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CALIFORNIA

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RESEARCH REPORT: RR 25124
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GENERAL APPROVAL – Redland Clay Roof Tiles: Cambridge, Two-Piece Mission, Two-Piece Baja Mission, "S," Napa "S," Cabrillo "S," Roman, Two-Piece Junipero and Alfaro Tiles as a Class A Fire Roof Covering.

DETAILS

Redland Clay Tile roof tiles are composed of vitrified clay, machine-formed and kiln-fired at various temperatures for different burnt-on colors. The tiles comply with ASTM C 1167.

A. Cambridge Tile:
The tiles are flat and are approximately 15 inches long, $6^{3}/_{4}$ inches wide and $^{5}/_{8}$ inch thick, and weigh 4.75 pounds each. Two nail holes are provided in the top portion of each tile. The tiles have an installed weight of 14.7 pounds per square foot when installed with a $6^{1}/_{2}$-inch exposure.
Hip and ridge tiles are curved to approximately one-third of a circle, and have widths at the large and small ends of approximately $8^{1}/_{2}$ and 7 inches, respectively. One nail hole is provided in the small end of the tile.

B. Two-piece Mission Tile:
Top and pan tiles are curved to approximately one-third of a circle, and have widths at the large and small ends of approximately $8^{1}/_{2}$ and 7 inches, respectively. One nail hole is provided in the small end of the top tile and in the large end of the pan tile. Tiles are approximately $^{1}/_{2}$ inch thick and 20 inches long, and weigh 10.7 pounds per square foot when installed with a maximum 11-inch center-to-center spacing, and a head-lap of 3 inches. The tiles may be used as hip, ridge and rake tiles for all tile profiles described in this report, provided they are embedded in mortar or roofing mastic. See Figure 2 for details.

C. Two-piece Baja Mission Tile:

The tiles are similar to the two-piece Mission Tile, except that the widths at the large and small ends are approximately $6^{3}/_{4}$ and 6 inches, respectively. Tiles are approximately $^{1}/_{2}$ inch thick and $17^{1}/_{2}$ inches long. The installed weight of the tiles, when installation is with a 9-inch center-to-center spacing, and a head-lap of 3 inches, is 9.4 pounds per square foot. The tiles may also be used as hip, ridge and rake tiles for all tile profiles described in this report, provided they are embedded in mortar or roofing mastic.

D. "S" Tile:
The tiles are single S-shaped tiles manufactured in a manner similar to the two-piece Mission Tiles, except they are 18 inches long, 13 inches wide and $^{1}/_{2}$ inch thick, with two nail holes in the pan tile and one nail hole in the cover tile. The installed tile weight is 9 pounds per square foot when installation is with an 11-inch center-to-center spacing and a 3-inch head-lap.

E. Napa "S" Tile:
The Napa "S" Tile is approximately $13^{3}/_{4}$ inches long, $10^{1}/_{2}$ inches wide and $^{1}/_{2}$ inch to $^{5}/_{8}$ inch thick. The barrel portion of the tile rises $2^{5}/_{16}$ inches over a span of 6.45 inches. The tile has a flat pan section approximately $2^{5}/_{16}$ inches wide, and the edge ends in a 45-degree flared lip. Two nail holes are located on the pan section and one nail slot is located on the barrel. The installed weight of the tiles is 10.5 pounds per square foot when installation is with an $8^{1}/_{2}$-inch center-to-center spacing and a 3-inch head-lap

F. Cabrillo "S" Tile:
The Cabrillo "S" Tile is approximately 20 inches long, $12^{1}/_{2}$ inches wide and $^{1}/_{2}$ inch thick. The barrel portion of the tile rises 3 inches over a span of 8.5 inches. The tile has a flat pan section approximately 2 inches wide, and the edge ends in a 45-degree flared lip. Two nail holes are located on the pan section and one nail slot is located on the barrel. The installed weight of the tiles is 7.5 pounds per square foot when installation is with an 11-inch center-to-center spacing and a 3-inch head-lap.

G. Roman Tile:
The tiles are $17^{3}/_{4}$ inches long, 11 inches wide, $^{5}/_{8}$ inch thick and $2^{3}/_{8}$ inches in height to the outer edge of the side lip. Two nail holes are centered approximately $1^{1}/_{2}$ inches from the tile head and are spaced $5^{1}/_{4}$ inches apart. The cover tile and pan tile are similar except that the nail holes are located on opposite ends. The installed weight of the tiles is 10.1 pounds per square foot when installation is with an 18-inch center-to-center spacing and with a head-lap of 3 inches.

H. Two-piece Junipero Tile:
The Junipero Pan Tile is a tapered clay tile approximately $16^{3}/_{4}$ inches long and $^{1}/_{2}$

inch thick, and has widths at the small and large ends of approximately $5^{3}/_{4}$ inches and 7 inches, respectively. The height of the tile is approximately 3 inches. One nail slot is located approximately 1 inch from the head of the tile.

