

## Product Evaluation

RC533 | 0221

Engineering Services Program

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 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.

For more information, contact TDI Engineering Services Program at (800) 248-6032.

**Evaluation ID:** RC-533

**Effective Date:** February 1, 2021

**Re-evaluation Date:** February 2025

**Product Name:** Clay Roof Tiles Installed with Roof Tile Adhesive or Mortar

**Manufacturer:** Ceramica Vereia USA  
7035 SW 44<sup>th</sup> Street  
Miami, FL 33155  
(786) 641-9154

### General Description:

Ceramica Vereia Clay Roof Tiles are acceptable for use in designated catastrophe areas along the Texas Gulf Coast when installed in accordance with this product evaluation report, the building specifications adopted by the TDI, and the manufacturer's installation instructions. This evaluation report covers roof tiles installed with either adhesive or mortar.

### Product Description:

Ceramica Vereia Roof Tiles are clay tiles that are machine formed from natural clay and are kiln-fired to various degrees to obtain required strength. Accessory tiles, such as ridge, gable, hip, bird stop, and rake tiles are available. This evaluation report covers Spanish S tiles, Barrel tiles, and Flat tiles.

**Mortar Attachment:** The Ceramica Vereia clay barrel roof tiles must be installed in accordance with this product evaluation report using Quikrete® Roof Tile Mortar, FL-15 (No. 1140). The roof tile mortar must be prepared as required by the Quikrete® Roof Tile Mortar instructions. General installation requirements for the roof tiles must be as specified in the roof tile manufacturer's installation instructions.

**Adhesive Attachment:** The Ceramica Verea clay Spanish S and Flat roof tiles must be installed in accordance with this product evaluation report and in accordance with the ICP Adhesives Polyset® AH-160 Installation Instructions published by ICP Adhesives and Sealants, © 2016. General installation requirements for the roof tiles must be as specified in the roof tile manufacturer's installation instructions. **Licensed applicators:** Installation must be performed by applicators who hold a current and valid Qualified Applicator Card presented by ICP Adhesives and Sealants.

**Tile Weight:** This evaluation report covers standard weight tiles. Lightweight tiles are outside of the scope of this evaluation report.

**Roof Tile Profile Classifications:** Roof tile profiles are classified as one of the following:

- **Flat/Low Profile:** Flat/Low profile tiles are tiles having a rise equal to or less than 1/2".
- **Medium Profile:** Medium profile tiles are defined as tiles having a rise greater than 1/2" and a rise to width ratio of less than or equal to 1.5.
- **High/Barrel Profile:** High/Barrel profile tiles are those tiles having a rise to width ratio greater than 1.5.

**Roof Tile Designations, Profile Classifications, and Dimensions:** Table 1 specifies the roof tile designations, profile classifications, and dimensions for the clay roof tiles that apply to this product evaluation report. Tile profiles and dimensions are shown in Figures 1-3.

**Table 1 Roof Tile Designations, Profile and Dimensions**

Tile Name	Tile Profile	Tile		
		Length (in.)	Width	
			Total (in.)	On Center (in)
Clay Spanish S Roof Tile	High	19.5	10.85	10.86
Clay Barrel Roof Tile	High	19.5	8.15	7.95
Clay Flat Roof Tile	Flat	15.5	9.85	9.69

**Installation and Limitations:**

**Roof Framing and Roof Deck:** Install roof framing members in accordance with either the IRC or the IBC. Do not space the roof framing members greater than 24" on center. The roof deck must be solidly sheathed with minimum 15/32" plywood. Fasten the roof deck to the roof framing members in accordance with either the IRC or the IBC.

If the existing roof deck is a spaced board roof deck, then either remove or cover the spaced boards with a minimum 15/32" plywood deck. Install the plywood sheathing over the spaced boards in accordance with either the IRC or the IBC to resist the required wind loads.

