



REVISED

Florida High Wind Concrete and Clay Tile Installation Manual

FRSA/TRI Fifth Edition REVISED Attachment Tables



*Imagine the Possibilities
Realize the Benefits*



FRSA/TRI

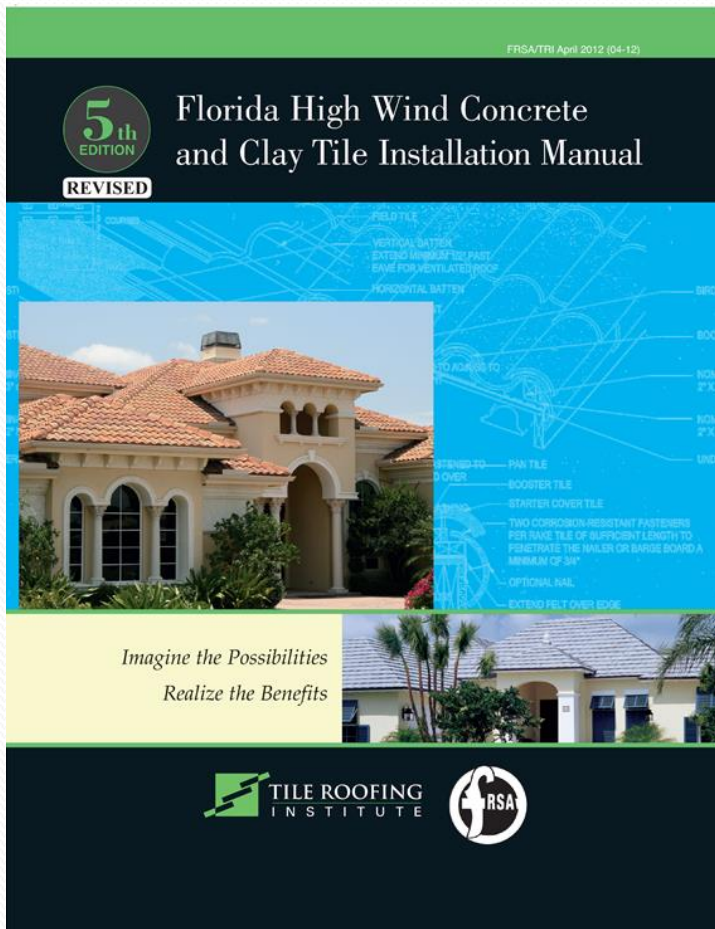
Instructor:

- Mark Zehnal, CPRC
- FRSA Director of Technical Services
- Florida Roofing and Sheet Metal Contractors Association (FRSA)
- Tile Roofing Institute (TRI)

Goals for the Seminar

- Basic layout of manual
- Review the Florida Tile Roof Assembly Chart (F-TRAC)
- How and when to use Design Tables
- Where to find Underlayment Attachment information
- Use design Tables to find simulated permit information
- Locate required Florida Product Approval information
- Locate required Miami-Dade NOA information

FRSA/TRI Florida High Wind Concrete & Clay Tile Installation Manual (REVISED)



As of September 28, 2014 this manual is currently an Equivalence of product standards with the Fourth Edition Concrete and Clay Roof Tile Installation Manual

2014 Florida Building Code Fifth Edition release date is June 30, 2015

Equivalence of Standards

- **61G20-3.015 Equivalence of Standards.**
- (1) Equivalence of product standards. Where conformance to the Code is based on standards, then product evaluation shall rely on national and international consensus standards referenced in the Code.
- Approved by the Florida Building Commission Workshop December 13, 2013.

Equivalence of Standards

- (5) Equivalence of product standards for specific product application. Standards which meet or exceed standards referenced by the Code and certified as equivalent for determining code compliance by one of the following entities shall be considered as equivalent by the Commission:
 - (d) Florida licensed professional engineer or architect; or
 - (e) A nationally recognized standard writing organization.

Quick Overview of the FRSA/TRI Florida High Wind Concrete & Clay Tile Installation Manual Fifth Edition REVISED

- General Overview Page : 1
- Products Page : 1 – 3
- Underlayment & Flashing Page : 3
- Single Ply System Page : 4
- Two Ply System Page : 5 – 6
- Metal Flashings Page : 6 – 8
- Tile Installation Page : 8 – 9
- Hip & Ridge Installation Page : 10 - 12

Quick Overview of the FRSA/TRI Florida High Wind Concrete & Clay Tile Installation Manual Fifth Edition REVISED (Continued)

- Design Tables Page : 13 – 17
- Construction Details Page : 18 – 39
- Identification of Roof Areas Page : 40
- Roof Layout Page : 41 – 44
- Glossary Page : 45 – 49

Changes to 5th Edition

- Resistance Values in Attachment and Design Tables in accordance with ASCE 7-10
- Removal of Redundant Information
- Self Adhered Underlayment Minimums
- Required primed metals
- Increased laps on metals
- Florida Tile Roof Assembly Chart (F-TRAC)

Changes to 5th Edition

- Removed system designations (1,2,3,4)
- F-TRAC recognizes almost every possibility
- Added drawings
- Battens will become “optional” on all pitches
- Minimized likelihood of “mixing systems”

Changes to 5th Edition Revised

- **Fastening Options for Adhesive Set Tile Installations**
- For roof slopes 2:12 up to and including 6:12; fasteners are not required in addition to the adhesives.
-
- For roof slopes greater than 6:12 and up to and including 7:12, fasten every tile in the first course and every third tile every fifth course in addition to the adhesive.
-
- For roof slopes greater than 7:12, fasten every tile in addition to the adhesive.
-
- When utilizing battens and tiles with protruding anchor lugs, fastening is not required in addition to the adhesive.

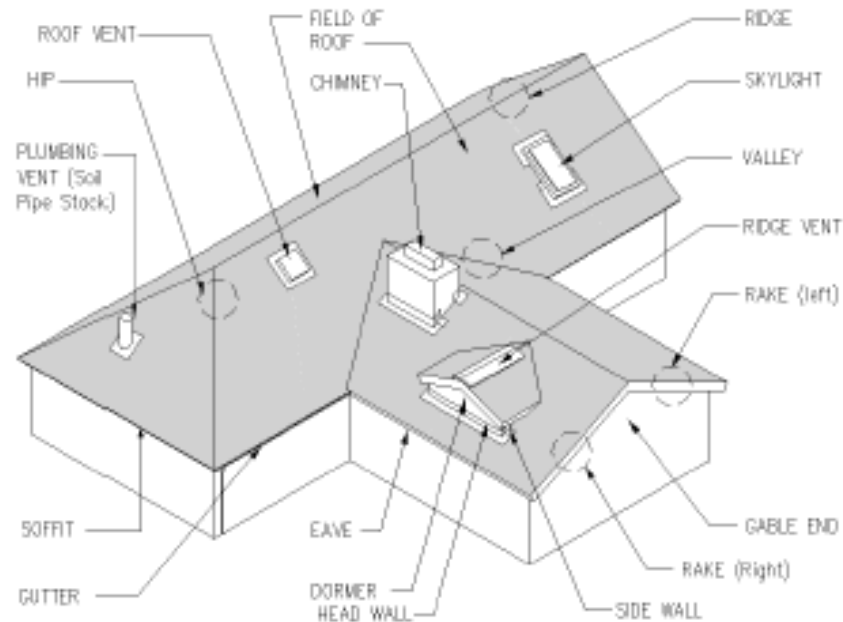
Common Roof Areas

40

FRSA/TRI

IDENTIFICATION OF ROOF AREAS

FHW-16



Roof Assembly

- The F-TRAC in the Fifth Edition manual replaces Systems 1, 2, 3 and 4a-b used in the Fourth Edition.
- Based on Manufacturers specifications, Florida Product Approval or Miami-Dade NOA, select a type of roofing system and follow the options in the F-TRAC.