The Junipero Cover Tile has a finger-embossed design on the surface and is designed to be used with the Junipero Pan Tile. The cover tile is similar to the Junipero Pan Tile except that the widths at the small and large ends are approximately $5^{3}/_{4}$ inches and 7 inches, respectively. The height of the cover tile is approximately $2^{1}/_{2}$ inches. One fastener slot is located approximately 1 inch from the head of the tile.

The tiles are installed with a head-lap of 3 inches and have an installed weight of 14 pounds per square foot when installation is with a 9-inch center-to-center spacing.

I. Alfaro Tile:

The Alfaro Tile is approximately 18 inches long and 10 inches wide, with a thickness of $^{1}/_{2}$ inch to $^{9}/_{16}$ inch. The height of the barrel portion of the tile is approximately $1^{13}/_{16}$ inches. The tile has a flat pan section approximately 3 inches wide, and two side lips that flare 45 degrees. Opposite corners are cut to a triangular shape. Two nail holes are located on the pan section and one nail slot is located on the barrel. Tiles are installed with a 3-inch head-lap and have an installed weight of 8.1 pounds per square foot when installation is with an 8-inch center-to-center spacing.

The approval is subjected to the following conditions:

1. General:

The tiles must be installed in accordance with IBC Section 1507.3 and IRC Section R905.3, as applicable, and the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, published by the Tile Roofing Institute and the Western States Roofing Contractors Association (hereafter referred to as the TRI/WSRCA installation manual), and recognized in ESR-2015P, except as noted in this report. This report and the TRI/WSRCA installation manual must be available at the jobsite at all times during installation.

Flashing must be in accordance with IBC Sections 1503.2 and 1507.3.9, or IRC Sections R903.2 and R905.3.8, as applicable.

2. Cambridge Tile: Because of the tile profile, the tiles must be installed in a manner similar to that of wood shakes except where otherwise noted in this report. The tiles must be installed at a maximum $6^{1}/_{2}$-inch exposure. The tiles must be placed with gaps in adjacent courses staggered a minimum of $1^{1}/_{2}$ inches, and spacing between tiles in each course must be approximately $^{3}/_{8}$ inch. Each tile must be fastened using two No. 11 gage, corrosion-resistant roofing nails having a 0.121 inch-diameter shank and a $^{5}/_{16}$-inch-diameter head and having sufficient length to penetrate the

sheathing at least $^{3}/_{4}$ inch, or to extend through the sheathing, whichever is less.

3. Hip and Ridge Tile:
   Nailer boards of sufficient height to adequately support hip or ridge tiles must be fastened to framing with two corrosion-resistant 10d nails at 24 inches on center, or must be secured using galvanized steel strapping or special galvanized attachment devices at 48 inches on center. One layer of ASTM D 226, Type II (No. 30), underlayment must be applied over the ridge nailer board prior to installation of the hip and ridge tile. Each hip and ridge tile must be attached to the nailer board with one No. 11 gage, corrosion-resistant roofing nail with a 0.121 inch-diameter shank, a $^{5}/_{16}$-inch-diameter head, and sufficient length to penetrate a minimum of $^{3}/_{4}$ inch into the nailer board. Roofer's mastic or tile adhesive, specified by Redland Clay Tile, must be applied at hip and ridge headlaps to cover the nail hole and create a bond between the tiles.

4. Roof Slope Limitations:
   Tiles must be installed on roof slopes between 4:12 (33%) and 21:12 (173%) for the Cambridge Tiles, and between 3:12 (25%) and 21:12 (173%) for all other tiles.

5. Underlayment:
   Underlayment must comply with, and be installed in accordance with, the applicable code.

6. Roof Classification:
   The Redland Clay Tile roof tiles installed in accordance with this report are Class A roof coverings in accordance with the exception to Section 1505.2 of the IBC and IRC Section R902.1.

7. Wind Resistance:
   When installed in accordance with this report, the Redland Clay Tile roof tiles are limited to areas subject to a maximum basic wind speed of 100 mph (161 km/h) on structures having a maximum mean roof height of 60 feet (18.3 m) for the IBC or 40 feet (12.2 m) for the IRC.

8. The tiles must be manufactured, identified and installed in accordance with this report, the applicable code, and the TRI/WSRCA installation manual. The instructions within this report govern if there are any conflicts between the TRI/WSRCA installation manual and this report.

9. The roof sheathing and roof framing system must be designed for the appropriate loads determined in accordance with the applicable code, subject to the approval of the code official.

10. Each tile is embossed with the words "Redland, Mexico." In addition, each pallet is identified with the evaluation report number (ESR-1489), the Redland Clay Tile name, the product name, the manufacturing location and the installed weight.

DISCUSSION

The report is in compliance with the 2011 Los Angeles City Building Code.

The approval is based on tests in accordance with the ICC-ES Acceptance Criteria for Clay and Concrete Roof Tiles (AC180), dated August 2007, including test in accordance with ASTM E 108.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this approval have been met in the project in which it is to be used.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

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