

TEXAS DEPARTMENT OF INSURANCE

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PRODUCT EVALUATION

Effective December 1, 2012

RC-352

*The following product has been evaluated for compliance with the wind loads specified in the **International Residential Code (IRC)** and the **International Building Code (IBC)**. This product shall be subject to reevaluation in **December 2016**.*

This product evaluation is not an endorsement of this product or a recommendation that this product be used. The Texas Department of Insurance has not authorized the use of any information contained in the product evaluation for advertising, or other commercial or promotional purpose.

This product evaluation is intended for use by those individuals who are following the design wind load criteria in Chapter 3 of the IRC and Section 1609 of the IBC. The design loads determined for the building or structure shall not exceed the design load rating specified for the products shown in the limitations section of this product evaluation. This product evaluation does not relieve a Texas licensed engineer of his responsibilities as outlined in the Texas Insurance Code, the Texas Administrative Code, and the Texas Engineering Practice Act.

TILE-TITE™ Roof Tile Mortar manufactured by

Premix-Marbletite Manufacturing Co., Inc.
1259 N.W. 21ST Street
Pompano Beach, Florida 33069
Telephone: (854) 970-5540

will be acceptable as an adhesive for adhering concrete and clay roofing tiles to roof decks of structures located in designated catastrophe areas along the Texas Gulf Coast when installed in accordance with the roofing tile manufacturer's installation instructions and this product evaluation.

PRODUCT DESCRIPTION

TILE-TITE™ is a lightweight pre-mixed roof tile mortar for adhering concrete and clay roofing tiles to hot mopped 30/90 roof underlayment systems. **TILE-TITE™** consists of a blend of ASTM D C91 mortar cement and ASTM C332 lightweight aggregate.

GENERAL REQUIREMENTS

Roofing tiles: Concrete and clay roofing tiles shall be installed in accordance with this product evaluation report and in accordance with the **TILE-TITE™ Roof Tile Mortar Installation Instructions** published by Premix-Marbletite Manufacturing Co., Inc.t. General installation requirements for the roofing tiles shall be as specified in the roofing tile manufacturer's installation instructions.

Tile dimension limitations: The Flat/Low profile, Medium profile, and High profile roofing tiles shall be between 12 and 21 inches in length. The exposed width of the roofing tiles shall be between 8 and 15 inches. The maximum thickness of the tail of the roofing tiles shall not exceed $1\frac{3}{8}$ inch. Each roofing tile shall have at least $\frac{2}{3}$ of the tile's area free of adhesive contact.

GENERAL REQUIREMENTS (cont.)

Roof tile profile classifications: Roofing tile profiles shall be classified as one of the following:

Flat/Low profile: Flat/Low profile tiles are defined as tiles having a rise equal to or less than $\frac{1}{2}$ inch and a rise-to-width ratio of less than or equal to 1.5.

Medium profile: Medium profile tiles are defined as tiles having a rise greater than $\frac{1}{2}$ inch and a rise-to-width ratio of less than or equal to 1:5.

High profile: High/Barrel profile tiles are defined as those tiles having a rise to width ratio greater than 1.5.

Roof height limitations: Roofing tiles adhered with the TILE-TITE™ Roof Tile Mortar shall only be installed on buildings with mean roof heights that do not exceed the limitations specified in Table 1 and Table 4 of this product evaluation report. For buildings with a mean roof height greater than 60 feet, the roof tiles and their adhesive attachment method shall be designed to withstand the aerodynamic wind uplift moment determined in accordance with Section 1609.7.3 of the IBC and the attachment of the underlayment system to the roof deck shall be designed to resist the wind loads determined from the IBC.

Roof slope limitations: The minimum roof slope shall be 2:12.

INSTALLATION INSTRUCTIONS

Roof Framing and Roof Deck: Roof framing members shall be in accordance with the International Building Code. The roof framing members shall be constructed with standard 2" x 6" framing members and not be spaced greater than 24 inches on center. The roof deck shall be solidly sheathed with minimum $\frac{15}{32}$ " wood structural panels. The minimum thickness and application of the roof sheathing to the roof framing members shall be in accordance with the International Building Code to resist the required wind loads.

