



EVALUATION SUBJECT: BORAL ROOFING – CONCRETE ROOF TILES

longitudinal edges and, except for the Cedarlite and Madera profiles, have anchor lugs.

REPORT HOLDER:

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4.0 DESIGN AND INSTALLATION

CSI Division: 07 Thermal and Moisture Protection
CSI Section: 07 32 16 Concrete Roof Tiles

4.1 General: The Boral Roofing concrete roof tiles shall be installed in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, dated August 2015, published by the Tile Roofing Institute and the Western States Roofing Contractors Association, except as modified in this evaluation report. The Roof Tile Installation Manual and this report shall be available at all times on the jobsite during installation. Where conflicts between this report and the installation instructions occur, the more restrictive shall govern.

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2015 International Building Code® (IBC)
- 2012 International Building Code® (IBC)
- 2009 International Building Code® (IBC)
- 2006 International Building Code® (IBC)
- 2015 International Residential Code® (IRC)
- 2012 International Residential Code® (IRC)
- 2009 International Residential Code® (IRC)
- 2006 International Residential Code® (IRC)
- 2013 California Building Code (CBC)–See attached Supplement
- 2013 California Residential Code (CRC)-See attached Supplement
- 2014 Florida Building Code, Building (FBC-Building)-See attached Supplement
- 2014 Florida Building Code, Residential (FBC, Residential)-See attached Supplement

4.2 Mortar Set Systems: The Boral Roofing concrete roof tiles shown in Table 1 of this report, except for the Barcelona 600, Cedarlite 600, Madera, Saxony 600, and Villa 600 roof tiles, may be installed with cementitious mortars that are recognized in an approved evaluation report for use with concrete roof tile applications. Installations, including underlayment, shall be in accordance with the mortar manufacturer's approved evaluation report.

1.2 Evaluated in accordance with:

- ICC-ES AC180, approved February 2012 (editorially revised April 2015)

4.3 Adhesively Attached Systems: The Boral Roofing concrete roof tiles may be installed with roof tile adhesives that are recognized in an approved evaluation report for use in concrete roof tile applications. Installations, including underlayment, shall be in accordance with the adhesive manufacturer's approved evaluation report.

1.3 Properties assessed:

- Weather resistance
- Wind uplift resistance
- Fire classification

4.4 Wind Resistance

4.4.1 Attachment of Roof Tiles: Except for the Cedarlite 600, Madera 700 and Madera 900 roof tiles, addressed in Section 4.4.2 of this report, all roof tiles shall be installed in accordance with this section.

2.0 PRODUCT USE

The Boral Roofing concrete roof tiles described in this report are used as roof covering materials complying with Chapter 15 of the IBC and Chapter 9 of the IRC, and may be used where Class A, B or C roof assemblies are required.

4.4.1.1 2015 and 2012 IBC or 2015 IRC: Under the 2015 and 2012 IBC or the 2015 IRC, as applicable, for ultimate design wind speeds (V_{ult}) of 130 mph (209 km/h) or less and mean roof heights of 60 feet (18288 mm) or less under the IBC, or 40 (12192 mm) feet or less under the IRC, attachments of the roof tiles shall be in accordance with Table 1507.3.7 of the IBC or Section R905.3.7 of the IRC, as applicable, and the Roof Tile Installation Manual.

3.0 PRODUCT DESCRIPTION

3.1 General: Boral Roofing concrete roof tiles are extruded concrete roof tiles complying with ASTM C1492. Table 1 of this report contains product designations, dimensions and weights. Figure 1 of this report illustrates roof tile profiles. Interlocking roof tiles have interlocking ribs along their

4.4.1.2 2009 and 2006 IBC or 2012, 2009 and 2006 IRC: Under the 2009 and 2006 IBC or 2012, 2009 and 2006 IRC, as applicable, for basic wind speeds (3-second gust) of 100 mph (161 km/h) or less and mean roof heights of 60 feet (18288 mm) or less under the IBC, or 40 (12192 mm) feet or less under the IRC, attachments of the roof tiles shall be in accordance with Section R905.3.7 of the IRC, and the Roof Tile Installation Manual.





4.4.2 Cedarlite 600, Madera 700, and Madera 900: Cedarlite 600, Madera 700 and Madera 900 roof tiles shall be installed in accordance with this section.

4.4.2.1 2015 and 2012 IBC or 2015 IRC: Under the 2015 and 2012 IBC or 2015 IRC, as applicable, for ultimate design wind speeds (V_{ult}) of 130 mph (209 km/h) or less and mean roof heights of 60 feet (18288 mm) or less under the IBC, or 40 (12192 mm) feet or less under the IRC, attachments of the Cedarlite 600, Madera 700 and Madera 900 roof tiles shall be in accordance with Table 1507.3.7 of the IBC, or Section R905.3.7 of the IRC, as applicable, and the Roof Tile Installation Manual.

