sheathing and extend up the roof deck a minimum of 2 inches (51 mm). Drip edges shall be mechanically fastened to the roof deck at a maximum of 12 inches (305 mm) o.c. with fasteners as specified in Section R905.2.5. Underlayment shall be installed over the drip edge along eaves and under the underlayment on gables. Unless specified differently by the shingle manufacturer, shingles are permitted to be flush with the drip edge.~~

Provide drip edge at eaves and gables of shingle roofs. Overlap 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 eaves shall be permitted to be installed either over or under the underlayment. If installed over the underlayment, there shall be a minimum 4 inch (51 mm) width of roof cement installed over the drip edge flange. Drip edge shall be mechanically fastened a maximum of 12 inches (305 mm) on center. Where the V_{asd} as determined in accordance with Section R301.2.1.3 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.

R5554

Date Submitted	7/21/2012	**Section**	R907 REROOFING	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Moves current Florida-specific criteria from Existing Buildings volume used in residential reroofing to the Residential volume.

Rationale

Currently the only Foundation Code references that provide guidance specific to residential reroofing are found in the Foundation Residential Code. Chapter 6 of the Florida Existing Building Code contains supplementary regulatory requirements exclusive to residential reroofing not contained within in the Foundation Code. However, these supplementary regulatory requirements must be combined with the materials and installation procedures of the Residential Code "611.1- Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential".
The purpose of this code modification is to create uniformity by following the Foundation Code model through the consolidation of all the associated roofing/reroofing code sections into one volume providing a single location for contractors, design professionals and code officials to find all code information related to the evaluation and installation of residential reroofing including the mitigation requirements specific to site-built single family residential structures in the Residential Code volume.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5554-A4

Proponent T Stafford **Submitted** 12/14/2012 **Attachments** Yes

Rationale

This comment modifies the original proposal. The intent is for the original code change to be approved with the modification provided in this comment. This comment incorporates results of recent tests on ring shank nails and discussion with industry on more commonly acceptable and available nails on the market.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will have no impact to local entities regarding enforcement of the code as the 2010 FBCR currently contains this requirement.

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

The cost impact to building and property owners will be minimal to negligible as the cost increase will be less than $10 for a 2000 square foot roof.

Impact to industry relative to the cost of compliance with code

The cost impact to building and property owners will be minimal to negligible as the cost increase will be less than $10 for a 2000 square foot roof.

Requirements

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

This requirement will strengthen the code which will improve the performance of buildings impacted by hurricanes.

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

The requirement will strengthen the code.

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

This requirement will not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This requirement will not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5554-A3

Proponent T Stafford **Submitted** 12/13/2012 **Attachments** Yes

Rationale

This comment only modifies the text of the original modification as shown in the comment. The remainder of the original proposal is intended to go forward as submitted. The original proposal is recommended for approval with the modifications shown in this comment. The FBCR and FBCEB have been somewhat inconsistent with the minimum dimensional characteristics of the ring shank nail that forms the basis of this proposal. This comment, in addition to other comments submitted, will make the codes consistent in regard to this and will reference nails commonly used in the field that are consistent with tests that formed the basis of the original code change.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

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

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

Impact to industry relative to the cost of compliance with code

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

Requirements

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

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

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

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

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

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

Does not degrade the effectiveness of the code

This language is currently contained in the 2010 FBC. No new requirements are being proposed.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5554-A1

Proponent Mark Zehnal **Submitted** 12/7/2012 **Attachments** Yes

Rationale

Currently the only Foundation Code references that provide guidance specific to residential reroofing are found in the Foundation Residential Code. Chapter 6 of the Florida Existing Building Code contains supplementary regulatory requirements exclusive to residential reroofing not contained within in the Foundation Code. However, these supplementary regulatory requirements must be combined with the materials and installation procedures of the Residential Code “611.1- Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the Florida Building Code, Building or Chapter 9 of the Florida Building Code, Residential”. The purpose of this code modification is to create uniformity by following the Foundation Code model through the consolidation of all the associated roofing/reroofing code sections into one volume providing a single location for contractors, design professionals and code officials to find all code information related to the evaluation and installation of residential reroofing including the mitigation requirements specific to site-built single family residential structures in the Residential Code volume.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

SECTION R907 REROOFING

R907.1 General.
Materials and methods of application used for re-covering or replacing an existing roof covering shall comply with the requirements of Chapter 9 of the *Florida Building Code, Residential*.

Exception: Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive roof drainage.

R907.2 Structural and construction loads.

The structural roof components shall be capable of supporting the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.

R907.3 Recovering versus replacement.
New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions ~~exist~~ occur:

1. Where the existing roof or roof covering is water-soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

2. Where the existing roof covering is wood shingle or shake, slate, clay, cement or asbestos-cement tile.

3. Where the existing roof has two or more applications of any type of roof covering.

4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining materials secured down before applying additional roofing.