**Metal Drip Edge:** Install a metal drip edge as specified in the manufacturer's installation instructions.

**Roof Underlayment:**

**Underlayment (Use One of the Following Options):**

**Option 1: Hot Mop 30/90 Underlayment:** The underlayment must consist of a two-ply 30/90 hot mop underlayment system.

- The base ply (anchor sheet) of the underlayment system must be an ASTM D 226 Type II (No. 30) asphalt-saturated organic felt. The base ply must be fastened to the wood roof deck with minimum 11-gauge (minimum 0.120" shank diameter) corrosion resistant roofing nails (smooth, ring, or screw shank) with a minimum 1" diameter flat head or with minimum 1-5/8" diameter tin caps. The fasteners must be long enough to penetrate a minimum of 1/4" through the bottom (underside) of the wood deck.
- The top ply of the underlayment system must consist of one layer of No. 90 ASTM D249 mineral surfaced roll roofing. The top ply must be applied over the base ply by first adhering the top ply to the base ply with a full mopping of ASTM D 312 Type IV asphalt. Next, the top ply must be back nailed to the base ply with minimum 11-gauge (minimum 0.120" shank diameter) corrosion resistant nails (smooth, ring, or screw shank) with a minimum 1" diameter flat head or with minimum 1-5/8" diameter tin caps. The fasteners must be long enough to penetrate a minimum of 1/4" through the bottom (underside) of the wood deck.

**Attachment of 30/90 Underlayment to Roof Deck:**

- The required underlayment design pressure must be determined using analysis based on the Building Exposure, the mean roof height of the structure, the location of the structure, and the roof slope of the structure.
- The allowable uplift resistance for the underlayment attachment is specified in Table 2. The allowable uplift resistance of the underlayment attachment must be greater than the required underlayment design pressure determined from analysis.

**Option 2: Self-Adhering Underlayment:** Self-adhering underlayment may be used in accordance with one of the following requirements:

- The self-adhering underlayment must be listed in a current ICC-ES Evaluation Report as approved for use with either the Quikrete® Roof Tile Mortar, FL-15 (No. 1140) or the ICP Adhesives Polyset® AH-160, or
- Document through testing at a TDI accepted test laboratory as having met the requirements set forth in ICC-ES AC152 Section 3.4. For testing in accordance with ICC-ES AC152, Section 3.4.5, the tensile adhesion/long term aging tests must have been completed using either the Quikrete® Roof Tile Mortar, FL-15 (No. 1140) or the ICP Adhesives Polyset® AH-160 with the subject self-adhering underlayment.

**Attachment of Self-Adhering Underlayment to Roof Deck:**

- The self-adhering underlayment must be installed in accordance with the self-adhering underlayment manufacturer's published installation instructions. The allowable uplift resistance of the self-adhering underlayment must be in accordance with the underlayment manufacturer's test and/or evaluation documentation. The underlayment must be backnailed to the roof deck with minimum 11-gauge (minimum 0.120" shank diameter) corrosion

resistant nails (smooth, ring, or screw shank) with minimum 1-5/8" diameter tin caps spaced 12" on center. The fasteners must be long enough to penetrate a minimum of 1/4" through the bottom of the wood deck.

**Battens:** Battens must be installed as required by the roof tile manufacturer. If battens are installed, then they must be installed over the underlayment. If battens are used, then the Quikrete® Roof Tile Mortar and the ICP Adhesives Polyset® AH-160 must not applied to the battens.

**Table 2. Allowable Uplift Pressures for Two-Ply Underlayment Systems  
(Cap Sheet Fully Adhered to Mechanically Attached Anchor Sheet)**

Attachment Method	Fastening Pattern			Allowable Pressure (psf)			
	Anchor Sheet <sup>4, 5</sup>		Cap Sheet	15/32" Plywood		19/32" Plywood	
	Field (in. o.c.)	Lap (in. o.c.)	Backnail (in. o.c.)	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	-32.3	-60.9
	4	6	12	-34.4	-69.6	-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 staggered in the field, one (1) row at the lap, and one (1) row at the top edge of the cap sheet  
2) **Attachment Method B** - Three (3) rows staggered in the field, one (1) row at the lap, and one (1) row at the top edge of the cap sheet  
3) **Attachment Method C** - Four (4) rows staggered in the field, one (1) row at the lap, and one (1) row at the top edge of the cap sheet  
4) Anchor sheet minimum diameter of nail head/disc is 1.0-inch.  
5) Minimum side lap is 2-inch.

### Roof Tile Installation:

**General:** Install the roof tiles in accordance with this product evaluation report and the manufacturer's installation instructions. The roof tiles and the underlayment system must be clean and dry at the time of their application.

**Moment of Resistance:** The overturning resistance (moment of resistance) due to wind of the roof tiles based on the installation method for the roof tiles is shown in Table 3.