4.4.2.2 2009 and 2006 IBC or 2012, 2009 and 2006 IRC: Under the 2009 and 2006 IBC or 2012, 2009 and 2006 IRC, as applicable, for basic wind speeds (3-second gust) of 100 mph (161 km/h) or less and mean roof heights of 60 feet (18288 mm) or less under the IBC, or 40 (12192 mm) feet or less under the IRC, attachment of the Cedarlite 600, Madera 700 and Madera 900 roof tiles shall be in accordance with Table 1507.3.7 of the IBC or Section R905.3.7 of the IRC, as applicable, and the Roof Tile Installation Manual.

For installations beyond the provisions of IBC Table 1507.3.7 and IRC Section R905.3.7, as applicable, the fastening systems shall be determined to withstand the required aerodynamic uplift moment in accordance with the Design Considerations for High Wind Applications, in Appendix B of the Roof Tile Installation Manual using the Tile Factor Ratio from Table 2 of this report.

4.4 Fire Classification: Boral Roofing concrete roof tiles, installed in accordance with this evaluation report, are Class A fire-retardant roof coverings in accordance with Section 1505.2 of the IBC and Section R902.1 of the IRC, as applicable. Roof classifications for adhesively attached systems shall be in accordance with the adhesive manufacturer’s approved evaluation report.

4.5 Roof Slope Limitations: Boral Roofing concrete roof tiles shall be installed on roof slopes of 2½ units vertical in 12 units horizontal (21-percent slope) or greater.

5.0 LIMITATIONS

The Boral Roofing concrete roof tiles described in this evaluation report comply with the codes listed in Section 1.0 of this report subject to the following conditions:

5.1 The roof tiles shall be manufactured, identified and installed in accordance with this report, the applicable code and the Roof Tile Installation Manual. Where conflicts occur, the more restrictive shall apply.

5.2 Roof sheathing and roof framing shall be designed for the design loads determined in accordance with the applicable code.

5.3 Boral Roofing concrete roof tiles are manufactured in the facilities specified in Table 1 of this report, under a quality control program administered by RI Ogawa & Associates, Inc.

6.0 SUBSTANTIATING DATA

Data in accordance with ICC-ES AC180, dated February 2012 (editorially revised April 2015), manufacturer’s descriptive literature and installation instructions. Test results are from laboratories in compliance with ISO/IEC 17025.

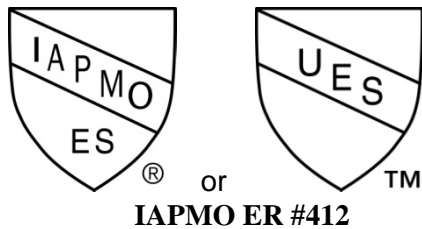
Table 2 - Tile Factor Ratio		
Tile	Tile Factor (ft ³)	Tile Factor Ratio ¹
Capri, Mission S/Barcelona, Saxony- (-Country Shake, -Country Slate, -Country Split Shake, -Impact, -Shake, -Slate, -Split Old English Thatch, -Split Shake, -Split Slate), Split Old English Thatch, Tejas Espana, Vanguard Roll, Villa	1.407	1.000
Atlantis Slate / Atlantis Textured	1.013	0.720
Spanish “S”	1.265	0.899
Spanish “S” Nuevo	1.144	0.813
Barcelona 900, Barcelona-Impact, Espana/Barcelona, Epana 600/Barcelona 600, Saxony 600, Saxony 700, Saxony 900, Saxony 900 Hartford Slate, Saxony 900-Impact, Saxony 900 Split Old English Thatch, Villa 600, Villa 900, Villa 900-Impact	1.525	1.084

¹Tile Factor Ratio = Tile Factor (ft³) / Base Tile Factor of 1.407 ft³



7.0 IDENTIFICATION

Shipping pallets are identified with the report holder's name (Boral Roofing), manufacturing address, product name, installed weight, approved inspection agency (RI Ogawa & Associates, Inc.), the UES Mark of conformity and evaluation report number (ER-412). The Cedarlite 600, Madera 700 and Madera 900 tiles are imprinted on the top side of each tile with an "M", all other filed tiles are imprinted with the name "MonierLifetile", "Boral", "Boral Lifetile" or "Vostile", or the Monierlifetile or Boral Roofing logo as shown in Figure 2 of this report. Either Mark of Conformity may be used as shown below:



