



SECTION 07 32 00
COMPOSITE ROOF TILE

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Composite Roof Tiles - Double Roman.
- B. Tile Roof Accessories for Composite System.

1.2 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.
- B. Section 06 20 00 - Finish Carpentry.
- C. Section 07 53 13 - Chlorinated-Polyethylene Roofing.
- D. Section 07 60 00 - Flashing and Sheet Metal.
- E. Section 07 71 23 - Manufactured Gutters and Downspouts.
- F. Section 07 72 13 - Manufactured Curbs.
- G. Section 08 60 00 - Roof Windows and Skylights.
- H. Division 15 - Mechanical: Mechanical work projecting through roof.
- I. Division 16 - Electrical: Electrical work projecting through roof.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D3161/D3161M-20 - Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method)
 - 2. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings
- B. Factory Mutual (FM):
 - 1. FM 4473 - Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls.
- C. Florida Building Code (FBC):
 - 1. FL46617 – Class A Only

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Verification Samples: Two representative units of each type, size, pattern, and color.
- D. 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.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Warranty documents, issued and executed by manufacturer of roof tile, countersigned by roof tile installer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience with projects of similar scope and complexity and/or supervision by a manufacturer's authorized installation representative.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
 - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
 - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 3. Retain mock-up during construction as a standard for comparison with completed work.
 - 4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Agenda shall include schedule, responsibilities, critical path items and approvals.
 - 1. Require attendance by representatives of the following:
 - a. Installer of this section.
 - b. Architect.
 - c. Other entities directly affecting, or affected by, construction activities of this section.
 - d. Quarrix representative.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's unopened pallets, labeled with data indicating compliance with specified requirements.
- B. Storage and Protection:
 - 1. Store products in manufacturer's unopened packaging until ready for installation.
 - 2. Maintain dry storage area for products of this section until installation of products.

1.8 SEQUENCING

- A. 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.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

- A. 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 recommended limits.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof tile manufacturer's 50 year limited warranty against defects in product workmanship and materials.
- B. Tile will be free from manufacturing defects, not rot, split, splinter or suffer structural damage from normal weather conditions and termite or fungal decay when subject to normal use for a period of fifty (50) years from date of original purchase or will not blow off or otherwise become damaged by winds less than eighty (80) miles per hour for a period of ten (10) years from the date of original purchase.
- C. Warranty does not provide protection against any failure, defect or damage caused by situations and events beyond Quarrix's control, including but not limited to:
 - 1. Natural Disasters: Hail over 1.0 inch (25 mm) in diameter, fire, smoke, chemicals, earthquakes, lightning, or static electricity.
 - 2. Falling, thrown, or blown objects.
 - 3. Neglect, abuse, misuse (including faulty installation, repair, or maintenance), improper transportation, handling or storage of Quarrix Products or other failure to comply with instructions in the documentation and/or manual accompanying Quarrix Products.
 - 4. Modification of Quarrix Products not provided by Quarrix.
 - 5. Malfunction of any product not provided by Quarrix with which Quarrix Products are used or combined.
 - 6. Use, modification, or other treatment of Quarrix Products in a manner for which it was not designed or intended.
 - 7. Defects or damage due to inferior building practices, ventilation, drainage issues or roof slopes inconsistent with snow and ice control.
 - 8. Replacement under or subjection to abnormal use conditions.
 - 9. Normal wear and tear including the natural effects of progressive aging on the color and surface of the tile
 - 10. Discoloration and variations in color or uniformity caused by weathering and/or UV exposure, staining due to shade or sap, ash or proximity to metals that might cause discoloration.
 - 11. Foot traffic.
 - 12. Vandalism or other malicious actions.
 - 13. Quarrix Products blown off by winds more than 80 mph.
- D. Refer to the Quarrix Composite Tile Limited Warranty and Certificate of Warranty for complete details.

1.11 EXTRA MATERIALS

- A. See Section 01 60 00 - Product Requirements.
- B. Provide an additional one percent of installed roof tiles, but not less than one full square, for

Owner's use in roof maintenance.