New Matrix – The Core of 5th Edition

Battens Utilized	Pitch of Roof	Field Tile Attachment	Number of Plys	Underlayment Application Method	Metal Flashing Type	Pre-formed Flashings With Returns or Without Returns	Additional Flashings Required	Roof Tile Fastener Penetrations
Yes	4:12 and Greater	Mechanical or Adhesive	Single	Self Adhered	Pre-Formed	Either	Transitional	–
			Two	Cold Applied	Pre-Formed	Either	Transitional	–
				Heat Applied	Pre-Formed	Either	Transitional	–
				Hot Mopped	Pre-Formed	Either	Transitional	–
			Self Adhered	Pre-Formed	Either	Transitional	–	
	Mechanical	Single	Dry/Mechanical	Pre-Formed	Either	Transitional	–	
No	4:12 and Greater	Mechanical or Adhesive	Single	Self Adhered	Pre-Formed	Either	–	–
					Standard	–	–	See note below
			Two	Cold Applied	Pre-Formed	Either	–	–
					Standard	–	–	Sealed
				Heat Applied	Pre-Formed	Either	–	–
					Standard	–	–	Sealed
				Hot Mopped	Pre-Formed	Either	–	–
					Standard	–	–	Sealed
			Self Adhered	Pre-Formed	Either	–	–	
				Standard	–	–	See note below	
		Mechanical	Single	Dry/Mechanical	Pre-Formed	Either	Transitional	–
					Standard	–	–	Sealed
	3:12 Less than 4:12	Mechanical or Adhesive	Single	Self Adhered	Pre-Formed	Without Returns	–	Sealed
					Standard	–	–	Sealed
			Two	Cold Applied	Pre-Formed	Without Returns	–	Sealed
					Standard	–	–	Sealed
				Heat Applied	Pre-Formed	Without Returns	–	Sealed
					Standard	–	–	Sealed
				Hot Mopped	Pre-Formed	Without Returns	–	Sealed
					Standard	–	–	Sealed
Self Adhered			Pre-Formed	Without Returns	–	Sealed		
			Standard	–	–	Sealed		
2:12 Less than 4:12	Adhesive	Single	Self Adhered	Pre-Formed	Without Returns	–	Sealed	
				Standard	–	–	Sealed	
		Two	Cold Applied	Pre-Formed	Without Returns	–	Sealed	
				Standard	–	–	Sealed	
			Heat Applied	Pre-Formed	Without Returns	–	Sealed	
				Standard	–	–	Sealed	
			Hot Mopped	Pre-Formed	Without Returns	–	Sealed	
				Standard	–	–	Sealed	
		Self Adhered	Pre-Formed	Without Returns	–	Sealed		
			Standard	–	–	Sealed		

Tile Roof Assembly Chart

- The Note Below the Chart
- Note: Refer to the underlayment manufacturer's written installation instructions or product approval.

Learning Sometimes Takes Practice, Practice, Practice

- Let's quickly go through the manual using an imagined home in central Florida
- Using the F-TRAC
- Locate and apply Underlayment Attachment information
- Locate and apply Resistance Values
- Choose Florida Product Approval's



Building Information

- Location of structure – Orlando, FL
- One Story Single Family Residence
- 4/12 Slope, Plywood Deck
- Wind Speed 140 MPH
- Exposure Category “C”
- Roof Mean Height 13.5’





Parcels

Parcels

Name	<input type="text" value="No Data"/>	Parcel ID	<input type="text" value="No Data"/>
Address	<input type="text" value="No Data"/>	<input type="text" value="No Data"/>	<input type="text" value="No Data"/>

Wind Zones

Risk Category I

Minimum Wind	<input type="text" value="129"/>	Windborne Debris Region	<input type="text" value="No"/>
--------------	----------------------------------	-------------------------	---------------------------------

Risk Category II

Minimum Wind	<input type="text" value="139"/>	Windborne Debris Region	<input type="text" value="No"/>
--------------	----------------------------------	-------------------------	---------------------------------

Risk Category III

Minimum Wind	<input type="text" value="149"/>	Windborne Debris Region	<input type="text" value="No"/>
--------------	----------------------------------	-------------------------	---------------------------------

Risk Category IV

Minimum Wind	<input type="text" value="149"/>	Windborne Debris Region	<input type="text" value="Yes"/>
--------------	----------------------------------	-------------------------	----------------------------------

www.atcouncil.org/windspeed/

Old FRSA Office
4111 Metric Drive
Winter Park, FL
32792



WINDSPEED BY LOCATION

Search Results

Latitude: 28.5999
Longitude: -81.2909

ASCE 7-10 Wind Speeds
(3-sec peak gust MPH):

Risk Category I: 127
Risk Category II: 136
Risk Category III-IV: 145
MRI** 10 Year: 80
MRI** 25 Year: 94
MRI** 50 Year: 104
MRI** 100 Year: 113

ASCE 7-05: 108
ASCE 7-93: 96



*MPH(Miles per hour)

**MRI Mean Recurrence Interval (years)

Users should consult with local building officials
to determine if there are community-specific wind speed
requirements that govern.

WIND SPEED WEB SITE DISCLAIMER:

While the information presented on this web site is believed to be correct, ATC assumes no responsibility or liability for its accuracy. The material presented in the wind speed report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the wind speed report provided by this web site. Users of the information from this web site assume all liability arising from such use. Use of the output of this web site does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site(s) described by latitude/longitude location in the wind speed report.

Sponsored by the ATC Endowment Fund [Applied Technology Council](http://www.atcouncil.org) 201 Redwood Shores Parkway, Suite 240 Redwood City, California 94065 (650) 595-1542

Existing Wind ASCE 7-10

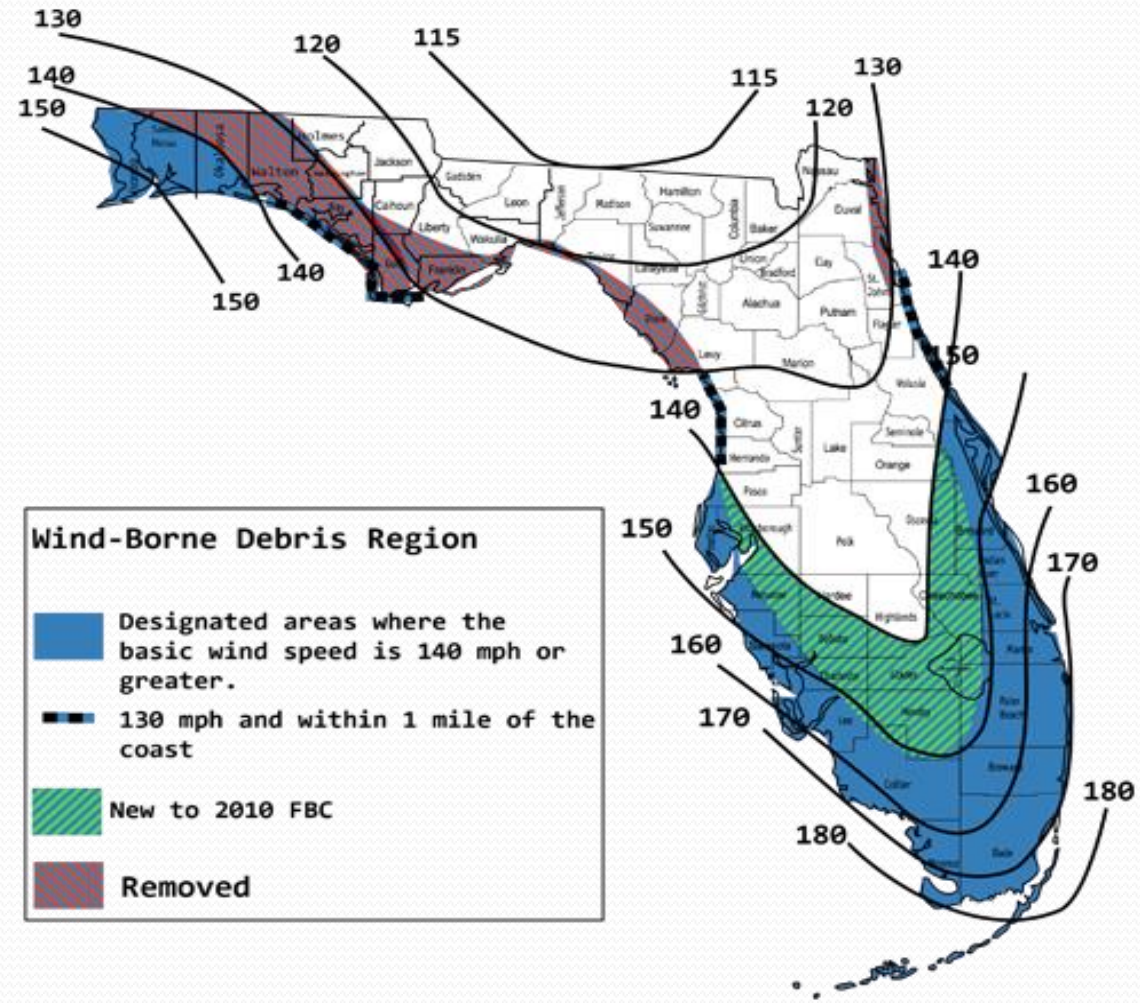


Figure 1609A Wind-Borne Debris Region, Category II and III Buildings and Structures except health care facilities

FBC Chapter 16

- **1609.2 Definitions**
- **WIND-BORNE DEBRIS REGION.** Areas within *hurricane-prone regions* located:
 - 1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed V_{ult} is 130 (48 m/s) or greater; or
 - 2. In areas where the ultimate design wind speed V_{ult} is 140 mph (53 m/s) or greater.
- For Risk Category II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609A. For Risk Category IV buildings and structures and Risk Category III health care facilities, the windborne debris region shall be based on Figure 1609B.