5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section R905 cannot be met.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

2. ~~Installation of metal panel, metal shingle and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.~~ Reserved.

3. The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.

~~4. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.~~ Reserved.

5. Roof Coating. Application of elastomeric and or maintenance coating systems over existing asphalt shingles shall be in accordance with the shingle manufacturer's approved installation instructions.

R907.4 Roof recovering.

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

R907.5 Reinstallation of materials.

Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Any existing flashings, edgings, outlets, vents or similar devices that are a part of the assembly shall be replaced when rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

R907.6 Flashings.

Flashings shall be reconstructed in accordance with *approved* manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

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R907.7 Wind Mitigation

When a roof covering on an existing site-built single- family residential structure is removed and replaced, the following procedures shall be permitted to be performed by the roofing contractor:

(a) Roof-decking attachment shall be as required by Section R907.7.1.

(b) A secondary water barrier shall be provided as required by Section R907.7.2.

Exception: Single family residential structures permitted subject to the *Florida Building Code* are not required to comply with this section.

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R907.7.1 Roof decking attachment for site-built single- family residential structures.

For site-built single-family residential structures the fastening shall be in accordance with Section R907.7.1.1 or R907.7.1.2 as appropriate for the existing construction. 8d nails shall be a minimum of 0.113 inch (2.9 mm) in diameter and shall be a minimum of $2^1/_4$ inch (57 mm) long to qualify for the provisions of this section for existing nails regardless of head shape or head diameter.

-

R907.7.1.1

Roof decking consisting of sawn lumber or wood planks up to 12" wide and secured with at least two nails (minimum size 8d) to each roof framing member it crosses shall be deemed to be sufficiently connected. Sawn lumber or wood plank decking secured with smaller fasteners than 8d nails or with fewer than two nails (minimum size 8d) to each framing member it crosses shall be deemed sufficiently connected if fasteners are added such that two clipped head, round head, or ring shank nails (minimum size 8d) are in place on each framing member it crosses.

-

R907.7.1.2

For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table R907.7.1.2 are deemed to comply with the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to complyprovided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.

Supplemental fasteners as required by Table R907.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

1. 0.113-inch nominal shank diameter.

2. Ring diameter a minimum of 0.012-inch greater than shank diameter.

3. 16 to 20 rings per inch.

4. A minimum 0.280-inch full round head diameter.

5. Ring shank to extend a minimum of $1^1/_2$ inches from the tip of the nail.

6. Minimum $2\text{-}^1/_4$ inch nail length.

TABLE R907.7.1.2 SUPPLEMENT FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

EXISTING FASTENERS	EXISTING SPACING	V_{asd} 110 MPH OR LESS SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN	V_{asd} GREATER THAN 110 MPH SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN
Staples or 6d	Any	6?o.c.[b]	6?o.c.[b]
8d clipped head, round head, smooth or ring shank	6?o.c. or less	None necessary	None necessary
8d clipped head, round	Greater than	6?o.c.[a]	6?o.c.[a]

head, smooth or ring shank	6?o.c.		

-

For SI: 1 inch = 25.4 mm.
a. Maximum spacing determined based on existing fasteners and supplemental fasteners.
b. Maximum spacing determined based on supplemental fasteners only.
c. V_{asd} shall be determined in accordance with Section 1609.3.1 of the Florida Building Code, Building or Section R301.2.1.3 of the Florida Building Code, Residential.

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R907.7.2 Roof secondary water barrier for site-built single family residential structures.

A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:

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1. All joints in structural panel roof sheathing or decking shall be covered with a minimum 4 inch (102 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The de ck and self adhering 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.

2. 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 Sections R905 of the *Florida Building Code, Residential.* (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.

3. The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions. No additional underlayment shall be required on top of this sheet for new installations.

4. An underlayment system approved for the particular roof covering shall be applied with the following modification:

(a) For roof slopes that require one layer of underlayment, a layer of approved asphalt impregnated ASTM D 226 Type I or Type II underlayment or approved synthetic underlayment shall be installed. The felt is to be fastened with 1 inch (25 mm) round plastic cap or metal cap nails, attached to a nailable deck in a grid pattern of 12 inches (305 mm) staggered between the overlaps, with 6-inch (152 mm) spacing at the overlaps. The synthetic underlayment shall be fastened in accordance with the manufacturer's recommendations.

(b) For roof slopes that require two layers of underlayment, an approved asphalt impregnated ASTM D 226 Type I or Type II underlayment shall be installed in a shingle–fashion and lapped 19 inch (483 mm) and fastened as described above. An approved synthetic underlayment shall be installed in accordance with the manufacturer's installation instruction. (No additional underlayment shall be required over the top of this sheet.)