- C. Furnish extra materials packaged with protective covering for storage and identified with labels clearly describing contents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Quarrix Building Products, which is located at: 705 Pennsylvania Ave. S.; Minneapolis, MN 55426; Toll Free Tel: 800-438-2920; Tel: 763-540-9700; Fax: 763-540-9709; Email:[request info \(marketing@quarrix.com\)](mailto:request info (marketing@quarrix.com)); Web:<http://www.quarrix.com>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 COMPOSITE ROOF TILE

- A. Basis or Design: Quarrix Composite Roof Tile;
 - 1. Profile: Similar to high barrel Spanish tile. 67 percent less weight than traditional or concrete tile. No need to reinforce roof structures.
 - 2. Material: Engineered polymer; high-density polyethylene (HDPE) base.
 - 3. Appearance: Textured in appearance to replicate look of true clay and concrete tile.
 - 4. Size:
 - a. Field Tile (LxWxH): 16-1/2 x 13 x 2-1/4 inches (419 x 330 x 57 mm)
 - b. Hip, Ridge, and Rake Tile (LxWxH): 16-1/2 x 8-1/2 x 3-7/8 inches (419 x 216 x 98 mm).
 - c. Hip Starter Tile (LxWxH): 17-1/4 x 8-1/8 x 3-7/8 inches (438 x 203 x 98 mm)
 - 5. Performance:
 - a. ASTM E108 Class A Fire Resistance: When installed over two layers of GAF VersaShield Underlayment.
 - b. ASTM E108 Class C Fire Resistance: When installed over one of the following:
 - 1) Self-adhered membrane: A minimum 30 lbs felt meeting requirements of ASTM D226 Type II.
 - 2) Listed synthetic underlayment per ASTM 108/UL790; Class C.
 - c. Wind Resistance per ASTM D3161/D 3161M-20: 110 mph.
 - d. Hail: Class 4 impact rating, tested in accordance with FM 4473.
 - 6. Exposure per Tile (LxW): 13-1/2 x 11-19/32 inches (343 x 294 mm).
 - 7. Fire Rating: Class A.
 - a. Weight per Composite Tile:
 - 1) Field Tile: 3.3 lbs (1.50 kg).
 - 2) Hip, Ridge, and Rake Tile: 2.2 lbs (1.00 kg).
 - 3) Hip Starter Tile: 2.09 lbs (0.95 kg).
 - b. Weight per Square: 297 lbs (134.72 kg).
 - 8. Fire Rating: Class C.
 - a. Weight per Composite Tile:
 - 1) Field Tile: 3.0 lbs (1.36 kg).
 - 2) Hip, Ridge, and Rake Tile: 2 lbs (0.91 kg).
 - 3) Hip Starter Tile: 1.9 lbs (0.86 kg).
 - b. Weight per Square: 270 lbs (122.47 kg).
 - 9. Color: Black.
 - 10. Color: Canyon Earth.
 - 11. Color: Desert Red.
 - 12. Color: Goldenrod.
 - 13. Color: Sage.

14. Color: Saddle Brown.
15. Color: Multi-Color Custom Blend:
 - a. Color: _____; _____ percent.
 - b. Color: _____; _____ percent.