If the existing roof deck is a spaced board roof deck, then the spaced boards shall either be removed or covered with minimum $\frac{15}{32}$ " wood structural panels. The wood structural panels shall be installed over the spaced boards in accordance with the International Building Code to resist the required wind loads.

UNDERLAYMENT

The base ply of the underlayment system shall be an ASTM D 226 Type II (No. 30) asphalt-saturated organic felt. The felt is applied with 6 inch head laps and 6 inch side laps. The No. 30 roofing felt is fastened with 1-1/4" x 3/8" galvanized annular ring shank roofing and 1-5/8" inch 32 gauge tin tabs placed 6 inches on center at the laps and two (2) rows 12 inches on center in the field staggered 6 inches from adjacent rows of fasteners. The granular surface felt was adhered to the #30 felt with Type IV mopping asphalt applied at 425 degrees F at 25 pounds per square \pm 15% consistent with good roofing practice. After adhering, the granular surfaced felt is back nailed at the lap with 1-1/4" x 3/8" inch galvanized annular ring shank roofing nails and 1-5/8" 29 gauge tin tabs placed 12 inches on center.

UNDERLAYMENT (cont.):

Attachment of underlayment to roof deck: The required underlayment design pressure is determined using Table 1 for Exposure B conditions based on the mean roof height of the structure, the location of the structure, and the roof slope of the structure. If the structure is located in an Exposure C condition, then the required underlayment design pressure determined from Table 1 shall be multiplied by the appropriate Exposure C coefficient from Table 2.

The allowable uplift resistance for the underlayment attachment is specified in Table 3. Either Attachment Method A, B, or C from Table 3 may be used as long as the allowable uplift resistance of the underlayment attachment is greater than the required underlayment design pressure determined from Tables 1 and 2.

TILE-TITE™ Roof Tile Mortar: The pre-mixed mortar is combined with potable water (approximately 5 gallons/bag) and mixed for 5 minutes to reach a good working consistency. The mix will yield a min. 350 psi compressive strength mortar. Once mixed, a full 10" mason trowel is applied for each tile.

Roofing tile installation: The roofing tiles and the underlayment system shall be clean and dry at the time of application.

The roofing tiles shall be adhered to the two-ply 30/90 hot mop underlayment system using the TILE-TITE™ Roof Tile Mortar in accordance with the published installation instructions published by Premix-Marbletite Manufacturing Co., Inc. and the trowel application methods provided in this product evaluation report. A brief overview of the installation instructions is presented in this section.

The roofing tiles shall be adhered directly to the underlayment system. Roofing tiles shall be adhered directly to freshly applied adhesive. The roofing tile must be set within 5 minutes after application. Trowel patterns are provided detail at the end of this evaluation as follows.

Adhesive Placement	
Profile	Placement Detail ""
Two-Piece Barrel	A
Medium	B
Low	C
Flat	D

Table 4 specify the limitations on allowable mean roof heights for each of the paddy placement application methods for flat/low profile, medium profile, high profile, and two-piece barrel profile roofing tiles.

Table 1
Required Underlayment Design Pressure (psf) ¹
Exposure B

Gable Roofs (Slope 2:12 - 8:12)			
Hip Roofs (Slope 5-1/2:12 - 6:12)			
Mean Roof Height	Inland II	Inland I	Seaward
0-30	-60.3	-71.7	-84.2
40	-65.4	-77.9	-91.4
50	-69.4	-83.0	-97.4
60	-73.2	-87.1	-102.2
Hip Roofs			
Roof Slope (2:12 - 6:12)			
Mean Roof Height	Inland II	Inland I	Seaward
0-30	-40.8	-48.5	-56.9
40	-44.3	-52.7	-61.8
50	-47.2	-56.1	-65.9
60	-49.5	-58.9	-69.1
Gable Roofs			
Roof Slope(6:12:12 - 12:12)			
Mean Roof Height	Inland II	Inland I	Seaward
0-30	-29.9	-35.6	-41.8
40	-32.5	-38.7	-45.4
50	-34.5	-41.2	-48.4
60	-36.6	-43.2	-50.7
Monoslope Roofs			
(Slope 2-1/2:12 - 7:12)			
Mean Roof Height	Inland II	Inland I	Seaward
0-30	-66.8	-79.5	-93.3
40	-72.5	-86.3	-101.3
50	-77.3	-92.0	-107.9
60	-81.1	-96.5	-113.3

Notes:

- 1) Importance Factor=1.0
- 2) Exposure category for the structure location shall be defined in the 2006 International Building Code.
- 3) Design Pressures are conservative based on the exposure area of 10ft. or less.
- 4) Building is enclosed.