Exceptions:

1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section R907.7.2 requirements for a secondary water barrier.

2. Clay and concrete tile roof systems installed as required by the *Florida Building Code,Residential* are deemed to comply with the requirements of Section R907.7.2 for Secondary Water Barriers.

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R907.8

When a roof covering on an existing site-built-single-family residential structure is removed and replaced on a building that is located in the wind-borne debris region as defined in the *Florida Building Code, Building* and that has an insured value of $300,000 or more or, if the building is uninsured or for which documentation of insured value is not presented, has a just valuation for the structure for purposes of ad valorem taxation of $300,000 or more:

(a) Roof to wall connections shall be improved as required by Section R907.8.1

(b) Mandated retrofits of the roof-to-wall connection shall not be required beyond a 15 percent increase in the cost of re-roofing.

Exception: Single-family residential structures permitted subject to the *Florida Building Code* are not required to comply with this section.

R907.8.1 Roof-to-wall connections for site-built single-family residential structures.

Where required by Section R907.8, the intersection of roof framing with the wall below shall provide sufficient resistance to meet the uplift loads specified in Table R907.8.1 either because of existing conditions or through retrofit measures. As an alternative to an engineered design, the prescriptive retrofit solutions provided in Sections R907.8.1.1 through R907.8.1.7 shall be accepted as meeting the mandated roof-to-wall retrofit requirements.

Exceptions:

1. Where it can be demonstrated (by code adoption date documentation and permit issuance date) t hat roof-to-wall connections and/or roof-to-foundation continuous load path requirements were required at the time of original construction.

2. Roof-to-wall connections shall not be required unless evaluation and installation of connections at gable ends or all corners can be completed for 15 percent of the cost of roof replacement.

TABLE R907.8.1 REQUIRED UPLIFT CAPACITIES FOR ROOF-TO-WALL CONNECTIONS[a, b] (POUNDS PER LINEAR FOOT)

ULTIMATE DESIGN WIND SPEED, V_{ult}	ROOF SPAN (feet)								
	12	20	24	28	32	36	40	OVERHANGS	
Within 6 feet of building corner	85	-69.85	-116.42	-139.70	-162.99	-186.27	-209.55	-232.84	-27
	90	-82.67	-137.78	-165.34	-192.90	-220.45	-248.01	-275.57	-30.3
	100	-110.51	-184.18	-221.01	-257.85	-294.68	-331.52	-368.36	-37.4

	110	-141.27	-235.45	-282.55	-329.64	-376.73	-423.82	-470.91	-45.3
	120	-174.97	-291.62	-349.94	-408.26	-466.59	-524.91	-583.23	-53.9
	130	-211.60	-352.66	-423.19	-493.72	-564.26	-634.79	-705.32	-63.2
	140	-251.15	-418.59	-502.31	-586.02	-669.74	-753.46	-837.18	-73.3
	150	-293.64	-489.40	-587.28	-685.16	-783.04	-880.92	-978.80	-84.2
	170	-387.40	-645.67	-774.81	-903.94	-1033.08	-1162.21	-1291.35	-108
	85	-39.10	-65.17	-78.20	-91.24	-104.27	-117.30	-130.34	-27
	90	-48.20	-80.33	-96.39	-112.46	-128.52	-144.59	-160.66	-30.3
	100	-67.95	-113.24	-135.89	-158.54	-181.19	-203.84	-226.49	-37.4
	110	-89.78	-149.63	-179.55	-209.48	-239.40	-269.33	-299.25	-45.3
Greater than 6 feet from building corner	120	-113.68	-189.47	-227.37	-265.26	-303.16	-341.05	-378.94	-53.9
	130	-139.67	-232.78	-279.34	-325.90	-372.45	-419.01	-465.57	-63.2
	140	-167.74	-279.56	-335.47	-391.38	-447.29	-503.21	-559.12	-73.3
	150	-197.88	-329.80	-395.76	-461.72	-527.68	-593.64	-659.60	-84.2
	170	-264.41	-440.68	-528.81	-616.95	-705.08	-793.22	-881.35	-108

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For SI: 1 foot = 304.8 mm; 1 pound per linear foot = 1.488 kg/m; 1 mile per hour = 0.305 m/s.

a. The uplift loads are pounds per lineal foot of building length. For roof uplift connections multiply by 1.33 for framing spaced 16 inches on center and multiply by 2 for framing spaced 24 inches on center.

b. The uplift loads do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 12 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

c. For Ultimate design wind speeds, V_{ult}, greater than 170 mph, wind uplift forces shall be determined in accordance with Florida Building Code, Residential, Section R802.3 or ASCE 7.

d. Ultimate Design Wind Speeds determined from Figure 1609A in the Florida Building Code,Building or Figure R301.2(4) in the Florida Building Code, Residential.

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R907.8.1.1 Access for Retrofitting Roof to Wall Connections.

These provisions are not intended to limit the means for gaining access to the structural elements of the roof and wall for the purposes of retrofitting the connection. The retrofit of roof to wall connections can be made by access through the area under the eave, from above through the roof, or from the interior of the house. Methods for above access include removal of roof panels or sections thereof or removal of portions of roof paneling at selected locations large enough for access, viewing, and installing the retrofit connectors and fasteners.

Where panels or sections are removed, the removed portions shall not be reused. New paneling shall be used and fastened as in new construction.

Holes shall be deemed adequately repaired if a patch of paneling is installed with no gap greater than $^1/_2$ inch (13 mm) between the patch and the existing sheathing and if the patch is supported using one of the following methods.

a) Solid $1^1/_2$ inch lumber shall fully support the patch and shall be secured to the existing sheathing with #8 by $1^1/_4$ inch screws spaced a minimum of 3 inches (76 mm) around the perimeter with screws a minimum of $^3/_4$ inch

from the near edge of the hole. The patch shall be secured to the lumber with #8 × 1-$^{1}/_{4}$ inch screws spaced on a grid no greater than 6 inches by 6 inches (152 mm × 152 mm) with no fewer than 2 screws.

b) Holes that extend horizontally from roof framing member to adjacent roofing framing member that are less than or equal to 7 inches (178 mm) wide along the slope of the roof shall be supported by minimum of 2 × 4 lumber whose face is attached to each roofing framing members using a minimum of 2 each 3-inch (76 mm) long fasteners (#8 screws or 10d common nails) connecting the two. The patch shall have attached to its bottom, running horizontally, a minimum 2 × 4 either flat wise or on edge secured with #8 × 1$^{1}/_{4}$ inch screws a maximum of 4 inches (102 mm) on center and no more distant from the end of the added lumber than 3 inches (76 mm). The patch shall be secured with two #8 × 1-1$^{1}/_{4}$ inch screws to each support member.

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R907.8.1.2 Partially inaccessible straps.

Where part of a strap is inaccessible, if the portion of the strap that is observed is fastened in compliance with these requirements, the inaccessible portion of the strap shall be presumed to comply with these requirements.

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R907.8.1.3 Prescriptive method for gable roofs on a wood frame wall.

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below. Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the rafter or truss to the wall stud below shall be allowed as an alternate provided the two members align with no more than 1$^{1}/_{2}$ inches (38 mm) offset.

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R907.8.1.4 Prescriptive method for gable roofs on a masonry wall.

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least a 2$^{1}/_{2}$ inch (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing $^{1}/_{4}$-inch diameter masonry screws, each with supplementary $^{1}/_{4}$-inch washer, having sufficient length to develop a 2$^{1}/_{2}$ inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

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R907.8.1.5 Prescriptive method for hip roofs on a wood frame wall.

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the top plate below using a strap or a right angle gusset bracket having a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the hip rafter, hip girder or adjacent rafters/trusses to the wall stud below shall be allowed as an alternate provided the two members align with no more than $1^1/_2$ inch (38 mm) offset.

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R907.8.1.6 Prescriptive method for hip roofs on a masonry wall.

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least $2^1/_2$ inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing $^1/_4$-inch (6 mm) diameter masonry screws, each with supplementary $^1/_4$-inch (6 mm) washer, with sufficient length to develop a $2^1/_2$ inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

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R907.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.

Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.

Text of Modification:

SECTION R907 REROOFING

R907.1 General.
Materials and methods of application used for re-covering or replacing an existing roof covering shall comply with the requirements of Chapter 9 of the *Florida Building Code, Residential*.

Exception: Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive roof drainage.

R907.2 Structural and construction loads.

The structural roof components shall be capable of supporting the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.

R907.3 Recovering versus replacement.
New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions ~~exist~~ occur:

1. Where the existing roof or roof covering is water-soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

2. Where the existing roof covering is wood shingle or shake, slate, clay, cement or asbestos-cement tile.

3. Where the existing roof has two or more applications of any type of roof covering.

4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining materials secured down before applying additional roofing.

5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section R905 cannot be met.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

2. ~~Installation of metal panel, metal shingle and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.~~ Reserved.

3. The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.

4. ~~Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.~~ Reserved.

5. Roof Coating. Application of elastomeric and or maintenance coating systems over existing asphalt shingles shall be in accordance with the shingle manufacturer's approved installation instructions.

R907.4 Roof recovering.
~~Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other *approved* materials securely fastened in place.~~ Reserved.

R907.5 Reinstallation of materials.
Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Any existing flashings, edgings, outlets, vents or similar devices that are a part of the assembly shall be replaced when rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

R907.6 Flashings.
Flashings shall be reconstructed in accordance with *approved* manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

R907.7

When a roof covering on an existing site-built single- family residential structure is removed and replaced, the following procedures shall be permitted to be performed by the roofing contractor:

(a) Roof-decking attachment shall be as required by Section R907.7.1.

