SECTION 07 32 00

CLAY ROOF TILE

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\*\* NOTE TO SPECIFIER \*\* MCA Clay Roof Tile, Maruhachi Ceramics of America, Inc. (MCA); Clay roof tile products.
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This section is based on the products of MCA Clay Roof Tile, Maruhachi Ceramics of America, Inc. (MCA), which is located at:
1985 Sampson Ave.
Corona, CA 92879
Toll Free Tel: 800-736-6221
Tel: 951-736-9590
Fax: 951-736-6052
Email: [request info (sales@mca-tile.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=MCA+Clay+Roof+Tile,+Maruhachi+Ceramics+of+America,+Inc.+(MCA)&coid=44096&rep=&fax=951-736-6052&message=RE:%20Spec%20Question%20(07322mca):%20%20&mf=)
Web: <http://www.mca-tile.com>
 [ [Click Here](https://www.arcat.com/arcatcos/cos44/arc44096.html) ] for additional information.
With nearly a century of experience, the MCA label is known worldwide for its excellent reputation in producing roofing tile. MCA has made a commitment to research and development, so that we can be sure every tile you purchase is state-of-the-art in design, specialization and manufactured quality. In every phase of our production and with every variety of tiles, our goal is always the same: to manufacture a clay tile that is of consistent high quality.
Our computerized production lines allow us to combine modern technology with centuries-old ceramics knowledge to manufacture a wide variety of flashed colors. MCA colors are "environmentally friendly" and are produced without the use of lead so there is no need to be concerned that rain run-off from your MCA tile will contaminate the soil or water table.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Clay roof tiles and roof system components.
		2. Metal roof flashing.
		3. Underlayment.
		4. Related roof accessories.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 06 10 00 - Rough Carpentry.
		2. Section 07 22 13 - Asphaltic Perlite Concrete Deck.
		3. Section 07 60 00 - Flashing and Sheet Metal.
		4. Section 07 71 13 - Manufactured Copings.
		5. Section 07 72 13 - Manufactured Curbs.
		6. Section 08 60 00 - Roof Windows and Skylights.
		7. Division 15 - Mechanical: Mechanical work projecting through roof.
		8. Division 16: - Electrical: Electrical work projecting through roof.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
		2. ASTM C 150 - Standard Specification for Portland Cement.
		3. ASTM C 270 - Standard Specification for Mortar for Unit Masonry
		4. ASTM C 1167 - Standard Specification for Clay Roof Tiles.
		5. ASTM E 108 (UL 790) - Standard Test Methods for Fire Tests of Roof Coverings
		6. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
		7. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials.
		8. ASTM D 1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
		9. ASTM D 2626 - Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing.
		10. ASTM D 2822 - Standard Specification for Asphalt Roof Cement.
		11. IAPMO ES Evaluation Report 0356 - Clay Roof Tiles.
		12. IAPMO UES ER-2015 - TRI Concrete and Clay Roof Tile Installation Manual
		13. Florida Building Code - FL22539, FL23992
		14. Miami-Dade County Approvals - 17-0515.04, 17-0329.12, 17-0329.13, 17-0329.14, 17-0905.02, 14-1020.01, 17-0905.01
		15. Texas Department of Insurance - TDI Approval RC-21 Clay Roof Tiles
		16. TRI Cold & Snow Concrete and Clay Tile Design Criteria for Cold and Snow Regions.
		17. TRI Concrete and Clay Roof Tile Installation Manual Fifth Edition
		18. FRSA/TRI Florida High Wind Tile Installation Manual Fifth Edition.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop Drawings: Indicate metal flashing profiles, joint locations, fastening locations, and installation details. Indicate tile layout with location of cut and special shaped tiles identified.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraphs if LEED is not applicable.