**Table 3 Moment of Resistance Based on Roof Tile Installation Method**

<b>Tile Designation</b>	<b>Moment of Resistance</b>
Clay Spanish S Roof Tile	58.6 ft-lbs.
Clay Barrel Roof Tile	45.4 ft-lbs.
Clay Flat Roof Tile	38.8 ft-lbs.

**Aerodynamic Uplift Moment:** The aerodynamic uplift moment for the roof tile is calculated using Equation 16-34 from the 2018 IBC. The aerodynamic uplift moment is calculated based on the mean roof height for the installation and the required wind speed and Exposure condition for the installation location using ASCE 7-16.

**Permissible Tile Installation:** The roof tiles may be installed if the Moment of Resistance for the roof tile specified in this evaluation report is greater than the Aerodynamic Uplift Moment for the roof tile calculated for the structure location.

**Quikrete® Roof Tile Mortar:** The Quikrete® Roof Tile Mortar, FL-15 (No. 1140) must be prepared as required by the Quikrete® Roof Tile Mortar instructions.

**ICP Adhesives Polyset® AH-160:** The ICP Adhesives Polyset® AH-160 is dispensed using an ICP RTF1000EZ dispensing system. The dispensing system must be operated in accordance with the ICP *RTF1000 Installation and Operating Manual*. Calibration of the ICP RTF1000EZ dispensing system equipment is required before the application of the ICP Adhesives Polyset® AH-160. The mix ratio between chemical "A" and chemical "B" must be within the range of 1.0 A:B to 1.15 A:B. The calibrated adhesive is dispensed in the form of paddies. The quantity of adhesive dispensed will depend on the paddy placement selected.

**Roof tile installation:** The roof tiles and the underlayment system must be clean and dry at the time of application.

The roof tiles must be adhered to the underlayment using either Quikrete® Roof Tile Mortar or ICP Adhesives Polyset® AH-160 in accordance with their respective installation instructions and this evaluation report.

The roof tiles must be adhered directly to the underlayment system. Battens are permitted but are not required. If battens are used, then the roof tiles must not be adhered to the battens. Roof tiles must be adhered directly to freshly applied mortar or adhesive. The roof tile must be set within 1 to 2 minutes after the mortar or adhesive has been dispensed depending on the ambient temperature.

**Flat Tile Installation:** Each tile is installed with one (1) paddy of the ICP Adhesives Polyset® AH-160. The paddy is approximately 2" wide x 10" long, applied directly to the underlayment system, located under the right half of the tile adjacent to the overlock approximately 3/4" from the head

of the tile. The average weight of the paddy is 24.6 grams. The tiles are installed with a 2-1/8" headlap.

**Spanish S Tile Installation:** Each tile is installed with one (1) paddy of the ICP Adhesives Polyset® AH-160. The paddy is approximately 2" wide x 10" long, applied directly to the underlayment system, located under the right half of the tile adjacent to the overlock approximately 3/4" from the head of the tile. The average weight of the paddy is 24.5 grams. The tiles are installed with a 3" headlap.

**Barrel Tile Installation:** The pan tiles are installed with one (1) 10" trowel of Quikrete® Roof Tile Mortar, FL-15 placed under the center of the barrel. Each cap tile is installed with one-half of a 10" trowel of Quikrete® Roof Tile Mortar, FL-15 placed on each inside edge of the pan tiles and the cap tile set in place.

**Hip and Ridge Tiles:** Fasten the hip and ridge tiles to hip and ridge boards (Dimension lumber of sufficient height to support the hip and ridge tiles) in accordance with one of the following options:

1. Drill a 3/16" hole in the lower 1/3 of the starter tile. Use a fastener as specified in Table 4 and secure the starter tile at both the drilled hole in the lower 1/3 and at the head of the tile. Seal the head of the fastener with a UV resistant sealant.
2. Prior to installing the starter tile, apply a roof tile adhesive along the entire length of the starter tile. Secure the head of the starter tile with a fastener as specified in Table 4.

Install the remaining hip and ridge tiles with a minimum 3" headlap. Place the nose of the tile into a 4" to 5" bead of roof tile adhesive along the head of the lower tile to insure proper contact with the two tiles. Secure the head of the hip or ridge tile using a fastener as specified in Table 4.