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For additional information about this evaluation report please visit
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Table 1 – Tile Weights, Dimensions, Manufacturing Location

Tile	Installed Dry Weight ¹ (Psf)	Dimensions ² (In)		Manufacturing Location
		Length	Width	
Atlantis- Slate	10.4	16 ¹ / ₈	10 ¹ / ₈	Pompano
Atlantis- Textured	10.4	16 ¹ / ₈	10 ¹ / ₈	Pompano
Barcelona- 900	9.5	17	13	Lake Wales
Barcelona- 900	9.3	17	13	Lathrop
Barcelona- Impact	10.3	16 ¹ / ₂	13	Katy
Capri	10.1	17	12 ³ / ₈	Lake Wales
Cedarlite- 600	5.9	13 ¹ / ₂	13	Stockton
Espana / Barcelona	9.0	17	12 ³ / ₈	Henderson
Espana / Barcelona	8.5	17	12 ³ / ₈	Lake Wales
Espana / Barcelona	9.0	17	12 ³ / ₈	Lathrop
Espana / Barcelona	9.0	17	12 ³ / ₈	Rialto
Espana 600 / Barcelona 600	5.9	17	12 ³ / ₈	Rialto
Madera 700	7.2	13 ¹ / ₂	13	Stockton
Madera 900	9.5	13 ¹ / ₂	13	Stockton
Mission S / Barcelona	10.3	16 ¹ / ₂	13	Phoenix
Saxony 600	5.9	17	13	Rialto
Saxony 600 – Shake	5.7	17	13	Stockton
Saxony 600 – Slate	5.7	17	13	Stockton
Saxony 600 – Split Shake	5.7	17	13	Stockton
Saxony 700 – Shake	7.2	17	13	Stockton
Saxony 700 – Shake	7.1	17	13	Rialto
Saxony 700 – Slate	7.1	17	13	Rialto
Saxony 700 – Slate	7.2	17	13	Stockton
Saxony 700 – Split Shake	7.2	17	13	Stockton
Saxony 700 – Split Shake	7.1	17	13	Rialto
Saxony 900	9.3	17	13	Rialto
Saxony 900 – Country Slate	9.1	17	13	Henderson
Saxony 900 – Country Slate	9.5	17	13	Lake Wales
Saxony 900- Country Slate	9.1	17	13	Stockton
Saxony 900 – Hartford Slate	9.1	17	13	Stockton
Saxony 900 – Impact	10.4	17	13	Stockton
Saxony 900 – Split Old English Thatch	9.8	17	13	Stockton
Saxony 900 – Shake	9.1	17	13	Henderson
Saxony 900 – Shake	9.5	17	13	Lake Wales
Saxony 900 – Shake	9.1	17	13	Lathrop
Saxony 900 – Shake	9.1	17	13	Stockton
Saxony 900 – Slate	9.1	17	13	Lathrop
Saxony 900 – Slate	9.1	17	13	Stockton
Saxony 900 – Slate	9.1	17	13	Henderson
Saxony 900 – Slate	9.5	17	10 ³ / ₈	Lake Wales
Saxony 900 – Split Shake	9.5	17	13	Lake Wales
Saxony – Country Shake	10.3	16 ¹ / ₂	13	Katy
Saxony – Country Shake	10.3	17	12 ³ / ₈	Rialto
Saxony – Country Slate	9.6	17	13	Denver
Saxony – Country Slate	10.3	16 ¹ / ₂	13	Katy
Saxony – Country Slate	10.3	17	12 ³ / ₈	Rialto
Saxony – Country Spilt Shake	10.3	16 ¹ / ₂	13	Katy
Saxony – English Thatch	10.3	16 ¹ / ₂	13	Katy
Saxony – English Thatch	10.3	17	12 ³ / ₈	Rialto