**Table 2
Adjustment Factors for Mean Roof Height**

Mean Roof Height (ft)	Exposure C ²
0-15	1.21
20	1.29
25	1.35
30	1.40
40	1.49
50	1.56
60	1.62

Note: ¹ The appropriate Exposure C coefficient shall be multiplied by the required underlayment design pressure determined from Table 2.

² The Exposure category for the structure location shall be as defined in the International Building Code.

**Table 3
Allowable Uplift Resistance for Two-Ply Underlayment Attachment (psf)**

Attachment Method (See Below)	Field (Inches o.c.)	Lap (Inches o.c.)	Backnail Cap Sheet (Inches o.c.)	Allowable Uplift Resistance (psf)			
				15/32"		19/32"	
				Smooth	Ring	Smooth	Ring
A	12	6	12	11.9	24.1	14.5	27.3
	9	6	12	14.8	29.8	17.9	33.8
	6	6	12	19.8	40.0	24.0	45.3
	4	6	12	25.1	50.8	30.5	57.6
	3	6	12	30.0	60.6	36.5	68.7
B	12	6	12	15.0	30.3	18.2	34.4
	9	6	12	19.0	38.4	23.1	43.5
	6	6	12	26.6	53.7	23.1	43.5
	4	6	12	34.4	69.5	41.9	78.9
	3	6	12	42.3	85.5	51.4	96.8
C	12	6	12	18.2	36.9	22.2	41.8
	9	6	12	23.3	47.0	28.3	53.3
	6	6	12	33.2	67.1	40.4	76.1
	4	6	12	44.3	89.5	53.8	101.4
	3	6	12	54.7	110.6	66.5	125.3

Notes:

- 1) **Attachment Method A:** Two (2) rows of fasteners staggered in the field; one (1) row of fasteners at the lap; and one (1) row of fasteners at the top edge of the 90 lb cap sheet.
- 2) **Attachment Method B:** Three (3) rows of fasteners staggered in the field; one row of fasteners at the lap; and one row of fasteners at the top edge of the 90 lb cap sheet.
- 3) **Attachment Method C:** Four (4) rows of fasteners staggered in the field, one (1) row of fasteners at the lap and one (1) row of at the top edge of the 90 lb cap sheet.
- 4) Anchor sheet minimum diameter of nail head/disc id 1.0 inch.
- 5) Minimum side lap is 2-inch.

Table 4
Mean Roof Height Limitations for Tile -Tite™ Mortar Set Applications
Flat/Low Profile Tiles, Medium Profile Tiles, High Profile Tiles,