* + 1. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
			1. Product Data for Credit MR 4.1 and MR 4.2: For products having recycled content, documentation including percentages by weight of post consumer and preconsumer recycled content
			2. Product Data for Credit MR 5.1 and Credit MR 5.2: Submit data, including location and distance from Project of material manufacturer and point of extraction, harvest or recovery for main raw material.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
		2. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
		3. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
		4. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking, cleaning and maintenance.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum five years documented experience producing concrete roof tile and member of Tile Roof Institute.
		2. Installer Qualifications: Minimum five years documented experience installing products specified in this section and/or supervision by a manufacturers authorized installation representative.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect.
			2. Mock-up shall be a minimum of a 10 foot (3.05 M) by 10 foot (3.05 M) area and include the edge, ridge, valley and other typical transition conditions anticipated.
			3. Do not proceed with remaining work until installation workmanship and appearance is approved by Architect.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + - 1. Mock-up may not remain as part of Work.
			2. Accepted mock-up may remain as part of Work.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
		2. Deliver products to project site in manufacturer's unopened pallets, labeled with data indicating compliance with specified requirements.
		3. Maintain dry storage area for products of this section until installation of products.
	2. SEQUENCING
		1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
		2. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	3. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
		2. Do not overload the roof. Distribute stacks of tile uniformly on roof at not greater than 12 inches (305 mm) in height.
	4. WARRANTY
		1. 50-Year Limited Warranty is available on all MCA Tiles.
	5. EXTRA MATERIALS
		1. See Section 01 60 00 - Product Requirements.
		2. Provide an additional 1 percent of installed roof tiles, but not less than one full square, for Owner's use in roof maintenance.
		3. Furnish extra materials packaged with protective covering for storage and identified with labels clearly describing contents.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: MCA Clay Roof Tile, Maruhachi Ceramics of America, Inc. (MCA), which is located at: 1985 Sampson Ave.; Corona, CA 92879; Toll Free Tel: 800-736-6221; Tel: 951-736-9590 ; Fax: 951-736-6052; Email: [request info (sales@mca-tile.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=MCA+Clay+Roof+Tile,+Maruhachi+Ceramics+of+America,+Inc.+(MCA)&coid=44096&rep=&fax=951-736-6052&message=RE:%20Spec%20Question%20(07322mca):%20%20&mf=); Web: <http://www.mca-tile.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Select the Clay Roof Tile type(s) required from the following paragraphs and delete those that are not applicable. Edit the products listed to suit the project requirements.

* 1. CLAY ROOF TILE
		1. Clay Tile General:
			1. Made with up to 59 percent recycled raw materials and are 100 percent recyclable.
			2. Class A fire rated.
			3. Cool Roof and Energy Star rated.
			4. California Title 24 (Heat Island) Compliant without upgrades.
		2. One Piece "S" Mission Roofing Tile: Type I, ASTM C 1167 Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.7, Miami-Dade County Approval 17-0515.04 and TDI Approval RC-21.
			2. Size: 19 inches by 14-1/2 inches (463 mm by 368 mm)
			3. Exposed Size: 16 inches by 12 inches (406 mm by 305 mm) O.C.
			4. Weight per square: 788 lbs (38 kg/m2).
			5. Weight per piece: 10.5 lbs (4.8 kg).
			6. Pieces per square: 75 pcs (pieces per M2: 8.073 pcs).

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Terra Cotta, Colors, and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.
		1. Classic "S" Mission Tile: Type I, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.3, Miami-Dade County Approval 17-0329.12 and TDI Approval RC-21.
			2. Actual size: 19 inches by 12 inches (483 mm by 305 mm)
			3. Exposed size: 16 inches by 10 inches (408 mm by 254 mm) O.C.
			4. Weight per square: 788 lbs (per M2: 35.56 kg/m2).
			5. Weight per piece: 8.75 lbs (3.67 kg).
			6. Pieces per sq: 90 pcs (pieces per M2: 9.69 pcs).

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Colors, Blends and Textures.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.
		1. Corona Tapered Mission Tile: Two piece pan and cover tile. Type I, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.4, Miami-Dade County Approval 17-0329.13 and TDI Approval RC-21.
			2. Actual Size: 19 inches by 8.71 inches / 5.94 inches (483 mm by 222 mm / 151 mm)
			3. Exposed Size: 16 inches by 12 inches (406 mm by 305 mm) O.C.
			4. Weight per square: 1050 lbs. (51.27 kg).
			5. Weight per piece: 7 lbs. (3.18kg).
			6. No. of pieces per square: 150 pcs (75 tops and 75 pans) (pieces per M2: 16.15pcs).
			7. Color: available in our Natural Red (F40) terra cotta, standard and custom colors and blends.