Figure 1609A Ultimate Design Wind Speeds, Vult For Risk Category II Buildings and Other Structures

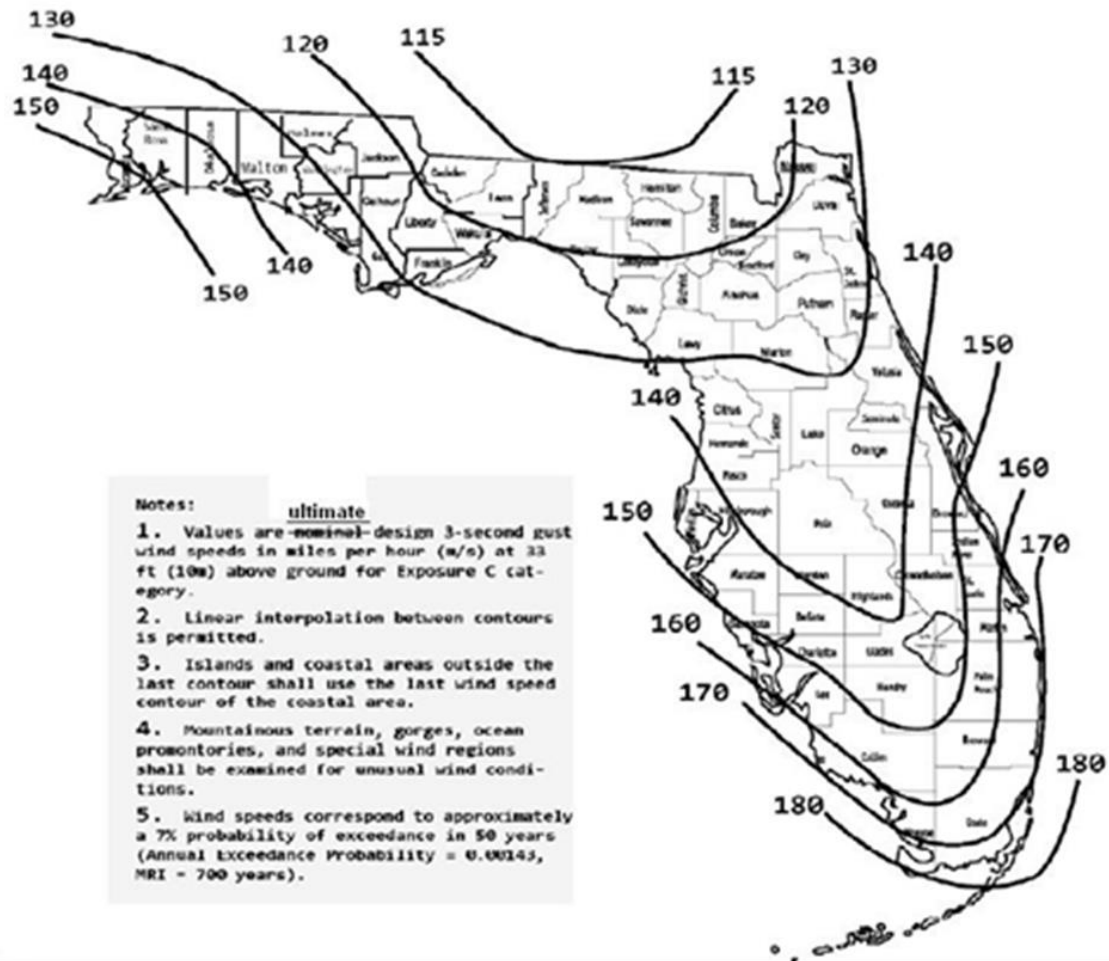


TABLE 1A

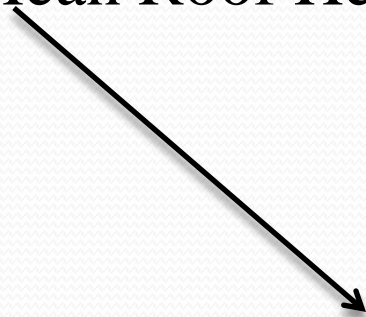
**Underlayment Table For Foam Adhesive and Mortar Set System
and Hip and Ridge Design Pressures**

***Required Design Pressures for Category II Buildings having a 2:12 and
Greater pitch per ASCE 7-2010 (psf)***

Exposure C		Basic Wind Speed in MPH							
		120	130	140	150	160	170	180	190
MRH									
0-15		44.4	52.1	60.5	69.4	79.0	89.2	100.0	111.4
20		47.0	55.2	64.0	73.5	83.6	94.4	105.8	117.9
25		49.1	57.7	66.9	76.8	87.3	98.6	110.5	123.2
30		51.2	60.1	69.7	80.0	91.1	102.8	115.2	128.4
35		52.8	62.0	71.9	82.5	93.8	105.9	118.8	132.3
40		54.4	63.8	74.0	84.9	96.6	109.1	122.3	136.3
45		55.4	65.0	75.4	86.6	98.5	111.2	124.7	138.9
50		57.0	66.9	77.5	89.0	101.3	114.3	128.2	142.8
55		58.0	68.1	79.0	90.6	103.1	116.4	130.5	145.4
60		59.1	69.3	80.4	92.3	105.0	118.5	132.9	148.1

Table 1A Mean Roof Height

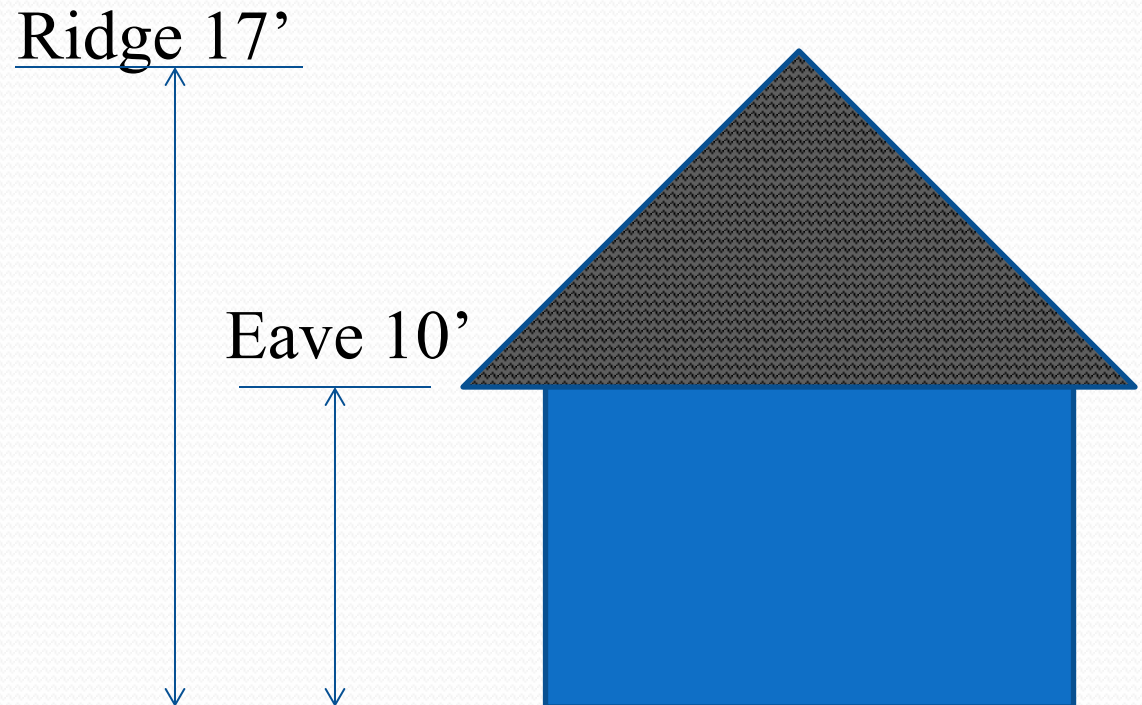
- Mean Roof Height



Exposure C	MRH	Basic Wind Speed in MPH							
		120	130	140	150	160	170	180	190
	0-15	44.4	52.1	60.5	69.4	79.0	89.2	100.0	111.4
	20	47.0	55.2	64.0	73.5	83.6	94.4	105.8	117.9
	25	49.1	57.7	66.9	76.8	87.3	98.6	110.5	123.2
	30	51.2	60.1	69.7	80.0	91.1	102.8	115.2	128.4
	35	52.8	62.0	71.9	82.5	93.8	105.9	118.8	132.3
	40	54.4	63.8	74.0	84.9	96.6	109.1	122.3	136.3
	45	55.4	65.0	75.4	86.6	98.5	111.2	124.7	138.9
	50	57.0	66.9	77.5	89.0	101.3	114.3	128.2	142.8
	55	58.0	68.1	79.0	90.6	103.1	116.4	130.5	145.4
	60	59.1	69.3	80.4	92.3	105.0	118.5	132.9	148.1

Mean Roof Height

- Measuring from the ground find the ridge height and the eave height.



Mean Roof Height

- Measure from the ground surface to the ridge. 17'
- Measure from the ground surface to the eave. 10'
- Add the two measurements together. 27'
- Divide the total by 2.
- $27 / 2 = 13.5'$
- This is the average number

Mean Roof Height

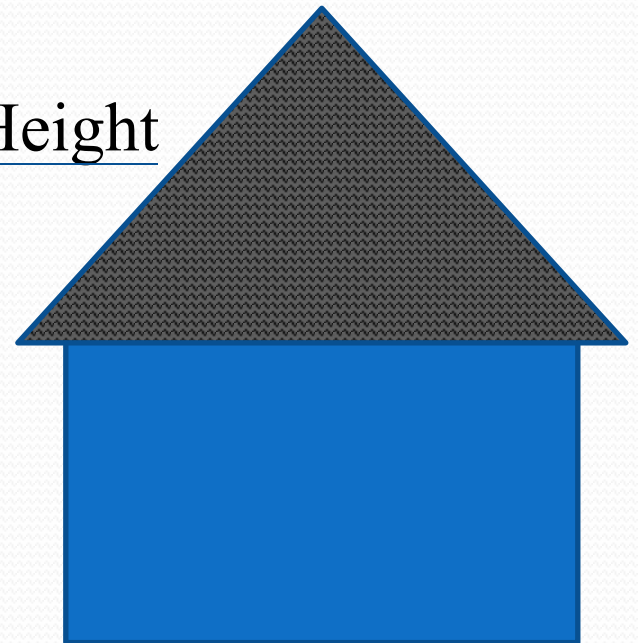


Table IA

Underlayment Design Pressures

- Choose the correct table according to the Exposure Category, which in this case is Exposure Category C
- Wind Speed 140 MPH, MRH 15' or Less, Roof Slope 4/12
- Design Pressure
- 60.5

Exposure C	Basic Wind Speed in MPH								
	120	130	140	150	160	170	180	190	
MRH									
0-15	44.4	52.1	60.5	69.4	79.0	89.2	100.0	111.4	
20	47.0	55.2	64.0	73.5	83.6	94.4	105.8	117.9	
25	49.1	57.7	66.9	76.8	87.3	98.6	110.5	123.2	
30	51.2	60.1	69.7	80.0	91.1	102.8	115.2	128.4	
35	52.8	62.0	71.9	82.5	93.8	105.9	118.8	132.3	
40	54.4	63.8	74.0	84.9	96.6	109.1	122.3	136.3	
45	55.4	65.0	75.4	86.6	98.5	111.2	124.7	138.9	
50	57.0	66.9	77.5	89.0	101.3	114.3	128.2	142.8	
55	58.0	68.1	79.0	90.6	103.1	116.4	130.5	145.4	
60	59.1	69.3	80.4	92.3	105.0	118.5	132.9	148.1	

Table IA Exposure Category B

Underlayment Table for Foam Adhesive and Mortar Set System and Hip and Ridge Design Pressures

Exposure B	Basic Wind Speed in MPH								
	120	130	140	150	160	170	180	190	
MRH									
0-15	36.6	42.9	49.8	57.2	65.0	73.4	82.3	91.7	
20	36.6	42.9	49.8	57.2	65.0	73.4	82.3	91.7	
25	36.6	42.9	49.8	57.2	65.0	73.4	82.3	91.7	
30	36.6	42.9	49.8	57.2	65.0	73.4	82.3	91.7	
35	38.2	44.8	51.9	59.6	67.8	76.6	85.8	95.7	
40	39.7	46.6	54.1	62.1	70.6	79.7	89.4	99.6	
45	40.8	47.7	55.5	63.7	72.5	81.8	91.7	102.2	
50	42.3	49.7	57.6	66.1	75.3	85.0	95.3	106.1	
55	43.4	50.8	59.0	67.8	77.1	87.1	97.6	108.8	
60	44.4	52.1	60.5	69.4	79.0	89.2	100.0	111.4	

Table IA Exposure Category D

Underlayment Table for Foam Adhesive and Mortar Set System and Hip and Ridge Design Pressures

Exposure D	Basic Wind Speed in MPH								
	120.0	130.0	140.0	150.0	160.0	170.0	180.0	190.0	
MRH									
0-15	53.8	63.2	73.3	84.1	95.7	108.0	123.1	135.0	
20	56.4	66.2	76.8	88.2	100.4	113.3	127.0	141.5	
25	58.5	68.7	79.7	91.5	104.1	117.5	131.7	146.8	
30	60.6	71.2	82.5	94.7	107.8	121.7	136.4	152.0	
35	62.2	73.0	84.7	97.2	110.6	124.8	139.9	155.9	
40	63.8	74.8	86.8	99.6	113.4	128.0	143.5	159.9	
45	65.3	76.7	88.9	102.1	116.1	131.1	147.0	163.8	
50	66.4	77.9	90.3	103.7	118.0	133.2	149.3	166.4	
55	67.4	79.1	91.8	105.3	119.9	135.2	151.7	169.0	
60	68.5	80.4	93.2	107.0	121.7	137.4	154.1	171.6	

Key Points for Proper Installation

- Underlayment serves as temporary roof covering in some methods and primary in others depending on flashing and fastening system.
- Deck repair prior to commencement.
- Verify condition and attachment of deck.
- Fasten underlayment adequately to resist wind damage until tile is installed. (Who Interprets This ?)

FRSA/TRI

Underlayment Requirements

- Single-Ply: Approved self-adhered cap sheet
- Two-Ply:
 - Approved base and #90
 - Approved base and approved self-adhered cap sheet
 - Approved self-adhered base and approved self-adhered cap sheet

2014 FBC Building Volume Underlayment Requirements

- 1507.3.3 Underlayment.
- Unless otherwise noted, required underlayment shall conform to: ASTM D 226, Type II, ASTM D 1970; ASTM D 2626 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.

2014 FBC Residential Volume Underlayment Requirements

- R905.3.3 Underlayment.
- Required underlayment shall conform with ASTM D 226, Type II; ASTM D 2626, Type II; or 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.

Anchor Sheet Attachment

- Use the 60.5 found in Table IA to locate an acceptable fastening pattern for the anchor sheet or fully adhered tile underlayment in Table I
- 62.1
- Field 11”oc
- Lap 6”oc
- Back nail 12”oc

TABLE I

**Allowable Uplift Resistance for Anchor Sheet Attachment (psf)
Two-Ply Underlayment Fastening System**

Inches on Center			Two -Rows in Field ¹				Three -Rows in Field ²				Four -Rows in Field ³			
Field	Lap	Backnail Cap Sheet	15/32 Inch		19/32 inch		15/32 Inch		19/32 inch		15/32 Inch		19/32 inch	
			Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴
12	6	12	41.6	47.4	52.7	60.0	49.6	56.5	62.9	71.5	58.6	66.6	74.2	84.3
11	6	12	43.1	49.1	54.6	62.1	51.8	58.9	65.6	74.6	61.4	69.9	77.8	88.5
10	6	12	44.9	51.0	56.8	64.6	54.4	61.9	68.9	78.3	64.9	73.9	82.2	93.5
9	6	12	47.0	53.5	59.5	67.7	57.6	65.5	72.9	82.9	69.2	78.7	87.6	99.6
8	6	12	49.6	56.5	62.9	71.5	61.5	70.0	78.0	88.6	74.4	84.7	94.3	107.2
7	6	12	53.0	60.3	67.2	76.4	66.6	75.8	84.4	96.0	81.3	92.4	102.9	117.0
6	6	12	57.6	65.5	72.9	82.9	73.5	83.6	93.0	105.8	90.3	102.8	114.4	130.1
5	6	12	63.9	72.7	81.0	92.0	83.0	94.4	105.1	119.5	103.0	117.2	130.5	148.4
4	6	12	73.5	83.6	93.0	105.8	97.3	110.7	123.2	140.1	122.1	138.9	154.6	175.8
3	6	12	89.3	101.6	113.2	128.6	121.1	137.8	153.4	174.4	153.9	175.1	194.9	221.6

Notes: 1 - Two rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 2 - Three rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 3 - Three rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 4 - Deformed shank is inclusive or either ring or screw shank nail

Anchor Sheet Attachment

- Notice the requirement of Note #4 – Deformed shank is inclusive of either ring or screw shank nail. Not Smooth

TABLE I

Allowable Uplift Resistance for Anchor Sheet Attachment (psf)
Two-Ply Underlayment Fastening System

Inches on Center			Two -Rows in Field ¹				Three -Rows in Field ²				Four -Rows in Field ³			
Field	Lap	Backnail Cap Sheet	15/32 Inch		19/32 inch		15/32 Inch		19/32 inch		15/32 Inch		19/32 inch	
			Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴	Smooth	Deformed ⁴
12	6	12	41.6	47.4	52.7	60.0	49.6	56.5	62.9	71.5	58.6	66.6	74.2	84.3
11	6	12	43.1	49.1	54.6	62.1	51.8	58.9	65.6	74.6	61.4	69.9	77.8	88.5
10	6	12	44.9	51.0	56.8	64.6	54.4	61.9	68.9	78.3	64.9	73.9	82.2	93.5
9	6	12	47.0	53.5	59.5	67.7	57.6	65.5	72.9	82.9	69.2	78.7	87.6	99.6
8	6	12	49.6	56.5	62.9	71.5	61.5	70.0	78.0	88.6	74.4	84.7	94.3	107.2
7	6	12	53.0	60.3	67.2	76.4	66.6	75.8	84.4	96.0	81.3	92.4	102.9	117.0
6	6	12	57.6	65.5	72.9	82.9	73.5	83.6	93.0	105.8	90.3	102.8	114.4	130.1
5	6	12	63.9	72.7	81.0	92.0	83.0	94.4	105.1	119.5	103.0	117.2	130.5	148.4
4	6	12	73.5	83.6	93.0	105.8	97.3	110.7	123.2	140.1	122.1	138.9	154.6	175.8
3	6	12	89.3	101.6	113.2	128.6	121.1	137.8	153.4	174.4	153.9	175.1	194.9	221.6