(b) A secondary water barrier shall be provided as required by Section R907.7.2.

Exception: Single family residential structures permitted subject to the *Florida Building Code* are not required to comply with this section.

R907.7.1 Roof decking attachment for site-built single- family residential structures.

For site-built single-family residential structures the fastening shall be in accordance with Section R907.7.1.1 or R907.7.1.2 as appropriate for the existing construction. 8d nails shall be a minimum of 0.113 inch (2.9 mm) in diameter and shall be a minimum of $2^1/_4$ inch (57 mm) long to qualify for the provisions of this section for existing nails regardless of head shape or head diameter.

R907.7.1.1

Roof decking consisting of sawn lumber or wood planks up to 12" wide and secured with at least two nails (minimum size 8d) to each roof framing member it crosses shall be deemed to be sufficiently connected. Sawn lumber or wood plank decking secured with smaller fasteners than 8d nails or with fewer than two nails (minimum size 8d) to each framing member it crosses shall be deemed sufficiently connected if fasteners are

added such that two clipped head, round head, or ring shank nails (minimum size 8d) are in place on each framing member it crosses.

R907.7.1.2

For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table R907.7.1.2 are deemed to comply with the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to complyprovided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.

Supplemental fasteners as required by Table R907.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

1. 0.113-inch nominal shank diameter.

2. Ring diameter a minimum of 0.012-inch greater than shank diameter.

3. 16 to 20 rings per inch.

4. A minimum 0.280-inch full round head diameter.

5. Ring shank to extend a minimum of $1^1/_2$ inches from the tip of the nail.

6. Minimum 2-$^1/_4$ inch nail length.

TABLE R907.7.1.2 SUPPLEMENT FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

EXISTING FASTENERS	EXISTING SPACING	V_{asd} 110 MPH OR LESS SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN	V_{asd} GREATER THAN 110 MPH SUPPLEMENTAL FASTENER SPACING SHALL BE NO GREATER THAN
Staples or 6d	Any	6?o.c.[b]	6?o.c.[b]
8d clipped head, round head, smooth or ring shank	6?o.c. or less	None necessary	None necessary
8d clipped head, round head, smooth or ring shank	Greater than 6?o.c.	6?o.c.[a]	6?o.c.[a]

For SI: 1 inch = 25.4 mm.
a. Maximum spacing determined based on existing fasteners and supplemental fasteners.

b. Maximum spacing determined based on supplemental fasteners only.
c. V_{asd} shall be determined in accordance with Section 1609.3.1 of the *Florida Building Code, Building* or Section R301.2.1.3 of the *Florida Building Code, Residential.*

R907.7.2 Roof secondary water barrier for site-built single family residential structures.

A secondary water barrier shall be installed using one of the following methods when roof covering is removed and replaced:

1. In either HVHZ or Non-HVHZ regions:

a) All joints in structural panel roof sheathing or decking shall be covered with a minimum 4 inch (102 mm) wide strip of self-adhering polymer modified bitumen tape applied directly to the sheathing or decking. The deck and self-adhering 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 Sections R4402.7.2, R4402.7.3, or R4402.7.4 of the *Florida Building Code, Residential.* (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) The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen sheet meeting ASTM D 1970 or an approved self-adhering synthetic underlayment installed in accordance with the manufacturer's installation instructions. No additional underlayment shall be required on top of this sheet for new installations.

b) An underlayment system approved for the particular roof covering shall be applied with the following modification:

(1) For roof slopes that require one layer of underlayment, a layer of approved asphalt impregnated ASTM D 226 Type I or Type II, ASTM D 4869, Type II or Type IV underlayment or approved synthetic underlayment shall be installed. The felt is to be fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). Synthetic underlayment shall be fastened in accordance with this section and the manufacturer's recommendations.

(2) For roof slopes that require two layers of underlayment, an approved asphalt impregnated ASTM D 226 Type I or Type II, ASTM D 4869, Type II or Type IV underlayment shall be installed in a shingle–fashion and lapped 19 inch (483 mm) and fastened with 1 inch (25 mm) round plastic cap, metal cap nails or nails and tin-tabs, attached to a nailable deck with one row in the field of the sheet with a maximum fastener spacing of 12 in. o.c. (305 mm), and one row at the overlaps fastened 6 in. o.c. (152 mm). An approved synthetic underlayment shall be installed in accordance with this section and the manufacturer's installation instruction. (No additional underlayment shall be required over the top of this sheet.)

Exceptions:

1. Roof slopes < 2:12 having a continuous roof system shall be deemed to comply with Section R907.7.2 requirements for a secondary water barrier.