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Terra cotta and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.
		1. Classic Tapered Mission Tile: Two piece pan and cover tile. Type I, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL23992.1, Miami-Dade County Approval 17-0329.13 and TDI Approval RC-21.
			2. Actual Size: 19 inches by 7.5 inches / 5 inches (483 mm by 191 mm).
			3. Exposed Size: 16 inches by 10 inches (406 mm by 254 mm) O.C.
			4. Weight per square: 1008 lbs. (49.2 kg/m2).
			5. Weight per piece: 5.6 lbs. (2.54 kg).
			6. No. of pieces per square: 180 pcs (90 tops and 90 pans) (pieces per M2: 19.38pcs)

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Flashed Colors, and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.
		1. 8 inch Straight Barrel Mission Tile: Two piece pan and cover tile. Type I, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.9, Miami-Dade County Approval 17-0329.14 and TDI Approval RC-21.
			2. Actual Size: 19 inches (483 mm) long by 8 inches (203 mm) wide.
			3. Exposed Size: 16 inches by 11 inches (406 mm by 279 mm ) O.C.
			4. Weight per square: Approximately 984 lbs. (40.8 kg/m2).
			5. Weight per piece: 6 lbs. (2.72 kg).
			6. No. of pieces per square: 164 pcs (82 tops and 82 pans) (pieces per M2: 17.6 pcs).

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Flashed Colors, and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.
		1. 10 inch Straight Barrel Mission Tile: Two piece pan and cover tile. Type I, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A.
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.9, Miami-Dade County Approval 17-0329.14 and TDI Approval RC-21.
			2. Actual Size: 19 inches (483 mm) long by 10 inches (254 mm) wide.
			3. Exposed Size: 16 inches by 13.5 inches (406 mm by 343 mm) O.C.
			4. Weight per square: Approximately 1206 lbs. (58.83 kg/m2).
			5. Weight per piece: 9 lbs. (4.08 kg).
			6. No. of pieces per square: 134 pcs (67 tops and 67 pans)(pieces per M2: 14.42 pcs).

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Flashed Colors, and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.

\*\* NOTE TO SPECIFIER \*\* Each turret is custom designed by M.C.A. and are available in up to 8 - 10 different sizes of two piece mission tile ranging from 10 inches to 2 inches wide to fit the turret area. Contact the manufacturer for additional information.

* + 1. Turret Tile: Provides true turret roof designs or fan shaped applications. Each turret is custom designed by MCA.
			1. Size: Provide custom tiles to suit the turret size(s) indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard Natural Red, Flashed Colors, and Blends.
			2. Color: Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends.

\*\* NOTE TO SPECIFIER \*\* Historic Clay Roof Tile is available in various standard and custom sizes available. MCA can reproduce extruded tile without any minimum piece requirement or tooling charge. Provide a sample of the old existing tile for the MCA factory to match. Contact MCA for more information

* + 1. Historical Clay Roof Tile
			1. Provide standard sizes and colors from the manufacturer's standard selections.
			2. Provide custom sizes and colors to match the samples provided by the Architect.
		2. Oriental - Japanese Style Clay Roof Tile: Type II, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A. Minimum roof slope for the Oriental tile is 4:12 (33.3 percent).
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.8, Miami-Dade County Approval 17-0905.02 and TDI Approval RC-21.
			2. Actual Size: 12 inches by 12 inches (305 mm by 305 mm).
			3. Exposed Size: 10-1/2 inches by 9-1/2 inches (266 mm by 241 mm).
			4. Weight per square: 864 lbs. (42.16 kg/m2).
			5. Weight per piece: 6 lbs. (2.72 kg).
			6. No. of pieces per square: 144 pcs No. of (pieces per M2: 15.5 pcs).

\*\* NOTE TO SPECIFIER \*\* The most traditional color used for a Japanese style teahouse or temple is the C09 Japanese Black.

* + - 1. Color: Color as selected by the Architect from the manufacturers standard selections.
		1. MF108 FLAT Interlocking Roof Tile: Interlocking flat tiles with two nail holes provided at the top of each tile. Type III, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A. Minimum roof slope for the MF108 FLAT tile is 4:12 (33.3 percent).
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.6, Miami-Dade County Approval 14-1020.01 and TDI Approval RC-21.
			2. Actual Size: 13-3/4 inches by 13-3/4 inches (345 mm by 345 mm).
			3. Exposed Size: 11-1/8 inches by 12 inches (282 mm by 305 mm).
			4. Weight per square: 850 lbs. (41.5 kg/m2).
			5. Weight per piece: 7.9 lbs. (3.6 kg).
			6. No. of pieces per square: 108 pcs (pieces per M2: 11.6 pcs).
			7. Color: Color as selected by the Architect from the manufacturers standard selections.
		2. IMPROVED "S" Tile: Spanish-style interlocking tile with two nail holes provided in the pan portion of the tile and two lugs on the back. Type II, ASTM C 1167, Grade 1 and ASTM E 108 (UL790), Class A. Minimum roof slope for the Improved "S" tile is 4:12 (33.3 percent).
			1. Complies with Uniform Evaluation Report IAPMO ES 0356 (covers City of Los Angeles and is in lieu of ICC-ES), Florida Building Code - FL22539.5, Miami-Dade County Approval 17-0905.01 and TDI Approval RC-21.
			2. Actual Size: 12 inches by 12-1/4 inches (310 mm by 310 mm).
			3. Exposed Size: 10-1/2 inches by 10-1/2 inches (267 mm by 267 mm).
			4. Weight per square: 950 lbs. (46.39 kg/M2).
			5. Weight per piece: 7.25 lbs. (3.29 kg/M2).
			6. No. of pieces per square: 131 pcs (pieces per M2: 14.1 pcs).
			7. Color: Color as selected by the Architect from the manufacturers standard selections.