2.3 TILE ROOF ACCESSORIES

- A. Underlayments:
 1. Synthetic Self-Sealing Roof Underlayment: Meet or exceed ICC- ES AC 48.
 2. Asphalt Saturated Organic Felt: No. 30. Meet ASTM D226, Type 2 or equal.
 3. Rubberized Self Sealing Underlayment per ASTM D1970: Self-adhering rubberized asphalt membrane having internal reinforcement, and "split" back plastic release film.
- B. DryRoof Roof Battens: Quarrix DryRoof Roof Battens. Corrosion-free, laminated high-density polyethylene (HDPE) corrugated plastic. Layers of corrugated plastic must be glued, not stapled.
 1. Color: Black.
 2. Dimensions (WxLxH): 1-1/2 x 96 x 3/4 inches (38 x 2438 x 19 mm)
- C. Upper and Lower Metal/Eave Closures: Quarrix coated steel Eave Closures (birdstop) pressure fit between the weather checks on the upper and lower edges of the tile.
 1. Lower Metal Closure: Formed to match the contour of the tile and fits on top of the drip edge under the first course of tile to raise the lower edge to the correct height as well as keep out birds and insects.
 2. Upper Metal Closures: Secured via fastener over the fastener lugs in the barrels at the top of the tile to protect from birds, insects, and wind-driven rain.
 3. Color: Black.
 4. Color: Canyon Earth.
 5. Color: Desert Red.
 6. Color: Golden Rod.
 7. Color: Saddle Brown.
- D. Universal Tile Ridge Vent: Combines tile ventilation and expandable weather blocking with an aluminum closure system to attach to tile with a peel-off butyl adhesive.
 1. Size (WxL): 15-3/74 inches x 16 ft (40 mm x 4.877 m)
 2. Color: Black.
 3. Color: Terra Cotta.
 4. Color: Venetian Red.
 5. Color: Brown.
- E. Quarrix Universal Tile Flashing: Fully adhered, expandable aluminum flashing that can be used as a primary flashing and counter flashing, in combination with bent metal flashings, or as a weather block wherever mortar would be required.
 1. Size (WxL): 11-3/4 inches x 16 ft (3581 mm x 4.877 m).
 2. Color: Black.
 3. Color: Terra Cotta.
 4. Color: Venetian Red.
 5. Color: Brown.
- F. Fasteners:
 1. Tile Fasteners:
 - a. Quarrix Tile Fasteners: Corrosion resistant exterior grade screws for specialty roof applications and recommended with Quarrix Composite Tile.
 - 1) Tested to SAE J78 with 2-3/4 inch (70 mm) overall length, 1-1/2 inch (38 mm) thread length, No. 10 pan-head (0.40 inch) screws. Two per tile.
 - b. Screw Fasteners: Use screws for maximum wind resistance.
 - 1) Two, 2-3/4 inch (6.98 cm), non-corrosive No. 10 coarse thread, 0.344

- or equal.
- b. For EPDM or Synthetic Underlayment:
 - 1) Sealants: Per manufacturer's recommendation.
- 8. Exposed Sealants: For counter flashings or non-soldered joints.
 - a. Sealants: Meet requirements of U.S. TT-S- 00230C, U.S. Fed Cat. No 8030-965-2397, Canadian 19-HP-5M, and ASTM C 290.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. Verify roof deck structure meets roof tile manufacturer's installation requirements.
 - 1. Roof penetrations are in place and flashed to deck surface.
 - 2. Roof openings are correctly framed prior to installing Work of this section.
 - 3. Deck is of sufficient thickness to accept fasteners.
 - 4. Deck surfaces are dry, unfrozen, and free of ridges, warps, and voids.
- C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. Broom clean deck surfaces prior to installation of underlayment.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Coordinate with installation of gutters, vents, skylights, and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and securely fastened.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
 - 1. Arrange three or more stacks of roof tile at installation area; mix tile from stacks as installation progresses for consistent color blend.
 - 2. Do not overload roof surface with staged materials.
 - 3. Tile must be installed on roof slope of 4/12 or greater. Slopes of 3/12 or less will require alternative roof covering materials.
 - 4. Quarrix Double Roman Composite Tile cannot be installed on curved surfaces, these areas will require an alternative roof covering material.
- B. Install roof tile in accordance with shop drawings, manufacturer's printed installation instructions for specified project conditions and the following:
 - 1. ICC-ES -AC07.
 - 2. WSRCA/TRI Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions.
 - 3. WSRCA/TRI Standard Installation Guide for Concrete and Clay Roof Tile in Cold Weather Applications.
 - 4. FRSA/TRI Concrete and Clay Roof Tile Installation Manual for Florida High Wind Applications.
 - 5. NRCA Steep Slope Roofing Manual.
 - 6. SMACNA Architectural Sheet Metal Manual.