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Saxony – English Thatch	10.4	17	12 ³ / ₈	Lake Wales
Saxony – Impact	10.5	16½	13	Katy
Saxony – Impact	10.5	17	13	Denver
Saxony – Shake	10.3	16½	13	Katy
Saxony – Shake	9.5	16½	13	Phoenix
Saxony – Shake	10.3	17	12 ³ / ₈	Rialto
Saxony – Shake	10.4	17	12 ³ / ₈	Lake Wales
Saxony – Shake	9.6	17	13	Denver
Saxony – Slate	9.5	16½	13	Phoenix
Saxony – Slate	10.3	16½	13	Katy
Saxony – Slate	10.3	17	12 ³ / ₈	Rialto
Saxony – Slate	10.4	17	12 ³ / ₈	Lake Wales
Saxony – Slate	9.6	17	13	Denver
Saxony – Split Old English Thatch	9.6	17	13	Denver
Saxony – Split Shake	10.3	17	12 ³ / ₈	Rialto
Saxony – Split Shake	10.4	17	12 ³ / ₈	Lake Wales
Saxony – Split Slate	10.3	17	12 ³ / ₈	Rialto
Saxony – Split Slate	10.4	17	12 ³ / ₈	Lake Wales
Spanish “S”	9.5	18	10	Pompano
Spanish “S” Nuevo	9.9	17	9¾	Lake Wales
Tejas Espana / Barcelona	9.0	16½	13	Katy
Vanguard Roll	8.4	16½	13	Pompano
Villa	9.0	16½	13	Katy
Villa	9.6	16½	13	Phoenix
Villa 600	5.8	17	13	Rialto
Villa 600	6.0	17	13	Stockton
Villa 900	9.0	17	13	Rialto
Villa 900	9.0	17	13	Denver
Villa 900	9.3	17	13	Stockton
Villa 900	9.2	17	13	Lake Wales
Villa 900 - Impact	10.1	17	13	Denver

For SI: 1 inch = 25.4 mm, 1 psf = 4.88 kg/m²

¹Installed dry weight is based on a 3-inch headlap.

²All dimensions are nominal



CALIFORNIA SUPPLEMENT

**EVALUATION SUBJECT:
BORAL ROOFING – CONCRETE ROOF TILES**

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CSI Division: 07 Thermal and Moisture Protection
CSI Section: 07 32 16 Concrete Roof Tiles

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2013 California Building Code (CBC)
- 2013 California Residential Code (CRC)

2.0 FINDINGS

The Boral Roofing concrete roof tiles described in IAPMO UES ER-412 comply with the 2013 CBC and the 2013 CRC. The design and installation of the Boral Roofing concrete roof tiles shall be in accordance with Sections 1507.3.10 and 1512 of the CBC or Section 905.3 of the CRC, as applicable, and ER-412.

The Boral Roofing concrete roof tiles may be used as a Class A roof covering complying with Section 1505.1.1 of the CBC or Section R902.1.1 of the CRC, or as a Class B roof covering complying with Section 1505.1.2 of the CBC or Section R902.1.2 of the CRC, or as a Class C roof covering complying with Section 1505.1.3 of the CBC or Section R902.1.3 of the CRC, as applicable.

Boral Roofing concrete roof tiles may be used in the construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or a Wildland-Urban Interface Fire Area, provided installation is also in accordance with the 2012 IBC as presented in ER-412 and the requirements of Sections 701A.3 and 705A of the CBC or Sections R327.1.3.1 and R327.5 of the CRC, as applicable.

This supplement expires concurrently with ER-412.



FLORIDA SUPPLEMENT

EVALUATION SUBJECT: BORAL ROOFING – CONCRETE ROOF TILES

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CSI Division: 07 Thermal and Moisture Protection
CSI Section: 07 32 16 Concrete Roof Tiles

program is audited by a quality assurance entity approved by the Florida Building Commission (or the building official when the report holder does not possess an approval by the Commission), to provide oversight and determine that the products are being manufactured as described in this evaluation report to establish continual product performance is required.

This supplement expires concurrently with ER-412.

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2014 Florida Building Code, Building (FBC-Building)
- 2014 Florida Building Code, Residential (FBC-Residential)
- 2013 California Building Code (CBC) – see attached Supplement
- 2013 California Residential Code (CRC) – see attached Supplement
- 2014 Florida Building Code, Building (FBC-Building) – see attached Supplement
- 2014 Florida Building Code, Residential (FBC, Residential) – see attached Supplement

2.0 FINDINGS

The Boral Roofing concrete roof tiles described in IAPMO UES ER-412 complies with the 2014 FBC, Building and the 2014 and 2014 FBC, Residential. The design and installation of the Boral Roofing concrete roof tiles shall be in accordance with the 2012 International Building Code and the 2012 International Residential Code as noted in ER-412. The Boral Roofing concrete roof tiles shall be installed in accordance with the requirements 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 FBC, Building Section 1609.3.1, FBC, Residential Section R301.2.1, or the recommendations of RAS 118, 119 or 120.

Load combinations shall be in accordance with Sections 1605.2 or 1605.3 of the FBC, Building as applicable.

Design wind loads shall be in accordance with Section 1609.5 of the FBC, Building or Section R301.2.1.1 of the FBC, Residential, as applicable.

For products falling under Florida Rule 61G20-2.008 verification that the report holder's quality assurance