**Table 4 Hip and Ridge Tile Fastener Requirements**

Dimension lumber	Fasteners per Tile
Spruce-Pine-Fir	One No. 8 wood screw
Southern Yellow Pine	One No. 8 wood screw or one No. 10d box nail

**Notes:** Keep a copy of the manufacturer's installation instructions and the ICP Adhesives Polyset® AH-160 Installation Instructions published by ICP Adhesives and Sealants, © 2016 available at the job site. When a self-adhering underlayment is used, the self-adhering underlayment product evaluation and the self-adhering underlayment manufacturer's installation instructions must be available at the job site. When a mortar fastening system is used, the mortar fastening system manufacturer's installation instructions must be available at the job site. When an adhesive fastening system is used, the adhesive fastening system manufacturer's installation instructions must be available at the job site. Use corrosion resistant fasteners as specified in the IRC and the IBC.

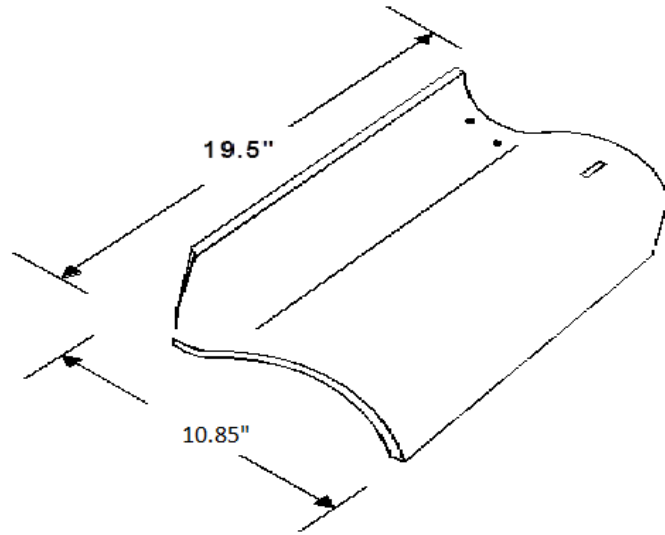


Figure 1. Spanish S Clay Roof Tile Profile and Dimensions

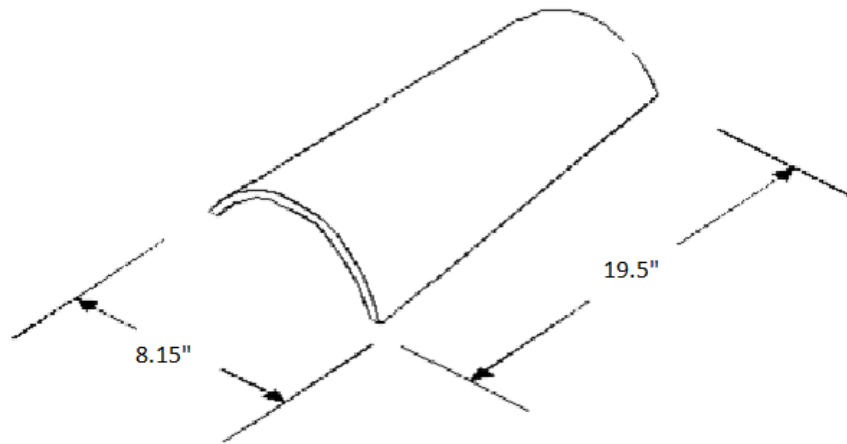


Figure 2. Barrel Clay Roof Tile Profile and Dimensions

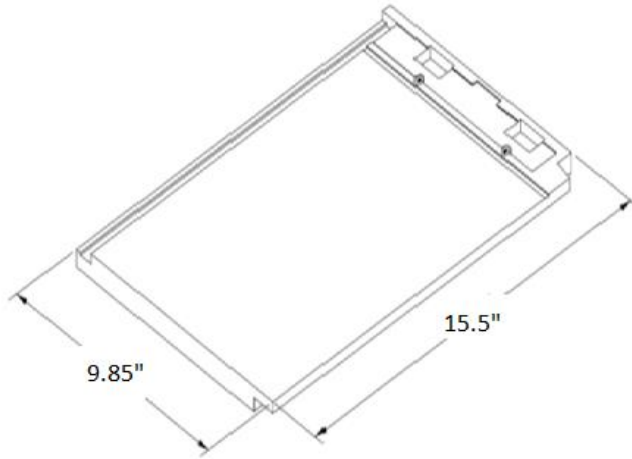


Figure 3. Flat Clay Roof Tile Profile and Dimensions