- C. Metal Eave Flashings: Install flashing 1/8 inch (3 mm) beyond fascia. Lap end joints a minimum 3 inches (76 mm), with plastic cement seal between overlapping metal surfaces.
1. Apply self-seal membrane over eave flashing parallel to eave edge in accordance with manufacturer's printed instructions.
 2. Extend self-seal membrane up roof slope minimum 2 ft (610 mm) beyond interior face of exterior wall or as required by code, whichever is greater.
 3. Place each successive ply overlapping top edge of previous ply 3 inches (76 mm).
- D. Valley Flashings: Install 24 to 28 inch (610 to 711 mm) standing seam, double rib, for closed valleys. or 24 inch (610 mm) double rib valley flashing, for open grouted valleys.
1. Form flashings in accordance with manufacturer's instructions for valley type indicated.
 2. Apply flashing over 36 inch (914 mm) full width vertical underlayment centered in all valley areas.
 3. Install flashings centered on valley; nail in place at 12 inches (305 mm) on center, 1 inch (25 mm) from metal edges.
 4. Roof Pitch 4 in 12 or Greater: Lap flashing end joints minimum 4 inches (102 mm).
 5. Roof Pitch Less Than 4 in 12: Lap flashing end joints minimum 6 inches (152 mm).
 6. For slopes below 3:12 or 4:12 in severe weather areas, install flashings and EPDM underlayment per details provided by the Manufacturer.
- E. Sidewall Flashings: Coordinate with installation of sidewall flashings specified in Section 07 60 00 - Flashing and Sheet Metal.
- F. Synthetic Underlayment:
1. Use self-sealing membrane. Meets requirements of ICC-ES 48 along roof perimeters and protrusions.
 - a. Install parallel to roof eave with a 6 inch (152 mm) lap on the ends, a 3 inch (76 mm) side lap and a minimum 1/4 inch (6 mm) lap over eaves.
 2. Class C: ICC-ES, Self-Sealing Membrane:
 - a. Up Roof Deck: 2 ft (610 mm) inside exterior wall.
 - b. Valleys: 6 ft (1.829 m).
 - c. Around Protrusions, Gables, Walls and Under Valley Flashings: 3 ft (914 mm)
 - d. For better protection, smaller roofs, and lower slopes, self-sealing membrane may be used on entire roof deck.
 - 1) High temperature underlayment is not required but may enhance performance.
 - 2) Heavy granulated underlayment is not recommended.
- G. Asphalt Saturated Organic Felt No.30 Underlayment or Approved Synthetic Underlayment: Install 2 plies underlayment over entire roof area, parallel to eaves.
1. First Ply: 18 inches (457 mm) wide at eave edge. Bottom edge extending 1/4 inch (6 mm) over lower edge of eave flashing. Seal to eave flashing.
 2. Second Ply: 36 inches (914 mm) wide over first ply. Flush at bottom. Seal to first ply.
 3. Third Ply: 36 inches (914 mm) wide. 15 inches (381 mm) up from first ply bottom edge.
 4. Each Successive Ply: 18 inches (457 mm) up from bottom of each previous ply.
 5. Nail Horizontal Seams: 1 inch (25 mm) from exposed edge of felt. Space nails in accordance with manufacturer's printed instructions for roof slope.
 6. Overlap Vertical Seams: 6 inches (457 mm), seal lap with plastic cement. Nail at 3 inches (76 mm) on center. Stagger vertical laps of each successive layer so that vertical joints do not align in any two adjacent plies.
 7. Ridges, Except at Ridge Vents: Extend underlayment over ridges 6 inches (152 mm) on each side making a double layer.
 8. Hips: Extend underlayment over hips 6 inches (152 mm) on each side making a double layer.