- Notes:
- 1 - Two rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 - 2 - Three rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 - 3 - Three rows staggered in the field, one row at the lap, and one row at the top edge of the cap sheet
 - 4 - Deformed shank is inclusive of either ring or screw shank nail

Anchor Sheet Attachment

- Be aware of the requirements found in Note #4 – Deformed shank is inclusive of either ring or screw shank nail. Not Smooth



Self-Adhered Underlayment

- **Self -Adhered Membrane** - Self -Adhered products shall meet ASTM D 1970, underlayment thickness, minimum thickness 40 mils. Self-Adhered products shall meet the following testing standards:

TAS 103, Item 7, wind uplift (satisfies wind uplift criteria)

TAS 103, Item 9, tear resistance

TAS 103, Item 10, breaking strength and elongation

TAS 103, Item 16, Water Vapor Transmission (satisfies waterproof/water resistant criteria)

TAS 103, Item 19, slippage resistance (satisfies tile stack- ability criteria)

TAS 103, Item 20, cracking cycling

ASTM D 1970, section 7.9 (satisfied nail seal-ability)

AC 48, Section 4.6, cycling and elongation

U.V. Exposure, minimum 90 days

TAS 103-95 - Test Procedure for Self-Adhered Underlayment's for Use in Discontinuous Roof Systems

- 7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft² and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft², holding each incremented pressure for one (1) minute, until the negative pressure has been held at **90 lbf/ft²** for one (1) minute.

Self-Adhered Underlayment

- Verify the uplift resistance of the Self-Adhered Underlayment. Make sure the resistance value used includes the safety factor of 2 to 1.
- 2014 FBC ***1504.9 Margin of Safety.***
A margin of safety of 2:1 shall be applied to all wind uplift resistance test results except when a margin of safety is specified in the test standard.

Determine the Tile Resistance Value

- Choose the correct table according to the Roof Pitch and Exposure Category, which in this case the is Roof Slope is 4/12 and the Exposure Category C, Wind Speed 140 MPH, MRH 15' or Less
- Design Pressure
- 60.5

TABLE 2A
Required Aerodynamic Uplift Moment For Field Tile, Ma (ft-lbf)
For Roof Pitches 6:12 and Less

Exposure C	Basic Wind Speed in MPH							
	120	130	140	150	160	170	180	190
MRH								
0-15	16.2	19.0	22.0	25.3	28.8	32.5	36.4	40.6
20	17.1	20.1	23.3	26.8	30.5	34.4	38.6	43.0
25	17.9	21.0	24.4	28.0	31.8	35.9	40.3	44.9
30	18.7	21.9	25.4	29.2	33.2	37.5	42.0	46.8
35	19.2	22.6	26.2	30.1	34.2	38.6	43.3	48.2
40	19.8	23.2	27.0	30.9	35.2	39.8	44.6	49.7
45	20.2	23.7	27.5	31.5	35.9	40.5	45.4	50.6
50	20.8	24.4	28.3	32.4	36.9	41.7	46.7	52.0
55	21.1	24.8	28.8	33.0	37.6	42.4	47.6	53.0
60	21.5	25.3	29.3	33.6	38.3	43.2	48.4	54.0

Florida Product Approval

The screenshot shows the Florida Department of Business & Professional Regulation website. The browser address bar displays http://www.floridabuilding.org/pr/pr_app_lst.aspx. The page header includes the department name and a navigation menu with links for [BCIS Home](#), [Log In](#), [User Registration](#), [Hot Topics](#), [Submit Surcharge](#), [Stats & Facts](#), [Publications](#), [FBC Staff](#), [BCIS Site Map](#), [Links](#), and [Search](#). The main content area is titled "Product Approval" and shows the user is logged in as "Public User". A navigation breadcrumb reads "Product Approval Menu > Product or Application Search > Application List".

Search Criteria

Code Version	2010	FL#	ALL
Application Type	ALL	Product Manufacturer	Boral Roofing / MonierLifetile
Category	ALL	Roofing Subcategory	Roofing Tiles
Application Status	ALL	Compliance Method	ALL
Quality Assurance Entity	ALL	Quality Assurance Entity Contract Expired	ALL
Product Model, Number or Name	ALL	Product Description	ALL
Approved for use in HVHZ	ALL	Approved for use outside HVHZ	ALL
Impact Resistant	ALL	Design Pressure	ALL
Other	ALL		

[Refine Search](#)

Search Results - Applications

FL#	Type	Manufacturer	Validated By	Status
FL601-R8 History	Revision	Boral Roofing / MonierLifetile Category: Roofing Subcategory: Roofing Tiles	Miami-Dade BCCO - VAL (786) 315-2590	Approved *
FL7849-R4 History	Revision	Boral Roofing / MonierLifetile Category: Roofing Subcategory: Roofing Tiles	Gary W. Walker (205) 854-0160	Approved

*Approved by DBPR. Approvals by DBPR shall be reviewed and ratified by the POC and/or the Commission if necessary.

Contact Us :: 1940 North Monroe Street, Tallahassee FL 32399 Phone: 850-487-1824

The State of Florida is an AA/EEO employer. Copyright 2007-2010 State of Florida. :: [Privacy Statement](#) :: [Accessibility Statement](#) :: [Refund Statement](#)

Under Florida law, email addresses are public records. If you do not want your e-mail address released in response to a public-records request, do not send electronic mail to this entity. Instead, contact the office by phone or by traditional mail. If you have any questions, please contact 850.487.1395. *Pursuant to Section 455.275(1), Florida Statutes, effective October 1, 2012, licensees licensed under Chapter 455, F.S. must provide the Department with an email address if they have one. The emails provided may be used for official communication with the licensee. However email addresses are public record. If you do not wish to supply a personal address, please provide the Department with an email address which can be made available to

Valid Florida Product Approval or Miami-Dade NOA

- Remember that the Florida Product Approval are valid through the specific code cycle and the PA indicates which version of the Florida Building Code it complies with usually in the Scope Section.
- Miami-Dade NOA is valid usually for five years or when the expiration date indicates on the NOA or if there is a standard update that effects the NOA.
- The Florida Product Approvals and Miami-Dade NOA's used in this seminar may or may not be updated to the 2014 FBC Fifth Edition.

Florida Product Approval-FL601

- **Boral Roofing Tile NOA No.: 12-0904.07**

Equivalence of Product Standards Certified By

TAS 102	1995
TAS 102 (A)	1995
TAS 112	1995

Product Approval Method: Method 1 Option A

Date Submitted: 01/15/2013
Date Validated: 02/08/2013
Date Pending FBC Approval: 02/12/2013
Date Approved: 02/12/2013

Summary of Products

FL #	Model, Number or Name	Description
601.1	Atlantis - Shake & Slate	Flat Profile - Pompano Beach
Limits of Use Approved for use in HVHZ: Yes Approved for use outside HVHZ: Yes Impact Resistant: N/A Design Pressure: N/A Other:		Certification Agency Certificate FL601_R8_C_CAC_12090409_Atlantis.pdf Quality Assurance Contract Expiration Date 12/16/2017 Installation Instructions FL601_R8_II_12090409_Atlantis.pdf Verified By: Miami-Dade BCCO - CER Created by Independent Third Party: Evaluation Reports Created by Independent Third Party:
601.2	Barcelona 900	High Profile - Lake Wales
Limits of Use Approved for use in HVHZ: Yes Approved for use outside HVHZ: Yes Impact Resistant: N/A Design Pressure: N/A Other:		Certification Agency Certificate FL601_R8_C_CAC_12-0222.02.pdf Quality Assurance Contract Expiration Date 04/26/2017 Installation Instructions FL601_R8_II_12-0222.02.pdf Verified By: Miami-Dade BCCO - CER Created by Independent Third Party:

Florida Product Approval-FL7849.1

http://www.floridabuilding.org/pr/pr_app_dtl.aspx?parc Florida Building Co... x

Suggested Sites Free Hotmail Get more Add-ons Suggested Sites

Referenced Standard and Year (of Standard)	Standard ASTM C1492	Year 2003
Equivalence of Product Standards Certified By		
Sections from the Code		
Product Approval Method	Method 1 Option C	
Date Submitted	01/15/2013	
Date Validated	01/22/2013	
Date Pending FBC Approval	02/07/2013	
Date Approved	04/09/2013	

Summary of Products

Go to Page GO Page 1 / 2

FL #	Model, Number or Name	Description
7849.1	Atlantis - Slate & Textured	Flat Profile - Pompano Beach
Limits of Use Approved for use in HVHZ: No Approved for use outside HVHZ: Yes Impact Resistant: N/A Design Pressure: N/A Other:		Installation Instructions FL7849_R4_II_Boral_FBS_Installation.pdf FL7849_R4_II_FRSA-TRI_Installation.pdf Verified By: Gary W. Walker 40455 Created by Independent Third Party: Yes Evaluation Reports FL7849_R4_AE_ICC_ESR_1647.PDF
7849.2	Barcelona 900	High Profile - Lake Wales
Limits of Use Approved for use in HVHZ: No Approved for use outside HVHZ: Yes Impact Resistant: N/A Design Pressure: N/A Other:		Installation Instructions FL7849_R4_II_Boral_FBS_Installation.pdf FL7849_R4_II_FRSA-TRI_Installation.pdf Verified By: Gary W. Walker 40455 Created by Independent Third Party: Yes Evaluation Reports FL7849_R4_AE_ICC_ESR_1647.PDF
7849.3	Capri	Medium Profile - Lake Wales

3:43 PM 8/9/2013

N.O.A.

FL. P.A.



DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES (RER)
BOARD AND CODE ADMINISTRATION DIVISION

NOTICE OF ACCEPTANCE (NOA)

Boral Roofing LLC.
7575 Irvine Center Drive, Suite 100
Irvine, CA. 92618

SCOPE:

This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County RER - Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. RER reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein, and has been designed to comply with the Florida Building Code including the High Velocity Hurricane Zone of the Florida Building Code.

DESCRIPTION: Atlantis Shake & Slate Concrete Roof Tile

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This renews NOA# 12-0308.12 and consists of pages 1 through 7.
The submitted documentation was reviewed by Alex Tigera.

MIAMI-DADE COUNTY
APPROVED

MIAMI-DADE COUNTY
PRODUCT CONTROL SECTION
11805 SW 26 Street, Room 208
Miami, Florida 33175-2474
T (786) 315-2590 F (786) 315-2599
www.miamidadecounty.gov/pera

NOA No.: 12-0904.07
Expiration Date: 12/16/17
Approval Date: 12/06/12
Page 1 of 7



Most Widely Accepted and Trusted

ICC-ES Evaluation Report

ESR-1647

Reissued August 1, 2011

This report is subject to renewal in two years.

www.icc-es.org | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 32 16—Concrete Roof Tiles

REPORT HOLDER:

MONIERLIFETILE, LLC
7575 IRVINE CENTER DRIVE, SUITE 100
IRVINE, CALIFORNIA 92618
(949) 756-1605
www.boralna.com
steven.zigich@boral.com

ADDITIONAL LISTEE:

BORAL ROOFING
7575 IRVINE CENTER DRIVE, SUITE 100
IRVINE, CALIFORNIA 92618
(949) 756-1605
www.boralna.com
steven.zigich@boral.com

EVALUATION SUBJECT:

CONCRETE ROOF TILES: ATLANTIS, BARCELONA 900, CAPRI, CEDARLITE / CEDARLITE 600, ESPANA / BARCELONA, ESPANA 600, MADERA, MADERA 700, MISSION S / BARCELONA, SAXONY, SAXONY 600, SAXONY 700, SAXONY 900, SPANISH "S", SPANISH "S" NUEVO, TEJAS ESPANA, VANGUARD ROLL, VILLA, VILLA 600 AND VILLA 900

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 International Building Code® (IBC)
- 2009 International Residential Code® (IRC)
- Other Codes (See Section 8.0)

Properties evaluated:

- Fire classification
- Weather resistance
- Wind-uplift resistance

2.0 USES

The MonierLifetile concrete roof tiles installed over solid sheathing are used as Class A roof coverings in accordance with Section 1505.2 of the IBC and Section R902.1 of the IRC.

3.0 DESCRIPTION

3.1 Interlocking Concrete Roof Tiles:

These roof tiles are extruded interlocking concrete roof tiles that comply with ASTM C 1492 and have interlocking ribs on the longitudinal edges of the tiles to restrict lateral movement and provide a water stop. All roof tiles are designed with anchor lugs except for the Cedarlite and Madera profiles. Mineral coloring oxides are either applied to the exposed surface in a cementitious material or mixed integrally with the tile mix to produce a through-colored product.

All roof tiles are cured to reach required strength before shipment. Product designations, dimensions and installed dry weights are indicated in Table 1 of this report. Roof tile profiles are illustrated in Figure 1.

3.2 Concrete Roof Tiles:

Spanish "S" roof tiles are extruded concrete roof tiles that comply with ASTM C 1492. The roof tile is manufactured in the same manner as the roof tiles described in Section 3.1, except the tile is non-interlocking. The roof tile is designed without anchor lugs. The product designation, dimensions and installed dry weight are indicated in Table 1. See Figure 1 for an illustration of the tile.

4.0 INSTALLATION

4.1 General:

Installation of the MonierLifetile roof tiles must be in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, dated March 2010, published by the Tile Roofing Institute and Western States Roofing Contractors Association (hereinafter referred to as the TRI/WSRCA installation manual), and recognized in ESR-2015P, except as otherwise noted in this report. In case of a conflict between the installation manual and this report, this report governs. This report and the TRI/WSRCA installation manual must be available at the jobsite at all times during installation. The roof tiles must be installed on a minimum roof slope of 2 1/2:12 (20.83%). Care must be taken during field installation to ensure that horizontal joints are kept parallel to the eave and vertical joints are at right angles to the eave in order to ensure uniform contact between the tiles and proper fit and appearance. All cracked and broken roof tiles must be replaced.

4.2 Adhesive Set Systems:

The MonierLifetile roof tiles may be installed with roof tile adhesives that are recognized in a current ICC-ES evaluation report for use in concrete roofing tile applications. Installation of tiles using these adhesive set

ICC-ES Evaluation Reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

Copyright © 2011



Page 1 of 10

Resistance Information

- Resistance value for Roof Tile for use with Florida Product Approval found in the Tile Adhesive Product Approval



EXTERIOR RESEARCH & DESIGN, LLC.
Certificate of Authorization #0503
353 CHRISTIAN STREET, UNIT 13
OXFORD, CT 06478
PHONE: (203) 262-9245
FAX: (203) 262-9243

EVALUATION REPORT

3M Company
3M Center
Building 0220-05-E-06
St. Paul, MN 55144-1000

Evaluation Report 02768.03.06-R4
FL6332-R4
Date of Issuance: 08/08/2008
Revision 4: 04/24/2013

SCOPE:

This Evaluation Report is issued under Rule 9N-3 and the applicable rules and regulations governing the use of construction materials in the State of Florida. The documentation submitted has been reviewed by Robert Nieminen, P.E. for use of the product under the Florida Building Code. The product described herein has been designed to comply with the 2010 Florida Building Code.

DESCRIPTION: 3M™ 2-Component Foam Roof Tile Adhesive AH-160

LABELING: Each unit shall bear labeling in accordance with the requirements the Accredited Quality Assurance Agency noted herein.

CONTINUED COMPLIANCE: This Evaluation Report is valid until such time as the named product(s) changes, the referenced Quality Assurance documentation changes, or provisions of the Code that relate to the product change. Acceptance of this Evaluation Report by the named client constitutes agreement to notify Robert Nieminen, P.E. if the product changes or the referenced Quality Assurance documentation changes. Trinity|ERD requires a complete review of this Evaluation Report relative to updated Code requirements with each Code Cycle.

ADVERTISEMENT: The Evaluation Report number preceded by the words "Trinity | ERD Evaluated" may be displayed in advertising literature. If any portion of the Evaluation Report is displayed, then it shall be done in its entirety.

INSPECTION: Upon request, a copy of this entire Evaluation Report shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This Evaluation Report consists of pages 1 through 6.

Prepared by:

Robert J.M. Nieminen, P.E.
Florida Registration No. 59166, Florida DCA ANE1983



The facsimile seal appearing was authorized by Robert Nieminen, P.E. on 04/24/2013. This does not serve as an electronically signed document. Signed, sealed hardcopies have been transmitted to the Product Approval Administrator and to the named client.

CERTIFICATION OF INDEPENDENCE:

1. Exterior Research & Design, LLC. d/b/a Trinity | ERD does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products it evaluates.
2. Exterior Research & Design, LLC. d/b/a Trinity | ERD is not owned, operated or controlled by any company manufacturing or distributing products it evaluates.
3. Robert Nieminen, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the evaluation reports are being issued.
4. Robert Nieminen, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

Allowable Overturning Moment



- Resistance Right Side Column
- Medium Patty 51
- Large Patty 92
- Two Patty 43

5.5 Field tiles using 3M™ 2-Component Foam Roof Tile Adhesive AH-160 are limited to projects having an **Aerodynamic Uplift Moment (M_a)¹ or Moment Resistance (M_r)²** not greater than the following Allowable Overturning Moment values. Refer to 3M Company published installation instructions for Adhesive Paddy Placement details attached herein.