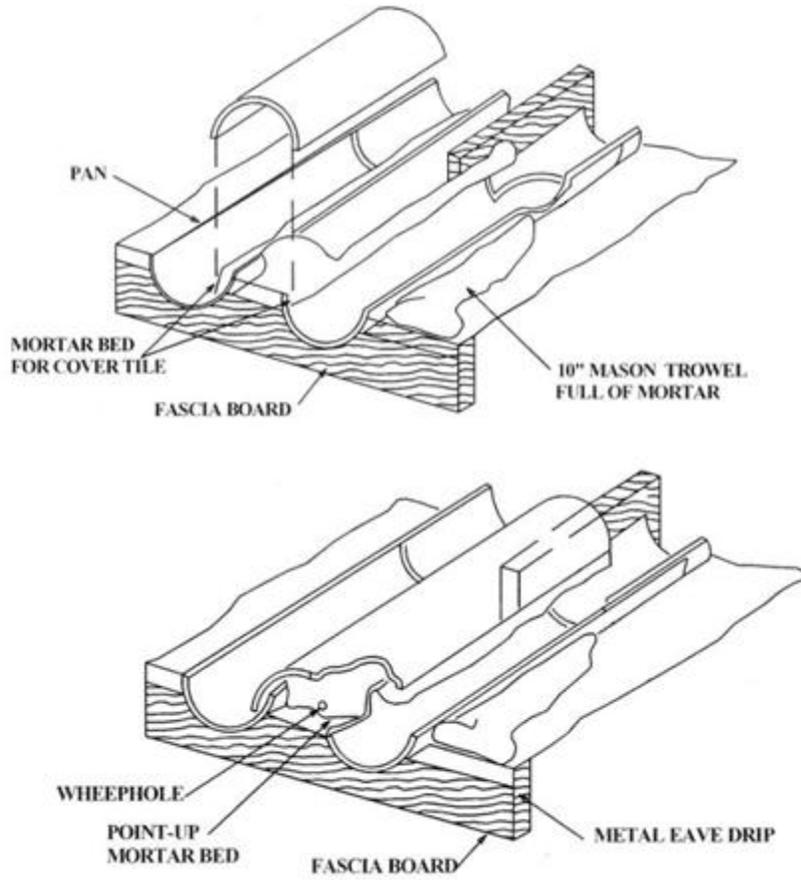
Gable Roof (Slope 2:12 - 6:12) and Hip Roof (Slope: 5-1/2:12 - 6:12)						
Trowel Size	Mean Roof Height Limitation ²					
	Inland II		Inland I		Seaward	
	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹
10" Trowel	60 ft	60 ft	60 ft	60 ft	60 ft	60 ft
Hip Roofs Slope (2:12 - 5-1/2:12)						
Trowel Size	Mean Roof Height Limitation ²					
	Inland II		Inland I		Seaward	
	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹
10" Trowel	60 ft	60 ft	60 ft	60 ft	60 ft	60 ft
Gable Roofs Slope (6:12 - 12:12)						
Trowel Size	Mean Roof Height Limitation ²					
	Inland II		Inland I		Seaward	
	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹
10" Trowel	60 ft	60 ft	60 ft	60 ft	60 ft	60 ft
Monoslope Roofs Slope (2-1/2:12 - 7:12)						
Trowel Size	Mean Roof Height Limitation ²					
	Inland II		Inland I		Seaward	
	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹	Exposure B ¹	Exposure C ¹
10" Trowel	60 ft	60 ft	60 ft	60 ft	60 ft	60 ft

Note: ¹ The Exposure category for the structure location shall be as defined in either the International Residential Code or the International Building Code.

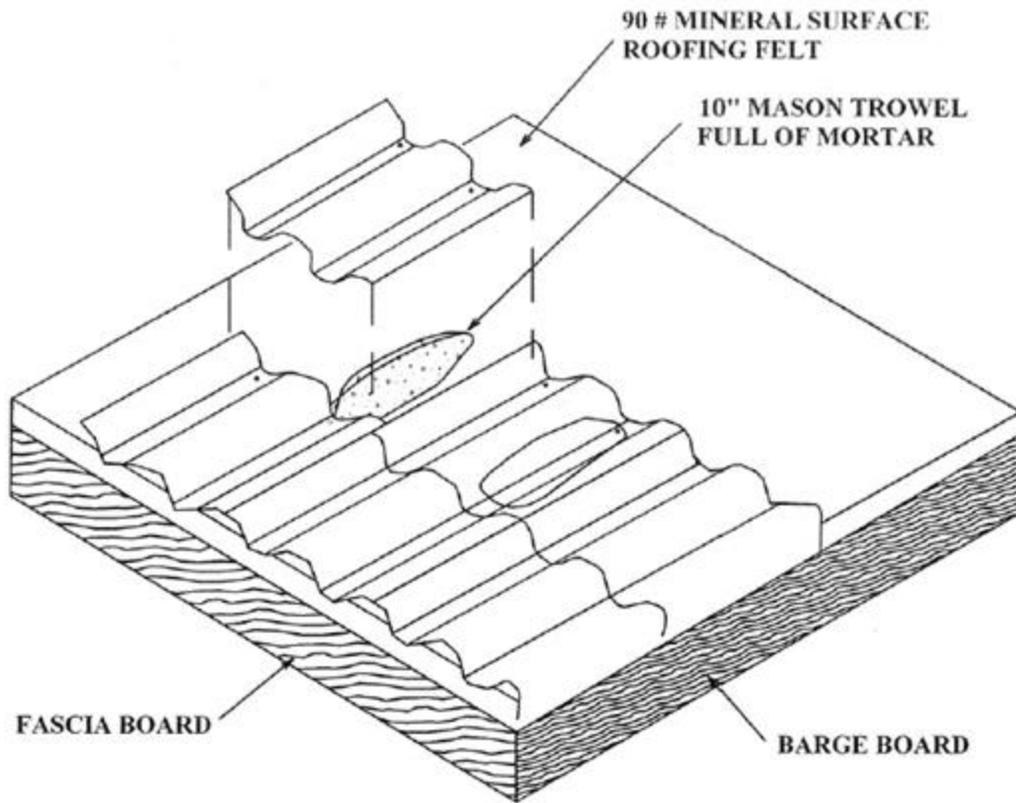
² Table is based on an Importance factor of 1.0