\*\* NOTE TO SPECIFIER \*\* Select the finial(s) required from the following paragraphs and delete those that are not applicable. Delete entirely if not required.

* + 1. Clay Roof Tile Finials

\*\* NOTE TO SPECIFIER \*\* Select the finials required from the following paragraphs and delete the ones not required.

* + - 1. 3 Forked Helmet Ridge
				1. Weight: 5.25 lbs.
				2. Height: 6 inches.
				3. Arch Height: 2-1/2 inches.
			2. 3 Forked Dome Ridge 5-1/2 inches Small
				1. Weight: 4.5 lbs.
				2. Height: 5-1/2 inches.
				3. Arch Height: 3 inches.
			3. 3 Forked Dome Ridge
				1. Height: 6-1/2 inches Medium.
				2. Weight: 4.35 lbs.
				3. Arch Height: 3-1/4 inches.
			4. 3 Forked Dome Ridge, 7-1/2 inches Large
				1. Weight: 5.7 lbs.
				2. Height: 6-1/2 inches.
				3. Arch Height: 3-3/4 inches.
			5. Hexagon Finial
				1. 15 inches Small.
				2. Weight: 11.5 lbs.
				3. Height: 15 inches.
				4. Base Diameter: 9 inches.
				5. Center Diameter: 5 inches.
			6. Hexagon Finial, 22 inches Large
				1. Weight: 16.5 lbs.
				2. Height: 22 inches.
				3. Base Diameter: 15 inches.
				4. Center Diameter: 8 inches.
			7. Octagon Finial ,21 inches
				1. Weight: 11.5 lbs.
				2. Height: 21 inches.
				3. Base Diameter: 13 inches.
				4. Center Diameter: 11 inches.
			8. Owl - 18 inches
				1. Weight: 7.4 lbs.
				2. Height: 18 inches.
				3. Base Diameter: 9 inches.
				4. Center Diameter: 8 inches.
			9. Ball - 9 inch Large Round Base
				1. Weight: 4 lbs.
				2. Height: 11 inches.
				3. Base Diameter: 9 inches.
				4. Center Diameter: 6 inches.
			10. Ball - 7 inch Small Round Base
				1. Weight: 4 lbs.
				2. Height: 12 inches.
				3. Base Diameter: 7 inches.
				4. Center Diameter: 6 inches.
			11. Ridge Ball - Arched Base
				1. Weight: 6.6 lbs.
				2. Height: 11 inches.
				3. Arch Height: 6 inches.
			12. Ridge Spike Arched Base
				1. Weight: 6.15 lbs.
				2. Height: 14 inches.
				3. Arch Height: 6 inches.
			13. Spike - 7 inch Round Base
				1. Weight: 3.45 lbs.
				2. Height: 15 inches.
				3. Base Diameter: 7 inches.
				4. Center Diameter: 6 inches.
			14. Ridge Dragon
				1. Weight: 11 lbs.
				2. Height: 12 inches.
			15. Colors

\*\* NOTE TO SPECIFIER \*\* Select one of the following color paragraphs and delete the on not required.

* + - * 1. Color as selected by the Architect from the manufacturers standard selections.
				2. Color as selected by the Architect from the manufacturers Custom Colors and Custom Blends selections.

\*\* NOTE TO SPECIFIER \*\* Select the Accessory Material items which are appropriate for the project and the system selected. Consult with the manufacturer for additional information on Roof System Components.