Tile		Adhesive Paddy Placement	Allowable Overturning Moment (ft-lbf)
Type	Profile		
Clay or Concrete	Flat	Independent, Medium Paddy (~30 gram)	51
		Independent, Large Paddy (~45 gram)	92
		Interdependent, Two Paddy (~12 gram per paddy)	43
Clay or Concrete	Low/ Medium	Independent, Medium Paddy (~30 gram)	36
		Independent, Large Paddy (~54 gram)	60
		Interdependent, Two Paddy (~12 gram per paddy)	50
Clay	High	Independent, Large Paddy (~45 gram)	116
Clay or Concrete	High	Independent, Medium Paddy (~30 gram)	49
		Independent, Large Paddy (~63 gram)	94
		Interdependent, Two Paddy (~12 gram per paddy)	30
Clay	Cap & Pan (Barrel)	2x10-inch x ~35 gram for pans; 2 @ 1x10-inch x ~17 gram for cap	142
Concrete	Cap & Pan (Barrel)	2x10-inch x ~35 gram for pans; 2 @ 1x10-inch x ~17 gram for cap	99
Clay	Cap atop 2x stringer	Independent: Continuous Paddy (~34 gram/ft)	129
Concrete	Cap atop 2x stringer	Independent: Continuous Paddy (~34 gram/ft)	113
Clay	Cap atop 2x stringer	Interdependent:	
		Head: One (1) #10 x 2½" screw; Overlap: 1 x 6 inch (~10.5 gram)	98
Concrete	Cap atop 2x stringer	Interdependent:	
		Head: One (1) #10 x 2½" screw; Overlap: 1 x 6 inch (~10.5 gram)	57

5.5.1 Data in Table 1 relates to installation over a '30/90' underlayment system, as detailed in the **FRSA/TRI 07320**. Alternate underlayment systems include those having a current **Florida Statewide Product Approval** or approved on a local-level by the AHJ for use with 3M™ 2-Component Foam Roof Tile Adhesive AH-160 (formerly PolyPro AH-160).

5.5.2 Tile roof systems using tile types or profiles other than those listed above acquiring acceptance for use with 3M™ 2-Component Foam Roof Tile Adhesive AH-160 shall be tested in accordance with SSTD 11 or TAS 101. For the interdependent two-paddy method, an additional 2-to-1 margin above that specified in SSTD 11 or TAS 101 shall be applied in determining the 'allowable overturning moment'.

¹ Determined in accordance with 2007 FBC Section 1609.5.3 and 1609.5.1.

² Determined in accordance with RAS 127.

High-Velocity Hurricane Zone Uniform Permit Application Form. Section E (Tile Calculations)

- For Moment based tile systems, choose either Method 1 or 2.
- Compare the values for M_r with the values from M_f . If the M_f values are greater than or equal to the M_r values, for each area of the roof, then the tile attachment method is acceptable.

Table 2A Exposure Category c

Required Aerodynamic Uplift Moment for Field Tile 6:12 and Less

TABLE 2A

Required Aerodynamic Uplift Moment For Field Tile, Ma (ft-lbf)
For Roof Pitches 6:12 and Less

Exposure C	Basic Wind Speed in MPH							
	120	130	140	150	160	170	180	190
MRH								
0-15	16.2	19.0	22.0	25.3	28.8	32.5	36.4	40.6
20	17.1	20.1	23.3	26.8	30.5	34.4	38.6	43.0
25	17.9	21.0	24.4	28.0	31.8	35.9	40.3	44.9
30	18.7	21.9	25.4	29.2	33.2	37.5	42.0	46.8
35	19.2	22.6	26.2	30.1	34.2	38.6	43.3	48.2
40	19.8	23.2	27.0	30.9	35.2	39.8	44.6	49.7
45	20.2	23.7	27.5	31.5	35.9	40.5	45.4	50.6
50	20.8	24.4	28.3	32.4	36.9	41.7	46.7	52.0
55	21.1	24.8	28.8	33.0	37.6	42.4	47.6	53.0
60	21.5	25.3	29.3	33.6	38.3	43.2	48.4	54.0

Hip and Ridge Maximum Design Pressure

- Hip and Ridge Attachment
- Tile Type
- Attachment Method
- MDP 56-116



5.6 Hip and ridge tiles using 3M™ 2-Component Foam Roof Tile Adhesive AH-160 are limited to projects having hip/ridge design pressure requirements³ not greater than the following values. Refer to 3M Company published installation instructions for Adhesive Paddy Placement details.

TABLE 2: Hip & Ridge Tiles in 3M™ 2-Component Foam Roof Tile Adhesive AH-160			
ULPIF RESISTANCE PERFORMANCE DATA			
Tile	Substrate	Attachment Method	MDP (psf)
Clay	2x PT ridge board	Independent: Continuous Paddy (~34 gram/ft)	116
Concrete	2x PT ridge board	Independent: Continuous Paddy (~34 gram/ft)	107
Clay	2x PT ridge board	Interdependent: Head: One (1) #10 x 2½" screw; Overlap: 1 x 6 inch (~10.5 gram)	90
Concrete	2x PT ridge board	Interdependent: Head: One (1) #10 x 2½" screw; Overlap: 1 x 6 inch (~10.5 gram)	56

6. INSTALLATION:

- 3M™ 2-Component Foam Roof Tile Adhesive AH-160 and the tile roof assembly shall be installed in accordance with FRSA/TRI 07320/8-05 and 3M Company published installation instructions, subject to the limitations outlined in Section 5.
- Hip and ridge boards or hip/ridge metal shall be installed in accordance with the FRSA/TRI 07320/8-05. Proprietary hip and ridge metal shall be installed in accordance with the manufacturer's Florida Product Approval.
- Installation shall be by a Factory Trained 'Qualified Applicator' approved and licensed by 3M Company.

7. LABELING:

All 3M™ 2-Component Foam Roof Tile Adhesive AH-160 containers shall comply with the Standard Conditions listed herein.

8. BUILDING PERMIT REQUIREMENTS:

As required by the Building Official or Authority Having Jurisdiction in order to properly evaluate the installation of this product.

9. QUALITY ASSURANCE ENTITY:

UL LLC – QUA9625; (414) 248-6409; Karen.buchmann@us.ul.com

³Determined in accordance with FBC 1609.1.5.

Hip and Ridge Maximum Design Pressure

- Component Product Approval
- Hip and Ridge Channel Metal



EXTERIOR RESEARCH & DESIGN, LLC.
Certificate of Authorization #9503
353 CHRISTIAN STREET, UNIT #13
OXFORD, CT 06478
PHONE: (203) 262-9245
FAX: (203) 262-9243

EVALUATION REPORT

East Coast Metals, Inc.
2301 West 8 Lane
Hialeah, FL 33010

Evaluation Report E10240.08.08-R3
FL5374-R3
Date of Issuance: 09/03/2008
Revision 3: 04/25/2012

SCOPE:

This Evaluation Report is issued under Rule 9N-3 and the applicable rules and regulations governing the use of construction materials in the State of Florida. The documentation submitted has been reviewed by Robert Nieminen, P.E. for use of the product under the Florida Building Code and Florida Building Code, Residential Volume. The products described herein have been designed to comply with the 2010 Florida Building Code.

DESCRIPTION: East Coast Metals Channel Metals

LABELING: Each unit shall bear labeling in accordance with the requirements the Accredited Quality Assurance Agency noted herein.

CONTINUED COMPLIANCE: This Evaluation Report is valid until such time as the named product(s) changes, the referenced Quality Assurance documentation changes, or provisions of the Code that relate to the product change. Acceptance of this Evaluation Report by the named client constitutes agreement to notify Robert Nieminen, P.E. if the product changes or the referenced Quality Assurance documentation changes. Trinity|ERD requires a complete review of this Evaluation Report relative to updated Code requirements with each Code Cycle.

ADVERTISEMENT: The Evaluation Report number preceded by the words "Trinity|ERD Evaluated" may be displayed in advertising literature. If any portion of the Evaluation Report is displayed, then it shall be done in its entirety.

INSPECTION: Upon request, a copy of this entire Evaluation Report shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This Evaluation Report consists of pages 1 through 7.

Prepared by:

Robert J.M. Nieminen, P.E.
Florida Registration No. 59166, Florida DCA ANE1983



The facsimile seal appearing was authorized by Robert Nieminen, P.E. on 04/25/2012. This does not serve as an electronically signed document. Signed, sealed hardcopies have been transmitted to the Product Approval Administrator and to the named client.

CERTIFICATION OF INDEPENDENCE:

1. Trinity|ERD does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products it evaluates.
2. Trinity|ERD is not owned, operated or controlled by any company manufacturing or distributing products it evaluates.
3. Robert Nieminen, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the evaluation reports are being issued.
4. Robert Nieminen, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

Hip and Ridge Maximum Design Pressure



- Non-HVHZ
- Maximum Design Pressure
- Right Column

5.2 FOR NON-HVHZ JURISDICTIONS:

- 5.2.1 For Hip & Ridge Channel Metal or Trim Lock Channel Metal, refer to "Instructions for Hip and Ridge Attachment" sections of the FRSA/TRI 07320/8-05. For Trim Lock Plus Channel Metal, refer to the installation instructions herein
- 5.2.2 For non-HVHZ, installations are limited to projects having hip/ridge design pressure requirements² not greater than the following values. Refer to the tile adhesive manufacturer's published installation instructions for Adhesive Paddy Placement details.
- > "Interdependent" paddy placement means each individual tile is bonded to the Channel Metal in a foam paddy, and a second foam paddy bonds the tile head lap, or two tiles are bonded to the Channel Metal using a single foam paddy.
 - > "Independent" paddy placement means each individual tile is bonded to the Channel Metal in its own, single foam paddy; tile head laps are not bonded.

Table 2A: Performance Limitations – non-HVHZ - Maximum Design Pressure – (psf)
Interdependent Foam-Paddy Placement

Channel Type	Tile Type	Foam Adhesive	Foam Paddy Information			MDP (psf)
			Approx. Size (inch)	Approx. Wt (grams)	Placement	
Trim Lock Channel Metal	Concrete	PolyPro	2 x 4	9.7	Tile-to-metal, 3" from tile head	103
		AH160	4 x 2	9.7	Tile-to-tile at 3" tile headlap	
		Polysset	2 x 4	6.0	Tile-to-metal, 3" from tile head	
		ONE	4 x 1	4.7	Tile-to-tile at 3" tile headlap	
	Clay	PolyPro	2 x 4	9.7	Tile-to-metal, 3" from tile head	140
		AH160	4 x 2	9.7	Tile-to-tile at 3" tile headlap	
		Polysset	2 x 4	6.0	Tile-to-metal, 3" from tile head	
		ONE	4 x 1	4.7	Tile-to-tile at 3" tile headlap	

Table 2B: Performance Limitations – non-HVHZ - Maximum Design Pressure – (psf)
Independent Paddy Placement

Channel Type	Tile Type	Foam Adhesive	Foam Paddy Information			MDP (psf)
			Approx. Size (inch)	Approx. Wt (grams)	Placement	
Hip & Ridge Channel Metal	Concrete	PolyPro AH160	2 x 8	Min. 30	Tile-to-metal, shared paddy starting 4-inch below the head of the 1 st course and ending 4-inch beyond the tail of the overlapping tile	169
Trim Lock Channel Metal	Concrete	PolyPro AH160	2 x 7	Min. 38	Tile-to-metal, centered along tile length	197
			Two at Min 2 x 7	Min. 15 each	One 2x7 paddy or continuous 2-inch wide bead to metal, one 2x7 paddy to tile underside, centered along tile length sandwiched together	140
	Clay	PolyPro AH160	2 x 7	Min. 38	Tile-to-metal, centered along tile length	368
			Two at Min 2 x 7	Min. 15 each	One 2x7 paddy or continuous 2-inch wide bead to metal, one 2x7 paddy to tile underside, centered along tile length sandwiched together	181
Trim Lock Plus Channel Metal	Concrete	PolyPro AH160	Two at Min 2 x 7	Min. 15 each	One 2x7 paddy or continuous 2-inch wide bead to metal, one 2x7 paddy to tile underside, centered along tile length sandwiched together	140
	Clay	PolyPro AH160	Two at Min 2 x 7	Min. 15 each	One 2x7 paddy or continuous 2-inch wide bead to metal, one 2x7 paddy to tile underside, centered along tile length sandwiched together	181

² Determined in accordance with FBC 1609.1.5.

Hip and Ridge Maximum Design Pressure Page 14

Exposure C	Basic Wind Speed in MPH								
	120	130	140	150	160	170	180	190	
MRH									
0-15	44.4	52.1	60.5	69.4	79.0	89.2	100.0	111.4	
20	47.0	55.2	64.0	73.5	83.6	94.4	105.8	117.9	
25	49.1	57.7	66.9	76.8	87.3	98.6	110.5	123.2	
30	51.2	60.1	69.7	80.0	91.1	102.8	115.2	128.4	
35	52.8	62.0	71.9	82.5	93.8	105.9	118.8	132.3	
40	54.4	63.8	74.0	84.9	96.6	109.1	122.3	136.3	
45	55.4	65.0	75.4	86.6	98.5	111.2	124.7	138.9	
50	57.0	66.9	77.5	89.0	101.3	114.3	128.2	142.8	
55	58.0	68.1	79.0	90.6	103.1	116.4	130.5	145.4	
60	59.1	69.3	80.4	92.3	105.0	118.5	132.9	148.1	

Roofing Application Standards (RAS)127

- **1. Scope**

This standard covers the procedure for determining the Moment of Resistance (M_r) and Minimum Characteristic Resistance Load (F') to install a tile system on buildings of a specified roof slope and height. Compliance with the requirements and procedures herein specified, where the pressures (P_{asd}) have been determined based on Table 1 or Table 2 of this standard, as applicable, do not require additional signed and sealed engineering design calculation. All other calculations must be prepared, signed and sealed by a professional engineer or registered architect. **Table 1 is applicable to a wind speed of 175 mph, risk category II buildings, and exposure category C.** Table 2 is applicable to a wind speed of 175 mph, risk category II buildings, and exposure category D.

Roofing Application Standards (RAS)127

**TABLE 1 — RISK CATEGORY II EXPOSURE CATEGORY "C"¹
MINIMUM DESIGN WIND UPLIFT PRESSURES IN PSF FOR FIELD [$P_{asd(1)}$],
PERIMETER [$P_{asd(2)}$] AND CORNER [$P_{asd(3)}$] AREAS OF ROOFS
FOR EXPOSURE C BUILDINGS WITH A ROOF MEAN HEIGHT AS SPECIFIED³**

ROOF SLOPE	> 2:12 to = 6:12			> 6:12 to =12:12	
	$P_{asd(1)}$	$P_{asd(2)}$	$P_{asd(3)}$ ²	$P_{asd(1)}$	$P_{asd(2)}$ & $P_{asd(3)}$
= 20'	-39.1	-68.1	-100.7	-42.8	-50.0
>20' to = 25'	-40.9	-71.3	-105.4	-44.8	-52.3
>25' to = 30'	-42.4	-73.9	-109.3	-46.4	-54.3
>30' to = 35'	-43.9	-76.6	-113.2	-48.1	-56.2
>35' to = 40'	-45.1	-78.7	-116.3	-49.4	-57.8

High-Velocity Hurricane Zone Uniform Permit

Application Form. Section E (Tile Calculations)

(P1: 39.1 x λ 0.208 equals 8.1328) – Mg: 6.01 equals Mr 1 2.1228 PA Mf

(P2: 68.1 x λ 0.208 equals 14.1648) – Mg: 6.01 equals Mr 2 8.1548 PA Mf

(P3: 100.7 x λ 0.208 equals 20.9456) – Mg: 6.01 equals Mr 3 14.9356 PA Mf

Table 3

Mechanical Roof Tile Resistance Values

TABLE 3

Mechanical Roof Tile Resistance Values (ft-lbf) For Field Tile

Deck Thickness	Method	Fastener Type	Attachment Description	Low	Medium	High
15/32"	Direct Deck	Nail	1 SS, 1C	25.2	25.2	35.5
			2 SS, 1C	38.1	38.1	44.3
			2RS	39.1	36.1	28.6
			2 RS 4" HL	50.3	43.0	33.1
	Batten	Screw	1 No. 8	39.1	33.2	28.7
			2 No. 8	50.2	55.5	51.3
			1 SS, 1C	27.5	27.5	29.4
			2 SS, 1C	37.6	37.6	47.2
Batten	Screw	2 RS	24.6	36.4	26.8	
		1 No. 8	25.6	30.1	25.5	
Batten	Screw	2 No. 8	36.1	41.9	37.1	
19/32"	Direct Deck	Nail	2 RS	46.4	45.5	41.2

*SS = Smooth Shank Nail or Screw Shank
C = Clip*

*RS = Ring Shank
HL = Head Lap*

For Uplift Resistance Values for Foam Adhesives, see TRI Technical Bulletin 2012-100, which is available for download at www.Tilerroofing.org

For mean roof heights over 60 ft, engineering calculations must be submitted for permitting.

Table 2A Exposure Category c

Required Aerodynamic Uplift Moment for Field Tile 6:12 and Less

TABLE 2A
Required Aerodynamic Uplift Moment For Field Tile, Ma (ft-lbf)
For Roof Pitches 6:12 and Less

Exposure C	Basic Wind Speed in MPH							
	120	130	140	150	160	170	180	190
MRH								
0-15	16.2	19.0	22.0	25.3	28.8	32.5	36.4	40.6
20	17.1	20.1	23.3	26.8	30.5	34.4	38.6	43.0
25	17.9	21.0	24.4	28.0	31.8	35.9	40.3	44.9
30	18.7	21.9	25.4	29.2	33.2	37.5	42.0	46.8
35	19.2	22.6	26.2	30.1	34.2	38.6	43.3	48.2
40	19.8	23.2	27.0	30.9	35.2	39.8	44.6	49.7
45	20.2	23.7	27.5	31.5	35.9	40.5	45.4	50.6
50	20.8	24.4	28.3	32.4	36.9	41.7	46.7	52.0
55	21.1	24.8	28.8	33.0	37.6	42.4	47.6	53.0
60	21.5	25.3	29.3	33.6	38.3	43.2	48.4	54.0



FRSA/TRI Florida High Wind Concrete
& Clay Tile Installation Manual

Questions



The End

FRSA/TRI

- FRSA – Florida Roofing, Sheet Metal & Air Conditioning Contractors Association

www.floridarroof.com

- TRI – Tile Roofing Institute

www.tilerroof.org