PLACEMENT DETAIL "A"

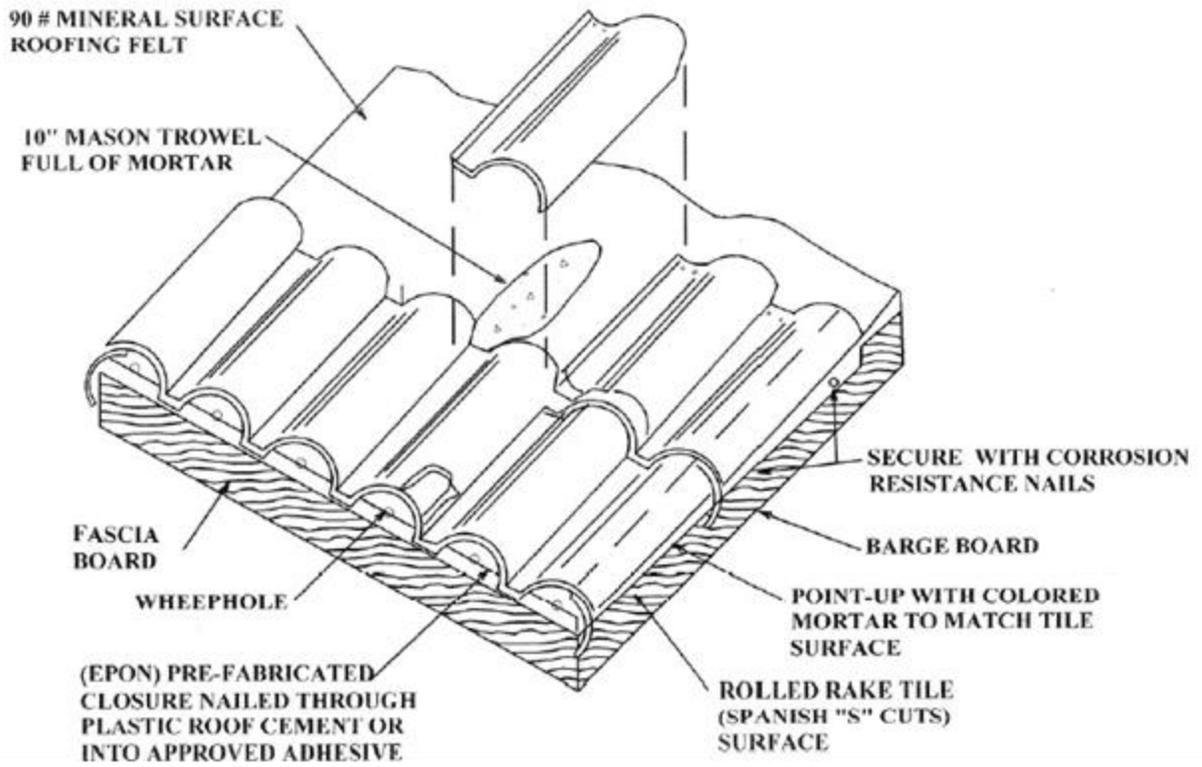
TILE & MORTAR PLACEMENT - BARREL TILE - 2 PC.



PLACEMENT DETAIL "B"



PLACEMENT DETAIL "C"



PLACEMENT DETAIL "D"

NOTE: MORTAR SHALL NOT REACH INTO THE HEAD OF TILE IN PREVIOUS COURSE OR INTO UNDERLOCK OF ADJACENT TILE.