* 1. ACCESSORY MATERIALS

\*\* NOTE TO SPECIFIER \*\* Edit the following paragraphs to suit the times and installation required. Note that One Piece S, Classic S, Corona Tapered, Classic tapered, Roman Pan, Historical Tile do not require horizontal batten; and Oriental tile, Improved S, MF108 Flat Tile requires a horizontal batten

* + 1. Substrate Materials:
			1. Decking: Solid, structural material adequate to meet project loading requirements.
			2. Battens: Decay resistant, nominal 1 inch by 2 inches (25 mm by 50 mm), not bowed or twisted.
			3. Nailer Boards: Decay resistant, nominal 2 inches (50 mm) by sufficient height to satisfy project conditions, not bowed or twisted.
			4. Metal or Poured Concrete Roof Decks: Where design indicates concrete roof deck or metal roof deck, Tile-Tie or Polyset AH-160 Roof Tile Adhesive may be used where approved by the authorities having jurisdiction.

\*\* NOTE TO SPECIFIER \*\* Select the underlayment membrane from the following paragraphs and delete the one not required..

* + 1. Underlayment:
			1. No. 30 asphalt felt or equivalent complying with ASTM D 226, Type I.
			2. Self-adhering underlayment complying with ASTM D 1970 and ICC-ES acceptance criteria AC152 Section 3.4 Alternate Underlayments.
			3. Use ICP-approved underlayment with Polyset AH-160 Roof Tile Adhesive.
		2. Fasteners: Sized to penetrate deck minimum 3/4 inch (19 mm) or through thickness of deck or batten.
			1. Minimum No, 11 gage, 5/16 inch-diameter-head (7.9 mm), corrosion-resistant nails.
		3. Rake and Gable End:
			1. Prefabricated Rake and Ridge tile. Choose to match tile profile and color.

\*\* NOTE TO SPECIFIER \*\* Select the required flashing material from the following paragraphs and delete those not required. Coordinate with flashing specified in other sections of the specification.

* + 1. Flashings:
			1. Ribbed Valley Metal, minimum 0.016-inch (26 gauge galvanized sheet) corrosion resistant metal flashing.
			2. Other Flashing: At the juncture of the roof and vertical surfaces, flashing and counter-flashing shall be provided per roofing manufacturer's instructions, and when the flashing and counterflashing are of metal, they shall be not less than 0.019-inch (No. 26 galvanized sheet gage) corrosion-resistant metal.
			3. Plumbing Stacks and Other Pipes Penetrating Roofs as recommended by the manufacturer.

NOTE TO SPECIFIER: Select adhesive if required, delete if not required.

* + 1. Mortar materials, plastic cement and sealant: Code approved adhesive suitable to bond to clay roof tile.
			1. Cement Mortar: ASTM C 270, Type M
			2. Sand: ASTM C 144.
			3. Portland cement: ASTM C 150, Type 1.
			4. Plastic cement: ASTM D 2822.
			5. Silicone sealant: ASTM D 1002.
		2. Snow Retention: Provide as required per local code and snow loads for metal and concrete roofing decks.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. Verify surfaces are uniform free of ridges, warp or voids, smooth, clean and dry
		3. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
	3. INSTALLATION - GENERAL

NOTE TO SPECIFIER: Select paragraphs applicable to project and region of installation and delete the paragraphs that are not applicable.

* + 1. Install in accordance with manufacturer's instructions and the following:
			1. IAPMO UES Evaluation Report 0356 - Clay Roof Tiles.
			2. IAPMO UES ER-2015 - TRI Concrete and Clay Roof Tile Installation Manual (TRI Installation Manual).
			3. TRI Cold & Snow Concrete and Clay Tile Design Criteria for Cold and Snow Regions.
			4. FRSA/TRI Florida High Wind Tile Installation Manual, Revised Fifth Edition, 2014.

\*\* NOTE TO SPECIFIER \*\* Select the installation paragraph for the Clay Roof Tile specified from the following paragraphs and delete those that are not applicable.

* 1. INSTALLATION
		1. Install in accordance with manufacturer's instructions and the applicable building code.
			1. Deck surfaces must be clean and dry prior to installation of underlayment. Foreign particles must be cleaned from all interlocking areas to ensure proper seating and to prevent water damming.
			2. Fascia boards or cant strips must be installed to properly elevate the first tile course.
		2. On vertical applications, and on extremely steep pitches where wind currents may cause lift:
			1. Set the butt of each tile in a bead of the specified plastic cement or sealant, or provide stainless steel "Wind Locks" as required.
			2. Use plastic cement and sealant carefully, and avoid smearing the exposed tile surface.

NOTE TO SPECIFIER: Select paragraphs applicable to the tile specified under Products and delete the paragraphs that are not applicable.