9. Valleys: Overlap metal valley flashing 3 inches (76 mm) and seal to metal.
- H. Rubberized Underlayment: Install over entire roof area, parallel to eaves.
1. Install in accordance with manufacturer's printed instructions.
 2. First Ply at Eave Edge: With bottom edge extending 1/4 inch (6 mm) over lower edge of eave flashing. Seal to eave flashing.
 3. Each Successive Ply: Overlap top edge of previous ply by 3 inches (76 mm).
 4. Ridges, Except at Ridge Vents: Extend underlayment over ridges 6 inches (457 mm) on each side making a double layer.
 5. Hips: Extend underlayment over hips 6 inches (152 mm) on each side making a double layer.
 6. Valleys: Overlap metal valley flashing 3 inches (76 mm) and seal to metal.
- I. Single Ply Roof Membrane: Install EPDM membrane over entire roof area, parallel to eaves.
1. Install in accordance with manufacturer's printed instructions.
 2. First Ply at Eave Edge: Bottom edge extending 1/4 inch (6 mm) over lower edge of eave flashing. Seal to eave flashing.
 3. Each Successive Ply: Overlap top edge of previous ply by 3 inches (76 mm).
 4. Bond lapped joints in accordance with EPDM manufacturer's printed instructions.
 5. Ridges, Except at Ridge Vents: Extend membrane over ridges 6 inches (152 mm) on each side making a double layer.
 6. Hips: Extend membrane over hips 6 inches (152 mm) on each side making a double layer.
 7. Valleys: Overlap metal valley flashing 3 inches (76 mm) and seal to metal.
- J. Intersections of Roof Surfaces and Abutting Vertical Surfaces:
1. Install continuous 36 inch (914 mm) wide strips of self-seal membrane to extend 30 inches (762 mm) across roof deck and 6 inches (152 mm) up vertical surface.
 2. Install continuous metal flashing to extend 3 inches (76 mm) up vertical surface.
 3. At locations where vertical surface will abut top edge of tile, install metal flashing to extend 3 inches (76 mm) up vertical surface, form metal flashing to extend minimum 3 inches (76 mm) over tile, and form 1/2 inch (13 mm) return hem at edge of metal.
 4. Form saddle flashings for protrusions through roof in accordance with manufacturer's printed instructions.
- K. Ridge Vent: Install in accordance with manufacturer's printed instructions.
1. Apply Quarrix Universal Tile Ridge Vent or Quarrix Universal Flashing to the ridge.
 2. Center vent on the ridge and loosely form the material to the tile roof surface.
 3. Determine how much vent you want exposed or concealed and snap horizontal lines accordingly.
 4. Overlap any rolls by 3 inch (76 mm).
 5. Remove the protective strip and firmly press into the tiles.
- L. Tile Battens:
1. Align the batten along the pre-chalked line.
 2. Never space battens more than 13-1/2 inches (89 mm) apart.
 3. Nail or screw battens 2 inches (51 mm) from each end.
 4. Nail or screw battens every 10 inches (254 mm).
 5. Quarrix Tile Battens are not structural support for the tile.
 6. Tile Fasteners: Need to penetrate roof deck through the battens by a minimum of 3/4 inch (19 mm).
 7. A utility knife can be used for cutting battens.
 8. When applying battens, install one roof plane at a time. Do not leave battens exposed an extended period to heat and sun as movement may occur prior to being covered by the tile.
- M. Eave Flashings: Install flashing 1/8 inch (3 mm) beyond the fascia. Lap end joints 3 inches

(76 mm), with plastic cement seal between overlapping metal surfaces.

1. Apply self-seal membrane over eave flashing parallel to eave edge in accordance with manufacturer's printed instructions.
2. Extend self-seal membrane up roof slope 2 feet (610 mm) beyond interior face of exterior wall or as required by code, whichever is greater.
3. Place each successive ply overlapping top edge of previous ply 3 inches (76 mm).

N. Fasteners: Install in accordance with manufacturer's printed instructions.

O. Roof Tile:

1. Install tile right to left, as viewed facing ridge.
2. Install closure strips in accordance with manufacturer's printed instructions for project conditions.
3. Fasten tiles to battens with two, Quarrix High-Low Roofing Screws, 2.75 inch No. 10 pan-head, 0.40 inch screws per tile.
4. Fasten tiles to battens with two, 2 inch (51 mm) 10 or 11 ga ring shank 3/8 inch diameter nails and 13-1/2 inches (343 mm) exposure.
5. Cut tile, as tile installation progresses, for hip, valley, and wall conditions.
6. Partial Tiles: Secure at two points or by two methods; screws, wires, adhesives, and clips.

P. Install venting as tile installation progresses. Locate in accordance with manufacturer's instructions.

Q. Trim:

1. Install trim for hips, ridges, and rakes as tile installation progresses. Cut shapes, set in bed of plastic roof cement, and secure in place with minimum 2 fasteners per piece for rake trim, and minimum 1 fastener per piece for hip and ridge trim.
2. Cut special shapes for project conditions as required.
3. Overlap trim piece ends 3 inches (76 mm). Seal overlapping surfaces with approved adhesives.

R. Counter Flashings:

1. Install counter flashings tight to substrates, with top edge of counter flashing concealing base flashings; lap end joints minimum 3 inches (76 mm).
2. Fasten counter flashings using specified fasteners; fasten on vertical surfaces only, at maximum spacing 12 inches (305 mm) on center.

3.4 CLEANING AND PROTECTION

- A. Protect installed products until completion of project.
- B. Clean products in accordance with the manufacturers recommendations.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION