

ICC-ES Evaluation Report

ESR-2144

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This report is subject to re-examination in one year.

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07320—Roof Tiles
REPORT HOLDER:

MARUHACHI CERAMICS OF AMERICA, INC.,
 dba MCA CLAY ROOF TILE
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EVALUATION SUBJECT:

MCA CLAY ROOF TILES: ONE-PIECE MISSION, 10-INCH STRAIGHT BARREL MISSION, 8-INCH STRAIGHT BARREL MISSION, CORONA TAPERED MISSION, CLASSIC TAPERED MISSION, ROMAN PAN, MF108 INTERLOCKING FLAT, IMPROVED-S AND ORIENTAL TILES

1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Weather resistance
- Fire classification
- Wind uplift resistance

2.0 USES

MCA clay roof tiles, installed in accordance with this report, are used as a roof covering material in Class A roofing assemblies.

3.0 DESCRIPTION
3.1 General:

The roof tiles are machine-formed from natural clay and fired to various degrees to obtain the required strength. The tiles have a natural, glazed or spray-flash finish. The surface of the glazed tiles receives an acrylic glaze prior to vitrification. The spray-flash consists of a sprayed-on mixture of natural clay materials, which is then baked on the surface of the tile. Accessory tiles such as ridge, gable, hip, birdstop and turret tiles are also available. See Figure 1 for tile profiles.

3.2 Roof Tiles:

3.2.1 One-piece Mission Tile: The One-piece Mission tiles are S-shaped, 19 inches (483 mm) long, 14¹/₂ inches (368 mm) wide, and an average of ¹/₂ inch (12.7 mm) thick.

The tiles weigh 7.8 pounds per square foot (38.0 kg/m²) when installed with a 3-inch (76 mm) headlap and 2³/₄-inch (70 mm) sidelap. The tiles have two nail holes in the pan and one nail hole in the cover side. The tiles are Type I, Grade 1, in accordance with ASTM C 1167.

3.2.2 10-inch Straight Barrel Mission Tile: The 10-inch Straight Barrel Mission tile consists of a pan and cover unit. The tiles are 19 inches (483 mm) long and 10 inches (254 mm) wide, and have a thickness of ¹/₂ inch (12.7 mm) at the center tapering to ⁷/₁₆ inch (11.1 mm) at the sides. The tiles weigh 10.2 pounds per square foot (49.8 kg/m²) when installed with a 3-inch (76 mm) headlap and 13¹/₂-inch (343 mm) center-to-center side spacing of pan units. One nail hole is provided at the top of each tile. The tiles are Type I, Grade 1, in accordance with ASTM C 1167.

3.2.3 8-inch Straight Barrel Mission Tile: The 8-inch Straight Barrel Mission tile consists of a pan and cover unit. The tiles are 19 inches (483 mm) long, 8 inches (203 mm) wide and approximately ¹/₂ inch (12.7 mm) thick. The tiles weigh 10.7 pounds per square foot (52.2 kg/m²) when installed with a 3-inch (76 mm) headlap and 11-inch (279 mm) center-to-center side spacing of pan units. One nail hole is provided at the top of each tile. The tiles are Type I, Grade 1, in accordance with ASTM C 1167.

3.2.4 Corona Tapered Mission Tile: The tile consists of a pan and cover unit measuring approximately 8³/₄ inches (222 mm) at the nose and 6 inches (152 mm) at the head of each tile. The tiles are 19 inches (483 mm) long and approximately ¹/₂ inch (12.7 mm) thick. The tiles weigh 10.7 pounds per square foot (52.2 kg/m²) when installed with a 3-inch (76 mm) headlap and 12-inch (305 mm) center-to-center side spacing of pan units. One nail hole is provided at the top of each tile. The tiles are Type I, Grade 1, in accordance with ASTM C 1167.

3.2.5 Classic Tapered Mission Tile: The tile consists of a pan and cover unit measuring 7¹/₄ inches (184 mm) at the nose and 6¹/₄ inches (159 mm) at the head of the tile. The tiles are 19 inches (483 mm) long and approximately ¹/₂ inch (12.7 mm) thick. The tiles weigh 10.4 pounds per square foot (50.8 kg/m²) when installed with a 3-inch (76 mm) headlap and 10-inch (254 mm) center-to-center side spacing of pan units. One nail hole is provided at the top of each tile. The tiles are Type I, Grade 1, in accordance with ASTM C 1167.

3.2.6 Roman Pan Tile: The Roman Pan tile is 19 inches (483 mm) long, 10 inches (254 mm) wide and approximately ¹/₂ inch (12.7 mm) thick. The tiles are Type III, Grade 1, in accordance with ASTM C 1167. Two nail holes are provided at the top of each tile.

The Roman Pan tiles use either Classic or Corona Tapered Mission tiles as cover units. When used with

Classic Tapered Mission tile covers, the tiles weigh 10.4 pounds per square foot (50.8 kg/m²), installed with a 3-inch (76 mm) headlap and 12-inch (305 mm) center-to-center side spacing of pan units. When used with the Corona Tapered Mission tile covers, the tiles weigh 10.4 pounds per square foot (50.8 kg/m²), installed with a 3-inch (76 mm) headlap and 13-inch (330 mm) center-to-center side spacing of pan units.

3.2.7 MF108 Interlocking Flat Tile: The tiles are interlocking flat tiles that are 13⁵/₈ inches (345 mm) long, 13³/₄ inches (348 mm) wide and 1¹/₂ inches (38 mm) thick. The tiles weigh 8.9 pounds per square foot (43.5 kg/m²) when installed with a 2¹/₄-inch (57 mm) head lap and a 1⁵/₈-inch (41 mm) side lap. Two nail holes are provided at the top of each tile. The tiles are Type III, Grade 1, in accordance with ASTM C 1167.

3.2.8 Improved-S Tile: Improved-S are Spanish-style interlocking tiles, 12³/₈ inches (314 mm) long and 12³/₈ inches (314 mm) wide, and having an approximate thickness of ⁵/₈ inch (15.9 mm). The tiles weigh 10.8 pounds per square foot (52.7 kg/m²) when installed with a 2-inch (51 mm) headlap. Two nail holes are provided in the pan portion of the tile and two lugs are provided on the back. The tiles are Type II, Grade 1, in accordance with ASTM C 1167.

3.2.9 Oriental Tile: Oriental tiles are interlocking tiles that are 12 inches (305 mm) long and 12 inches (305 mm) wide, and have an approximate thickness of ⁵/₈ inch (15.9 mm). The tiles weigh 8.4 pounds per square foot (41.0 kg/m²) when installed with a 2³/₈-inch (60 mm) headlap. A nail hole is provided in the pan portion and two lugs are provided on the back. The tiles are Type II, Grade 1, in accordance with ASTM C 1167.

4.0 INSTALLATION

4.1 General:

The tiles must be installed in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, dated July 2006, published by the Tile Roofing Institute and the Western States Roofing Contractors Association (herein referred to as the TRI/WSRCA installation manual), and recognized in the ICC-ES evaluation report [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.

4.2 Adhesively Attached Systems:

MCA clay roof tiles may be installed with roof tile adhesives that are recognized in a current ICC-ES evaluation report for use in clay roof tile applications. Installation of tiles using these adhesively attached systems must be in accordance with the adhesive manufacturer's ICC-ES evaluation report.

4.3 Roof Slope Limitations:

The tiles are installed at a minimum roof slope of 2¹/₂:12 (21 percent) except for the MF108 Interlocking Flat, the Improved-S and the Oriental tiles, which must be installed at a minimum roof slope of 4:12 (33.3 percent).

4.4 Underlayment:

For adhesively attached systems, underlayment must be in accordance with the adhesive manufacturer's ICC-ES evaluation report.

4.5 Fire Classification:

MCA clay roof tiles, when installed in accordance with this report, are Class A roof assemblies in accordance with the exception to IBC Section 1505.2 and IRC Section R902.1.

4.6 Wind Resistance:

4.6.1 Mechanically Fastened Systems: For applications beyond the prescriptive parameters of IBC Table 1507.3.7 and IRC Section R905.3.7, the fastening systems must be determined to withstand the aerodynamic uplift moment in accordance with the Design Considerations for High Wind Applications in Appendix B of the TRI/WSRCA installation manual.

4.6.2 Adhesively Attached Systems: See the adhesive manufacturer's ICC-ES evaluation report.

4.7 Reroofing Applications:

The tiles may be installed over existing roofs, provided the requirements of IBC Section 1510 or IRC Section R907, as applicable, are met. The roof classification is as noted in Section 4.5.

5.0 CONDITIONS OF USE

The MCA clay roof tiles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The tiles are manufactured, identified and installed in compliance 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.
- 5.2 The roof sheathing and roof framing must be designed for the appropriate loads determined in accordance with the applicable code.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Clay and Concrete Roof Tiles (AC180), dated August 2007.

7.0 IDENTIFICATION

A tag including the report holder's name (MCA Clay Roof Tile) and address, the product name and installed weight, and the evaluation report number (ESR-2144) is attached to each shipping pallet. Each Improved-S and Oriental tile is marked with "KTH" or "MTK"; each MF108 tile is marked with the letter "D," and all other tiles manufactured at the Corona facility are marked with "MCA."

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the requirements of the following:

- 1999 *Standard Building Code*[®] (SBC)
- 1997 *Uniform Building Code*[™] (UBC)

8.1 Uses:

The MCA clay roof tiles, when installed in accordance with this report, are used as a roof covering material in Class A (SBC) or noncombustible (UBC) roofing assemblies.

8.2 Description:

See Section 3.0.

8.3 Installation:

8.3.1 General: In jurisdictions enforcing the SBC, the tiles must be installed in accordance with SBC Sections 1503.2, 1506.5 and 1507.4, as applicable.

For jurisdictions enforcing the UBC, see Section 4.1.

8.3.2 Adhesively Attached Systems: See Section 4.2.

8.3.3 Roof Slope Limitations: See Section 4.3.

8.3.4 Underlayment: See Section 4.4.

8.3.5 Fire Classification:

8.3.5.1 SBC: MCA clay roof tiles installed in accordance with this report are Class A roof coverings in accordance with the exception to SBC Section 1505.2.

8.3.5.2 UBC: MCA clay roof tiles installed in accordance with this report are noncombustible roof coverings in accordance with UBC Section 1504.2.

8.3.6 Wind Resistance:

8.3.6.1 Mechanically Fastened Systems:

8.3.6.1.1 SBC: On buildings having a maximum mean roof height of 60 feet (18.3 m) under the SBC, exposed to a maximum basic wind speed (fastest mile) of 80 mph (161 km/h), installation must comply with SBC Table 1507.4.7.

8.3.6.1.2 UBC: For applications beyond the prescriptive parameters of UBC Tables 15-D-1 and 15-D-2, the fastening systems must be determined to withstand aerodynamic uplift moment in accordance with the Design Considerations for High Wind Applications in Appendix B of the TRI/WSRCA installation manual.

8.3.6.2 Adhesively Attached Systems: See the adhesive manufacturer's ICC-ES evaluation report.

8.3.7 Reroofing Applications: The tiles may be installed over existing roofs, provided the requirements of SBC Section 1510 or the Appendix to UBC Chapter 15, as applicable, are met. The roof classification is as noted in Section 8.3.5.1 (SBC) or Section 8.3.5.2 (UBC).

8.4 Conditions of Use:

The MCA clay roof tiles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 8.0 of this report, subject to the following conditions:

8.4.1 The tiles are manufactured, identified and installed in compliance with this report, the applicable code and the TRI/WSRCA installation manual (UBC only). The instructions within this report govern if there are any conflicts between the TRI/WSRCA installation manual and this report.

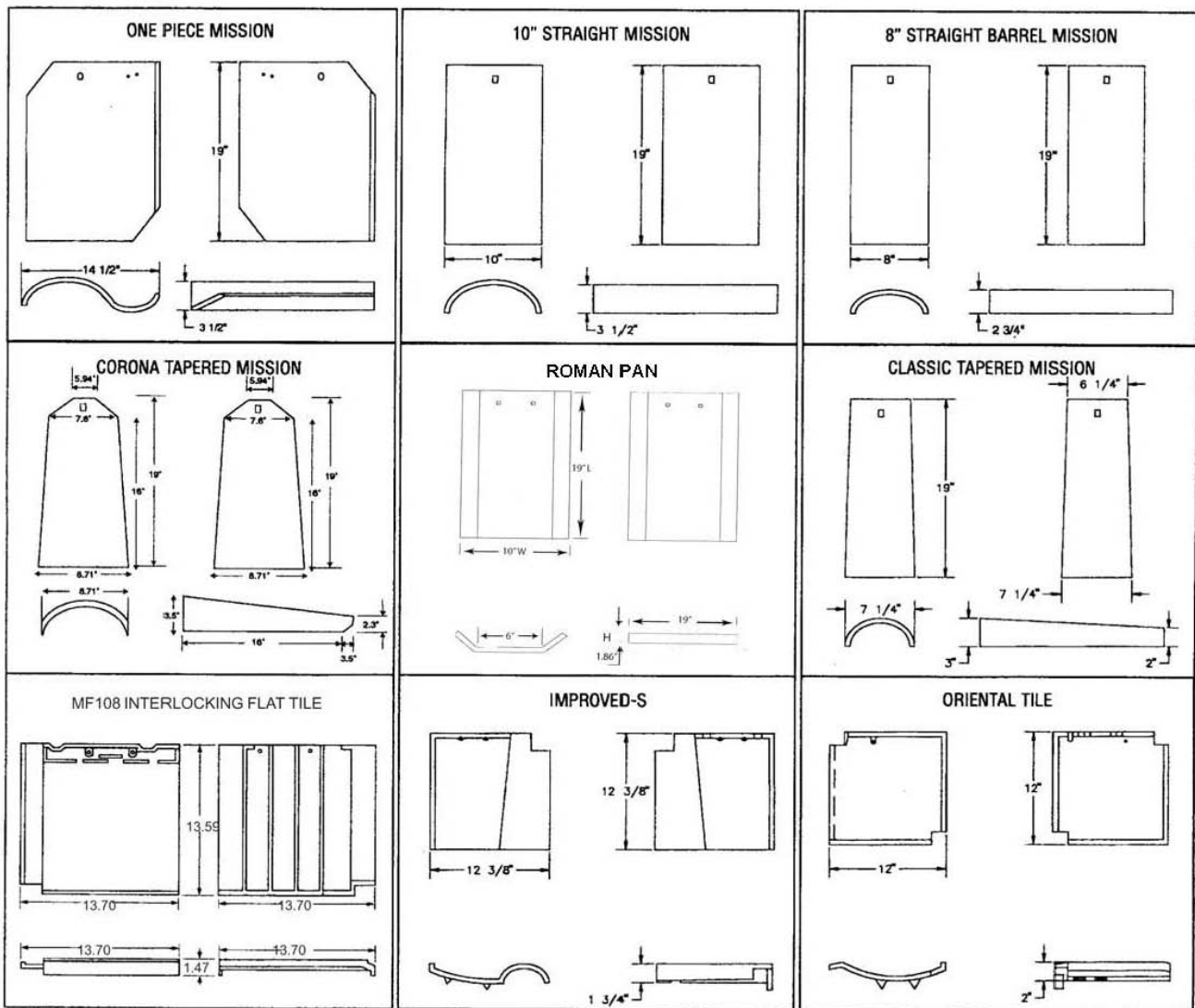
8.4.2 See Section 5.2.

8.5 Evidence Submitted:

See Section 6.0.

8.6 Identification:

See Section 7.0.



For SI: 1 inch - 25.4 mm.

FIGURE 1—TILE PROFILES