* + 1. Installing One Piece "S" Mission roofing tiles:
			1. Clay Birdstop or concrete mud ball:
				1. Install the clay birdstops or concrete mud ball full length of all eaves.
				2. If no rain gutter condition, install first row 13 inches (330 mm) from the eave, leaving a 3 inch (76 mm) overhang; exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 12 inches (305 mm) centers.
				3. If installing rain gutter, install first row 1.5 inch (38mm) overhung
				4. Exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 12 inches (305 mm) centers.
				5. Install nailers at ridges and hip warp with the felt,
				6. Install nailers at rakes, and gables.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Start at the lower left corner with a gable tile;
				2. Install ridge, hip, and valley tiles in accordance with the applicable building code.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles.

Completely and neatly fill and point up all voids.

* + - 1. Installing One Piece "S" Mission roofing tiles with two piece eave
				1. Birdstop, Boosters, DS07 Two Piece Eave Pan and DS02 Two Piece Eave Top

Install clay birdstops or concrete mud ball full length of all eaves.

Install first row of DS07 Two Piece Eave Pans 13 inches (330 mm) from the eave, leaving a 3 inch (76 mm) overhang; exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 12 inches (304.8 mm) centers. If rain gutter is indicated use 1.5 inch (38 mm) overhang.

Install booster above birdstop.

Install DS02 Two Piece Eave Top tiles directly above booster tile; length exposure shall not exceed 13 inch (325 mm) centers, and width exposure shall not exceed 12 inches (304.8 mm) centers.

Install the nailers at ridges hip warp with the felt.

Install nailers at rakes, and gables.

* + - * 1. Install One Piece "S" Mission Tile in the 2nd row from left to right, beginning at lower left corner of the roof.

Install each tile successively, fastening each tile with the specified fasteners.

Length exposure on field tile shall not exceed 16 inches (406 mm) centers, and width exposure on field tiles shall not exceed 12 inch (304.8 mm) centers

Install ridge, hip, and valley tiles in accordance with the applicable building code.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Completely and neatly fill and point-up all voids

* + 1. Installing Classic "S" Mission roofing tiles with two piece eave tile
			1. Birdstops, Boosters and Classic Two Piece Pan and Top:
				1. Install clay birdstops or concrete mud ball full length of all eaves.
				2. Install first row of Classic Two Piece Mission Pans 13 inches (330 mm) from the eave, leaving a 3 inch (76 mm) overhang; exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 10 inches (254 mm) centers. If rain gutter is indicated use 1-1/2 inch (38 mm) overhang.
				3. Install booster above birdstop.
				4. Install Classic Two Piece Mission Top tiles directly above booster tile; length exposure shall not exceed 13 inch (325 mrn) centers, and width exposure shall not exceed 10 inches (254 mm) centers.
				5. Install the nailers at ridges hip warp with the felt.
				6. Install nailers at rakes, and gables.
			2. Install Classic "S" Mission Tile in the 2nd row from left to right, beginning at lower left corner of the roof.
				1. Install each tile successively, fastening each tile with the specified fasteners.
				2. Length exposure on field tile shall not exceed 16 inches (406 mm) centers, and width exposure on field tiles shall not exceed 10 inch (254 mm) centers.
				3. Install ridge, hip, and valley tiles in accordance with the applicable building code.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Completely and neatly fill and point-up all voids

* + - 1. Installing Classic "S" Mission Style roofing tiles without two piece eave
				1. Clay Birdstop or concrete mud ball
				2. Install Classic S clay birdstops or concrete mud ball full length of all eaves.
				3. If no rain gutter condition, install first row 13 inches (330 mm) from the eave, leaving a 3 inch (76 mm) overhang; exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 10 inches (254 mm) centers.
				4. If installing rain gutter, install first row 1.5 inch (38 mm) overhung.
				5. Exposure length shall not exceed 16 inches (406 mm) centers, and width exposure shall not exceed 10 inches (254 mm) centers.
				6. Install Classic S Mission tiles directly length exposure shall not exceed 13 inch (325 mm) centers, and width exposure shall not exceed 10 inches (254 mm) centers.
				7. Install the nailers at ridges and hip warp with the felt.
				8. Install the nailers at rakes, and gables.
		1. Installing Corona Tapered Mission Style roofing tiles:
			1. Birdstops, Boosters and Starters:
				1. Install clay birdstops or concrete mud ball full length of all eaves.
				2. If no rain gutter condition, Install first row of pans 13 inches (330 mm) from the eave, leaving a 3 inch (75 mm) overhang.
				3. If rain gutter condition, install first row 1.5 inch (38mm) overhung
				4. Install booster above birdstop.
				5. Install starter tiles directly above booster tiles; length exposure shall not exceed 13 inch (330 mm) centers, and width exposure shall not exceed 12 inch (343mm) centers.
				6. Install nailers at ridges and hip with felt
				7. Install nailers at rakes, and gables.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Install each tile successively, fastening each tile with one, two, or three fasteners.
				2. Length exposure on field tile shall not exceed 16 inch (400 mm) centers, and width exposure on field tiles shall not exceed 12 inch (300 mm) centers.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles.

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles.

Completely and neatly fill and point up all voids.

* + 1. Installing Classic Tapered Mission Style roofing tiles:
			1. Birdstops, Boosters and Starters:
				1. Install clay birdstops or concrete mud ball full length of all eaves.
				2. Install first row of pans 13 inches (330 mm) from the eave, leaving a 3 inch (76 mm) overhang.
				3. Install booster above birdstop.
				4. Install starter tiles directly above booster tiles; length exposure shall not exceed 13 inch (325 mm) centers, and width exposure shall not exceed 10 inch (254 mm) centers.
				5. Install nailers at ridges, rakes, and gables.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Install each tile successively, fastening each tile with one, two, or three fasteners.
				2. Length exposure on field tile shall not exceed 16 inch (406 mm) centers, and width exposure on field tiles shall not exceed 10 inch (254 mm) centers.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles.

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles;

Completely and neatly fill and point up all voids.

* + 1. Installing 8 inch Straight Barrel Mission Style roofing tiles:
			1. Birdstops, Boosters and Starters:
				1. Install clay birdstops or concrete mud ball full length of all eaves.
				2. Install first row of pans 11 inches (279 mm) from the eave, leaving a 3 inch (75 mm) overhang.
				3. Install booster above birdstop.
				4. Install starter tiles directly above booster tiles; length exposure shall not exceed 13 inch (330 mm) centers, and width exposure shall not exceed 11 inch (279 mm) centers.
				5. Install nailers at ridges, rakes, and gables.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Install each tile successively, fastening each tile with one, two, or three fasteners.
				2. Length exposure on field tile shall not exceed 16 inch (400 mm) centers, and width exposure on field tiles shall not exceed 11 inch (279 mm) centers.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles;

* + - * 1. Completely and neatly fill and point up all voids.
		1. Installing 10 inch Straight Barrel Mission Style roofing tiles:
			1. Birdstops, Boosters and Starters:
				1. Install clay birdstops or concrete mud ball full length of all eaves.
				2. Install first row of pans 11 inches (279 mm) from the eave, leaving a 3 inch (75 mm) overhang.
				3. Install booster above birdstop.
				4. Install starter tiles directly above booster tiles; length exposure shall not exceed 13 inch (330 mm) centers, and width exposure shall not exceed 13.5 inch (330 mm) centers.
				5. Install nailers at ridges, rakes, and gables.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Install each tile successively, fastening each tile with one, two, or three fasteners.
				2. Length exposure on field tile shall not exceed 16 inches (400 mm) centers, and width exposure on field tiles shall not exceed 13.5 inch (343 mm) centers.

Provide cement mortar Type M complying with ASTM C 270 at all ridges and hips too completely seal the area under ridge and hip tiles;

Install a thin coat of rich cement mortar (one part Type I Portland cement complying with ASTM C 150 to three parts sand complying with ASTM C 144) along exposed edges of all ridge and hip tiles.

Completely and neatly fill and point up all voids.