2. Clay and concrete tile roof systems installed as required by the *Florida Building Code,Residential* are deemed to comply with the requirements of Section R907.7.2 for Secondary Water Barriers.

R907.8

When a roof covering on an existing site-built-single-family residential structure is removed and replaced on a building that is located in the wind-borne debris region as defined in the *Florida Building Code, Building* and that has an insured value of $300,000 or more or, if the building is uninsured or for which documentation of insured value is not presented, has a just valuation for the structure for purposes of ad valorem taxation of $300,000 or more:

(a) Roof to wall connections shall be improved as required by Section R907.8.1

(b) Mandated retrofits of the roof-to-wall connection shall not be required beyond a 15 percent increase in the cost of re-roofing.

Exception: Single-family residential structures permitted subject to the *Florida Building Code* are not required to comply with this section.

R907.8.1 Roof-to-wall connections for site-built single-family residential structures.

Where required by Section R907.8, the intersection of roof framing with the wall below shall provide sufficient resistance to meet the uplift loads specified in Table R907.8.1 either because of existing conditions or through retrofit measures. As an alternative to an engineered design, the prescriptive retrofit solutions provided in Sections R907.8.1.1 through R907.8.1.7 shall be accepted as meeting the mandated roof-to-wall retrofit requirements.

Exceptions:

1. Where it can be demonstrated (by code adoption date documentation and permit issuance date) that roof-to-wall connections and/or roof-to-foundation continuous load path requirements were required at the time of original construction.

2. Roof-to-wall connections shall not be required unless evaluation and installation of connections at gable ends or all corners can be completed for 15 percent of the cost of roof replacement.

TABLE R907.8.1 REQUIRED UPLIFT CAPACITIES FOR ROOF-TO-WALL CONNECTIONS[a, b] (POUNDS PER LINEAR FOOT)

ULTIMATE DESIGN WIND SPEED, V_{ult}	**ROOF SPAN (feet)**								
	12	**20**	**24**	**28**	**32**	**36**	**40**	**OVERHANGS**	
	85	-69.85	-116.42	-139.70	-162.99	-186.27	-209.55	-232.84	-27
Within 6 feet of building corner	90	-82.67	-137.78	-165.34	-192.90	-220.45	-248.01	-275.57	-30.3
	100	-110.51	-184.18	-221.01	-257.85	-294.68	-331.52	-368.36	-37.4

	110	-141.27	-235.45	-282.55	-329.64	-376.73	-423.82	-470.91	-45.3
	120	-174.97	-291.62	-349.94	-408.26	-466.59	-524.91	-583.23	-53.9
	130	-211.60	-352.66	-423.19	-493.72	-564.26	-634.79	-705.32	-63.2
	140	-251.15	-418.59	-502.31	-586.02	-669.74	-753.46	-837.18	-73.3
	150	-293.64	-489.40	-587.28	-685.16	-783.04	-880.92	-978.80	-84.2
	170	-387.40	-645.67	-774.81	-903.94	-1033.08	-1162.21	-1291.35	-108
Greater than 6 feet from building corner	85	-39.10	-65.17	-78.20	-91.24	-104.27	-117.30	-130.34	-27
	90	-48.20	-80.33	-96.39	-112.46	-128.52	-144.59	-160.66	-30.3
	100	-67.95	-113.24	-135.89	-158.54	-181.19	-203.84	-226.49	-37.4
	110	-89.78	-149.63	-179.55	-209.48	-239.40	-269.33	-299.25	-45.3
	120	-113.68	-189.47	-227.37	-265.26	-303.16	-341.05	-378.94	-53.9
	130	-139.67	-232.78	-279.34	-325.90	-372.45	-419.01	-465.57	-63.2
	140	-167.74	-279.56	-335.47	-391.38	-447.29	-503.21	-559.12	-73.3
	150	-197.88	-329.80	-395.76	-461.72	-527.68	-593.64	-659.60	-84.2
	170	-264.41	-440.68	-528.81	-616.95	-705.08	-793.22	-881.35	-108

For SI: 1 foot = 304.8 mm; 1 pound per linear foot = 1.488 kg/m; 1 mile per hour = 0.305 m/s.

a. The uplift loads are pounds per lineal foot of building length. For roof uplift connections multiply by 1.33 for framing spaced 16 inches on center and multiply by 2 for framing spaced 24 inches on center.

b. The uplift loads do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 12 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

c. For Ultimate design wind speeds, V_{ult}, greater than 170 mph, wind uplift forces shall be determined in accordance with *Florida Building Code, Residential,* Section R802.3 or ASCE 7.

d. Ultimate Design Wind Speeds determined from Figure 1609A in the *Florida Building Code,Building* or Figure R301.2(4) in the *Florida Building Code, Residential.*

R907.8.1.1 Access for Retrofitting Roof to Wall Connections.

These provisions are not intended to limit the means for gaining access to the structural elements of the roof and wall for the purposes of retrofitting the connection. The retrofit of roof to wall connections can be made by access through the area under the eave, from above through the roof, or from the interior of the house. Methods for above access include removal of roof panels or sections thereof or removal of portions of roof paneling at selected locations large enough for access, viewing, and installing the retrofit connectors and fasteners.

Where panels or sections are removed, the removed portions shall not be reused. New paneling shall be used and fastened as in new construction.

Holes shall be deemed adequately repaired if a patch of paneling is installed with no gap greater than $^1/_2$ inch (13 mm) between the patch and the existing sheathing and if the patch is supported using one of the following methods.

a) Solid $1^1/_2$ inch lumber shall fully support the patch and shall be secured to the existing sheathing with #8 by $1^1/_4$ inch screws spaced a minimum of 3 inches (76 mm) around the perimeter with screws a minimum of $^3/_4$

inch from the near edge of the hole. The patch shall be secured to the lumber with #8 × 1-$^1/_4$ inch screws spaced on a grid no greater than 6 inches by 6 inches (152 mm × 152 mm) with no fewer than 2 screws.

b) Holes that extend horizontally from roof framing member to adjacent roofing framing member that are less than or equal to 7 inches (178 mm) wide along the slope of the roof shall be supported by minimum of 2 × 4 lumber whose face is attached to each roofing framing members using a minimum of 2 each 3-inch (76 mm) long fasteners (#8 screws or 10d common nails) connecting the two. The patch shall have attached to its bottom, running horizontally, a minimum 2 × 4 either flat wise or on edge secured with #8 × 1$^1/_4$ inch screws a maximum of 4 inches (102 mm) on center and no more distant from the end of the added lumber than 3 inches (76 mm). The patch shall be secured with two #8 × 1-1$^1/_4$ inch screws to each support member.

R907.8.1.2 Partially inaccessible straps.

Where part of a strap is inaccessible, if the portion of the strap that is observed is fastened in compliance with these requirements, the inaccessible portion of the strap shall be presumed to comply with these requirements.

R907.8.1.3 Prescriptive method for gable roofs on a wood frame wall.

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below. Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the rafter or truss to the wall stud below shall be allowed as an alternate provided the two members align with no more than 1$^1/_2$ inches (38 mm) offset.

R907.8.1.4 Prescriptive method for gable roofs on a masonry wall.

The anchorage of each of the exposed rafters or truss within 6 feet (1829 mm) of the corner along the exterior wall on each side of each gable end shall be inspected. Wherever a strap is missing or an existing strap has fewer than four fasteners on each end, approved straps, ties or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg) shall be installed that connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least a 2$^1/_2$ inch (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing $^1/_4$-inch diameter masonry screws, each with supplementary $^1/_4$-inch washer, having sufficient length to develop a 2$^1/_2$ inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

R907.8.1.5 Prescriptive method for hip roofs on a wood frame wall.

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the top plate below using a strap or a right angle gusset bracket having a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. Wherever access makes it possible (without damage of the wall or soffit finishes), both top plate members shall be connected to the stud below using a stud to plate connector with a minimum uplift capacity of 500 lbs (740 kg). Use of straps that connect directly from the hip rafter, hip girder or adjacent rafters/trusses to the wall stud below shall be allowed as an alternate provided the two members align with no more than $1^1/_2$ inch (38 mm) offset.

R907.8.1.6 Prescriptive method for hip roofs on a masonry wall.

Unless it is possible to verify through non-destructive inspection or from plans prepared by a design professional that the roof structure is anchored at least as well as outlined below, access shall be provided at a minimum to the hip rafter (commonly known as a "king jack"), to the hip girder and at each corner of the hip roof. The hip rafter (commonly known as a "king jack"), the hip girder and the rafters/trusses adjacent to the hip girder that are not anchored with a strap having at least four fasteners on each end, shall be connected to the concrete masonry wall below using approved straps or right angle gusset brackets with a minimum uplift capacity of 500 lbs (740 kg). Adding fasteners to existing straps shall be allowed in lieu of adding a new strap provided the strap is manufactured to accommodate at least 4 fasteners at each end. The straps or right angle gusset brackets shall be installed such that they connect each rafter or truss to the top plate below or directly to the masonry wall using approved masonry screws of a length and diameter recommended by the manufacturer. In the absence of manufacturer's recommendations, screws shall provide at least $2^1/_2$ inches (64 mm) embedment into the concrete or masonry. When the straps or right angle gusset brackets are attached to a wood sill plate, the sill plate shall be anchored to the concrete masonry wall below. This anchorage shall be accomplished by installing $^1/_4$-inch (6 mm) diameter masonry screws, each with supplementary $^1/_4$-inch (6 mm) washer, with sufficient length to develop a $2^1/_2$ inch (64 mm) embedment into the concrete and masonry. These screws shall be installed within 4 inches (102 mm) of the truss or rafter on both sides of each interior rafter or truss and on the accessible wall side of the gable end truss or rafter.

R907.8.1.7 Priorities for mandated roof-to-wall retrofit expenditures.

Priority shall be given to connecting the exterior corners of roofs to walls where the spans of the roofing members are greatest. For houses with both hip and gable roof ends, the priority shall be to retrofit the gable end roof-to-wall connections unless the width of the hip end is more than 1.5 times greater than the width of the gable end. When considering priorities for houses with both hip and gable roof ends, and the fifteen percent of the cost of roof replacement is sufficient to complete all of the prioritized elements pursuant to this section, but is not sufficient to complete all of the non-prioritized elements, then no portion of complete retrofit of the non-prioritized element is required.

R907.7.1.2

For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table R907.7.1.2 are deemed to comply with the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to complyprovided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.

Supplemental fasteners as required by Table R907.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

1. 0.113-inch nominal root shank diameter.

2. Ring diameter a minimum of 0.010 ~~0.012~~-inch greater than shank diameter.

3. 16 to 20 rings per inch.

4. A minimum 0.280-inch full round head diameter.

5. Ring shank to extend a minimum of $1^1/_2$ inches from the tip of the nail.

6. Minimum 2-3/8 ~~$^1/_4$~~ inch nail length.

R907.7.1.2

For roof decking consisting of wood structural panels, fasteners and spacing required in columns 3 and 4 of Table R907.7.1.2 are deemed to comply with the indicated design wind speed range. Wood structural panel connections retrofitted with a two part urethane based closed cell adhesive sprayed onto the joint between the sheathing and framing members are deemed to complyprovided testing using the manufacturer's recommended application on panels connected with 6d smooth shank nails at no more than a 6-inch edge and 12-inch field spacing demonstrate an uplift resistance of a minimum of 200 psf.

Supplemental fasteners as required by Table R907.7.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

1. 0.113-inch nominal root shank diameter.

2. ~~Ring diameter a minimum of 0.012-inch greater than shank diameter.~~ Difference between root and ring diameter a minimum of 5% of root nail diameter

3. 16 to 20 rings per inch.

4. A minimum 0.280-inch full round head diameter.

5. Ring shank to extend a minimum of $1^{1}/_{2}$ inches from the tip of the nail.

6. Minimum 2-3/8 ~~1/4~~ inch nail length.

R5316

Date Submitted	7/18/2012	**Section**	R907	**Proponent**	Mark Zehnal
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Provides current Florida-specific criteria

Rationale

To carry forward previous Commission approved code language, standards and tables, providing continuity for the proper installation of roofing systems and components from one code edition to the next connected to Florida's unique environmental conditions including extreme temperatures, enduring tropical rain events and life/property threatening high wind events.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

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

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Impact to industry relative to the cost of compliance with code

No impact. Current 2010 FBC code language, standards and tables, without any new requirements being established.

Requirements

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

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

Does not discriminate. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Does not degrade the effectiveness of the code

Does not degrade. Current, Commission approved 2010 FBC performance proven code language, standards and tables, without any new requirements being established.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

R5316-G1

Proponent	Mark Zehnal	Submitted	12/7/2012	Attachments	No

Comment:

This Code Modification can be withdrawn

SECTION R907 REROOFING

R907.1 General.
~~Materials and methods of application used for re-covering or replacing an existing roof covering shall comply with the requirements of Chapter 9.~~

~~**Exception:** Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive roof drainage.~~
Reroofing shall be done in accordance with the Florida Existing Building Code.

R907.2 Structural and construction loads.

~~**The structural roof components shall be capable of supporting the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.**~~

Reserved.

R907.3 Recovering versus replacement.
~~New roof coverings shall not be installed without first removing all existing layers of roof coverings where any of the following conditions exist:~~

~~1. Where the existing roof or roof covering is water-soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.~~

~~2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.~~

~~3. Where the existing roof has two or more applications of any type of roof covering.~~

~~**Exceptions:**~~

~~1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.~~

~~2. Installation of metal panel, metal shingle and concrete and clay tile roof coverings over existing wood shake roofs shall be permitted when the application is in accordance with Section R907.4.~~

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~~3. The application of new protective coating over existing spray polyurethane foam roofing systems shall be permitted without tear-off of existing roof coverings.~~

~~4. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.~~

Reserved.

R907.4 Roof recovering.

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

R907.5 Reinstallation of materials.

~~Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Any existing flashings, edgings, outlets, vents or similar devices that are a part of the assembly shall be replaced when rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.~~

Reserved.

R907.6 Flashings.

~~Flashings shall be reconstructed in accordance with approved manufacturer's installationinstructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.~~

Reserved. -