* + 1. Installing Turret Tile Style roofing tiles:
			1. Birdstops, Boosters and Starters:
				1. At the first course, between vertical chalk lines, install clay bird- stop and then place pan tile on top of vertical chalk line.
				2. Fasten each pan tile with copper or other non-corrosive 11 gage (3 mm diameter) large headed nail, or use "Tile-Tye" system; if the job site is located in a high wind area, use mastic or other sealant to secure pan tile.
				3. Once the birdstop and pan tiles are in place, install the booster and starter tile, securing with copper wire or other non-corrosive nails; if the job site is located in a high wind area, use a "Wind Lock", mastic, or other sealant to secure the tile.
			2. For the rest of the courses, lay 16 inches (406 mm) to the weather.
				1. When the tile becomes crowded, adjust to the next smaller size and continue up to the top of the roof.
				2. It is very important to follow the chalk line and to use the "Turret Worksheet" provided.
			3. Require Installers to use judgment on the last four to five courses below the top.
				1. Some tiles normally need to be nipped or cut to achieve proper fit.
				2. When installing the last two to three courses, some tops and pans may need to be adjusted for correct fit of the turret radius.
				3. The smallest size tile may need to be secured with roofing mastic due to the tight fit.
				4. Do not stain the exposed surface of the tile with the adhesive.
			4. Prior to installing the last two to three courses, lay a mock-up.
				1. To assure proper fit, do not use adhesives or nails to secure the tiles until after the mock-up is complete and satisfactory.
				2. Note that the final two to three courses will normally lose one or two lines, or more, close to the top.
				3. Start installing the final two to three courses from top down, securing each tile.
				4. Do not walk on Turret Tile; do not permit damage.
				5. Roof area to be installed last should, if possible, be the area, which is least visible from ground level.
		2. Installing Oriental Style roofing tiles:
			1. Wood strips:
				1. Install the specified eave strip full length of all eaves.
				2. Install the specified batten strips horizontally at 9 inch (228 mm) centers on the first two rows and 9-1/2 inch (242 mm) centers for all rows thereafter.
			2. Install the tile in rows from left to right, beginning at lower left corner of the roof.
				1. Start at the lower left corner with field tile with a gable tile.
				2. Install each tile successively, firmly engaging the tile lugs with the battens, and fastening each tile with one, two, or three fasteners.
				3. Install Ridge and hip, in accordance with pertinent requirements of the governmental agencies having jurisdiction.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Install a thin coat of rich cement mortar (one part Portland cement to three parts sand) along exposed edges of all ridge and hip tiles;

Completely and neatly fill and point up all voids.

* + 1. Installing MF108 Flat Interlocking Style roofing tiles:
			1. Wood strips:
				1. Install eave strip full length of all eaves.
				2. Install batten strips horizontally at 9-1/8 inch (228 mm) centers on the first course and 11-1/8 inch (278 mm) vertical exposure for all rows thereafter.
			2. Install the tile in rows from right to left, beginning at lower right corner of the roof.
				1. Start at the lower right corner with field tile, this has a 12 inch width exposure.
				2. Install each tile successively, fastening each tile with a minimum of one of the specified fasteners.
				3. Start second course at the lower right corner. Tiles should be layed staggered.
				4. Install Ridge, hip, in accordance with pertinent requirements of the governmental agencies having jurisdiction.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles;

Completely and neatly fill and point up all voids.

* + 1. Installing Improved S Style roofing tiles:
			1. Wood strips and Battens:
				1. Install eave strip full length of all eaves.
				2. Install batten strips horizontally at 8-5/8 inch (220 mm) centers on the first course and 10-1/2 inch (267 mm) vertical exposure for all rows thereafter.
			2. Install the tile in rows from right to left, beginning at lower right corner of the roof.
				1. Start at the lower right corner with field tile with a 12 inch width exposure.
				2. Install each tile successively, fastening each tile with a minimum of one of the specified fasteners.
				3. Install Ridge, hip, in accordance with pertinent requirements of the governmental agencies having jurisdiction.

Provide cement mortar at all ridges and hips to completely seal the area under ridge and hip tiles;

Install a thin coat of rich cement mortar (one part Type I Portland cement to three parts sand) along exposed edges of all ridge and hip tiles;

Completely and neatly fill and point up all voids.

* + 1. Visual Inspection: Avoid color patterning, checkerboarding, spotting, and stairstepping:
			1. After the installation of each 80 roofing tiles, make a visual inspection from the ground level and at a distance from the building of about 40 feet (12 m).
			2. Verify that tile courses follow straight and true lines;
			3. Verify that color range is smooth with no abrupt changes.
			4. Make necessary corrections before proceeding with further installation.
	1. CLEANING
		1. Remove all broken tile, debris and excess tile from roof.
		2. Sweep cut tiles clean.
	2. REPAIR AND REPLACEMENT
		1. Damaged Tile:
			1. Break out damaged roof tile.
			2. Repair torn underlayment.
			3. Drive fastener flush.
			4. Apply minimum 3/8 inch (10 mm) by 2 inch (51 mm) bead of approved adhesive on tile in course below replacement tile.
			5. Immediately set replacement tile in position assuring proper contact.
		2. Damaged Small Valley and Hip Cuts:

\*\* NOTE TO SPECIFIER \*\* For hip cuts on roof pitches greater than 7:12, mechanical fastening may be required.

* + - 1. Apply a minimum of 3/8 inch (10 mm) by 2 inch (51 mm) bead of approved adhesive at head of cut tile.
			2. Immediately set tile in course above in position assuring proper contact.
	1. PROTECTION
		1. Protect installed products until completion of project.
		2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION