

GUIDE SPECIFICATION



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SECTION 07 32 00

COMPOSITE ROOF TILE

This specification guide is written in Construction Specifications Institute (CSI) 3-Part Format and has been prepared by Quarrix Building Products. The information provided is to assist Specifiers in preparing written construction documents for composite roof tile Double Roman. Sections must be carefully reviewed and edited by the Architect to meet the requirements of the project and local building code. Quarrix reserves the right to change or make modifications to the specification guide at any time. Updates can be found on manufacturer's website and distributed in print.

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For specification assistance,
contact Quarrix Customer Service toll-free at 800-438-2920 or info@quarrix.com

QUARRIX COMPOSITE TILE SPECIFICATION

GENERAL

1.1 SECTION INCLUDES

- A. Composite Roof Tiles.
- 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 10 – Roof Specialties.
- F. Section 07 72 00 – Roof Accessories.
- 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 A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- E. ASTM C 290 - Method of Test for Resistance of Concrete Specimens to Rapid Freezing and Thawing in Water.
- F. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
- G. ASTM C 887 - Standard Specification for Packaged, Dry, Combined Materials for Surface Bonding Mortar.
- H. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- I. ASTM D 635 - Rate of Burn and Rate of Burn – Weathered.
- J. ASTM D 638 - Tensile and Tensile – Weathered.

- K. ASTM D 1929 – Ignition Temps and Ignition Temps - Weathered.
- L. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- M. ASTM D 2822 - Standard Specification for Asphalt Roof Cement.
- N. ASTM D 2843 – Smoke Density
- O. ASTM E 108 – Class C Fire
- P. ASTM G 155 – 2000 Hours – Xenon Weathering
- Q. Temperature Cycling per AC-07
- R. FS SS-S-153C - Sealants used with EPDM.
- S. FS TT-S-00230C - Chlorosulfonated polyethylene sealants.
- T. ICBO-ES AC48 - Acceptance Criteria for Roof Underlayment for Use in Severe Climate Areas.
- U. ICC-ES -AC07 - Acceptance Criteria for Special Roofing Systems.
- V. FM 4473 - Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls.
- W. TAS 100 - Test Procedure For Wind And Wind Driven Rain Resistance.
- X. Canadian Standard 19-HP-5M - Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- Y. NRCA - Steep Roofing Manual; National Roofing Contractors of America.
- Z. SMACNA - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association.
- AA. WSRCA/TRI Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions.
- BB. WSRCA/TRI Standard Installation Guide for Concrete and Clay Roof Tile in Cold Weather Applications.
- CC. FRSA/TRI Concrete and Clay Roof Tile Installation Manual for Florida High Wind Applications

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Roofing tile materials and installation was tested to ICC-ES -AC07 Acceptance Criteria for Specialty Roofing Systems.
 - 1. ASTM G155 – 2000 Hours – Xenon Weathering
 - 2. ASTM D638 – Tensile & Tensile - Weathered
 - 3. Wind resistance
 - 4. Uplift bend
 - 5. Penetration
 - 6. ASTM E108 – Class C Fire
 - 7. ASTM D1929 – Ignition Temps & Ignition Temps - Weathered
 - 8. ASTM D635 – Rate of Burn & Rate of Burn – Weathered
 - 9. ASTM D2843 – Smoke Density

- 10. Temperature Cycling
- 11. FM 4473 – Ice Hail Impact – Hail impact test for Class 4 Hail

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. 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.
- C. 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.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two full size samples, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Warranty documents, issued and executed by manufacturer of roof tile, countersigned by roof tile installer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum three years documented experience producing composite roof tile.
- B. Installer Qualifications: Minimum five years documented experience installing products specified in this section and/or supervision by a manufacturers authorized installation representative.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
- D. Pre-Installation Meeting:
 - 1. Convene at job site seven calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
 - 2. Require attendance by representatives of the following:
 - 3. Installer of this section.
 - 4. Other entities directly affecting, or affected by, construction activities of this section.
 - 5. Notify Architect four calendar days in advance of scheduled meeting date.

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 absolute limits.

1.10 WARRANTY

- A. Manufacturer's Warranty: Furnish roof tile manufacturer's 50 year limited warranty against defects in product workmanship and materials.
- B. Tile will be free from manufacturing defects not to 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: (i) natural disasters, hail over 1.0" in diameter, fire, smoke, chemicals, earthquakes, lightning or static electricity, (ii) falling, thrown or blown objects, (iii) the neglect, abuse, misuse (including faulty installation, repair or maintenance), improper transportation, handling or storage of the Quarrix Products or other failure to comply with the instructions set forth in the documentation and/or manual accompanying the Quarrix Products, (iv) a modification of the Quarrix Products not provided by Quarrix, (v) a malfunction of any product not provided by Quarrix with which the Quarrix Products are used or combined, (vi) use, modification or other treatment of the Quarrix Products in a manner for which it was not designed or intended, (vii) defects or damage due to inferior building practices, ventilation, drainage issues or roof slopes inconsistent with snow and ice control, (viii) replacement under or subjection to abnormal use conditions, (ix) normal wear and tear including the natural effects of progressive aging on the color and surface of the tile, (x) 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; (xi) foot traffic, (xii) vandalism or other malicious actions, or (xiii) Quarrix Products blown off by winds in excess of 80 mph.
- D. Refer to the Quarrix Composite Tile Limited Warranty & 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.

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Quarrix Building Products, A Division of Verscene an LDI Company, 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 to request info (Info@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

- C. Roof Tiles: Quarrix Composite Tile, Double Roman Lightweight Tile; Profile similar to a high barrel Spanish tile and 67% less weight than traditional tile or concrete eliminating the need to reinforce roof structures. Made of HDPE colored resin with textured appearance and two pre-drilled factory fastening locations in each tile.
 - 1. Size: 16-1/2 inches (419 mm) long by 13 inches (330 mm) wide.
 - 2. Material: High Density Polyethylene Polymer
 - 3. Exposure per Tile: 13-1/2 inches (343 mm) long by 11-19/32 inches (394 mm) wide with an overall height of 2-1/4 inches.
 - 4. Weight/Tile 3.38 lb. (1.50 kg).
 - 5. Weight/Square 304 lbs. (137.9 kg).
 - 6. Fire Rating: Class C
 - 7. Certification testing completed to ICC-ES AC-07 Acceptance Criteria for Special Roofing Systems:
 - a. ASTM G155 – 2000 Hours – Xenon Weathering
 - b. ASTM D638 – Tensile & Tensile – Weathered
 - c. Wind resistance
 - d. Uplift bend
 - e. Penetration
 - f. ASTM E108 – Class C Fire
 - g. ASTM D1929 – Ignition Temps & Ignition Temps – Weathered
 - h. ASTM D635 – Rate of Burn & Rate of Burn – Weathered
 - i. ASTM D2843 – Smoke Density
 - j. Temperature Cycling
 - k. FM 4473 – Ice Hail Impact – Hail impact test for Class 4 Hail
 - 8. Color:
 - a. Black.
 - b. Canyon Earth.
 - c. Desert Red.
 - d. Goldenrod.
 - e. Sage.
 - f. Saddle Brown.
 - 9. Multi-Color Custom Blend:
 - a. Color:____; ____percent.
 - b. Color:____; ____percent.
- D. Trim: Supply manufactured shapes of same material, style, color, and texture as roof tile for indicated hips, ridges, and rakes.

2.3 TILE ROOF ACCESSORIES

- A. Underlayment:

1. Synthetic Self Sealing Roof Underlayment: For roof slopes 4:12 and above underlayment shall meet or exceed ICC-ES AC 48 and AC 207 criteria to meet UBC, IBC and IRC requirements for Roofing Underlayments.
 2. Asphalt Saturated Organic Felt: No. 30 Asphalt Saturated Organic Felt, to meet requirements of ASTM D 226, Type 2 or equal.
 3. Rubberized Self Sealing Underlayment: ASTM D 1970 sheet barrier of self-adhering rubberized asphalt membrane underlayment having internal reinforcement, and "split" back plastic release film.
- E. Tile Battens: Quarrix Tile Battens, manufactured of corrosion-free, laminated high-density polyethylene corrugated plastic. Layers of corrugated plastic must be glued, not stapled.
1. Tile Battens: Quarrix Tile Battens.
 - a. Color: Black.
 - b. Dimensions: 1-1/2 inches (38.1 mm) wide by 8 feet (2.4 m) long by 3/4 inch (19 mm) high.
- F. Upper and Lower Metal/Eave Closures: Quarrix coated steel Eave Closure (birdstop) friction fits between the weather checks on the lower edge of the tile. Closure is 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.
1. Color:
 - a. Black
 - b. Canyon Earth
 - c. Desert Red
 - d. Golden Rod
 - e. Saddle Brown
- G. 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. Color / Width:
 - a. Black / 15 inches by 16 feet (381 mm by 4.87 m)
 - b. Terra Cotta / 15-3/4 inch by 26 feet (400 mm by 7.92 m)
 - c. Venetian Red / 15-3/4 inches by 16 feet (400 mm by 4.87 m)
 - d. Brown / 15-3/4 inches by 16 feet (400 mm by 4.87 m)
- H. Quarrix Universal Tile Flashing: Fully adhered, expandable aluminum flashing with a width of 11-3/4 inches, 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. Color:
 - a. Black
 - b. Terra Cotta
 - c. Venetian Red
 - d. Brown
- I. Fasteners:
1. Tile Fasteners:
 - a. Quarrix Tile Fasteners: Corrosion resistant exterior grade screws specially engineered for special roof applications and recommended with Quarrix composite tile. Tested to SAE J78 standard with 2-3/4 inch overall length, 1-1/2 inch thread length, #10 pan-head (.40 inch) screws, 2 per tile.
 - b. Screw Fasteners: use screws for maximum wind resistance. Two 2-3/4 inch (6.98 cm), non-corrosive No. 10 coarse thread, .344 inch – diameter (8.74 mm) pan-head screws. This will allow for 1/4 inch (6.35 mm) penetration through sheathing.
 - c. Nails: two non-corrosive, 2-3/4 inch (5.08 cm), 10/11-gauge, ring-shank (18

- rings/inch), 3/8 inch-diameter (9.53 mm) head nails. This will allow for 1/4 inch (6.35 mm) penetration through sheathing, when using Quarrix tile battens.
2. Batten Fasteners: Battens should be fastened every 10 inch using nails or screws that are non-corrosive and of sufficient length to fully penetrate the roof sheathing.
 3. Underlayment Fasteners: Fasteners for underlayment shall be 11-gauge roofing nails with 3/8 inch (9.53 mm) heads with sufficient length to penetrate into the sheathing 3/8 inch (9.53 mm) or through the sheathing 3/4 inch (19.05 mm) or through the sheathing, whichever is less.
 4. Flashing Fasteners: Flashing shall be fastened with 11-gauge, ring-shank, corrosion-resistant nails compatible with the flashing material with sufficient length to penetrate the sheathing 3/4 inch (19.05 mm) or thorough the sheathing, whichever is less.
 5. Fasteners for Hip/Ridge/Rake trim and Hip/Ridge Starter: Quarrix Tile Fasteners for hip and ridge trim shall be No. 10, coarse-thread, 0.344 inch-diameter (8.74 mm), corrosion-resistant pan-head screws (same as the tile fasteners). Use 2-3/4" (6.98 cm) long for ridges and 2-3/4" (6.98 cm) long for the hips. A 3" (7.62 cm) non-corrosive, ring-shank nail in combination with an approved adhesive under the nose of each trim piece can also be used.
- J. Snow Guard: Roof tile manufacturer's fabricated unit for protection over entrances, lower roof areas, or other areas where falling snow is not desired. Fabricated from metals and profiles from Alpine Snow Guards (Alpinesnowguards.com).
- K. Mortar/grout for hips, open valleys and saddles shall be a combination of 50 lb. mix of Quickwall Surface Bonding Cement and 120 lb. Mason Mix to meet or exceed strength requirements of ASTM C 387 for Type "N" mortar and Concrete Acrylic Fortifier to meet or exceed ASTM C 887 standard specifications as manufactured by Quikrete, Atlanta, GA. Grout and colored mortar to match field tile as manufactured by Flexim is recommended by the Tile Manufacturer.
- L. Adhesives to secure cut pieces of field tile along hips, valleys, flying gables, and protrusions and to install hip/ridge/rake trim shall be Titebond as manufactured by Franklin International, Columbus, OH; RT-600 as manufactured by Ohio Sealant Inc., Mentor, OH, or 3500 Roof Tile Adhesive/Sealant by Geocel, Elkhart, IN, or equal.
- M. Metal Flashings:
1. General Requirements: Form flashings to profiles indicated on Drawings, in accordance with manufacturer's printed instructions, and as recommended by SMACNA Architectural Sheet Metal Manual to protect materials from physical damage and to shed water.
 - a. Form flashing lengths square, accurate to profile, in maximum possible lengths; form flashing lengths free from distortion or defects detrimental to appearance or performance.
 - b. Hem edges of flashings exposed to view a minimum 1/4 inch (6 mm) on underside.
 2. Eave Flashings and Other Metal Flashings: Copper sheet, ASTM B 370, cold rolled, natural finish; 16 ounces per square foot minimum thickness.
 3. Eave Flashings and Other Metal Flashings: Copper sheet, ASTM B 370, cold rolled, natural finish; 20 ounces per square foot minimum thickness.
 4. Eave Flashings and Other Metal Flashings: Stainless Steel Sheet for Flashings: ASTM A 666, Type 304 alloy, soft tempered; 24 gauge minimum thickness.
 5. Eave Flashings and Other Metal Flashings: 24 gauge galvanized steel sheet, ASTM A 653/A 653M, minimum G90/Z275 hot-dip zinc coating.
 6. Eave Flashings: Aluminum sheet, ASTM B 209; 0.019 inch minimum thickness.
 7. Concealed sealants along gable rakes, ridge/hip trim and flashings with asphalt saturated felt underlayment shall be non-running, heavy body Plastic Roof Cement that meets or exceeds the requirements of ASTM D 2822 and Federal Specifications

SS-S-153C (Type 1) or equal. Sealants used with EPDM or Synthetic Underlayment shall be per manufacturer's recommendation.

8. Exposed sealants, such as those used on counter flashings or non-soldered joints, should be high quality sealants to meet or exceed requirements of U.S. TT-S-00230C, U.S. Fed Cat. No 8030-965-2397, Canadian 19-HP-5M, ASTM C 290 or equal.

| EXECUTION

3.1 EXAMINATION

- A. Verification roof deck structure to meet roof tile manufacturer's installation requirements.
 1. Verify roof penetrations are in place and flashed to deck surface.
 2. Verify roof openings are correctly framed prior to installing Work of this section.
 3. Verify deck is of sufficient thickness to accept fasteners.
 4. Verify deck surfaces are dry, unfrozen, and free of ridges, warps, and voids
- B. Notify Architect 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. General: Install in accordance with manufacturer's instructions.
 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.
- C. 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.
- B. Eave Flashings: Install metal eave flashing 1/8 inch (3 mm) beyond the fascia; lap end joints 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 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).

- C. Valley Flashings: Install 24 inch (610 mm) to 28 inch (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.
- D. Sidewall Flashings: Coordinate with the installation of sidewall flashings specified in Section 07 60 00 - Flashing and Sheet Metal Flashing and Sheet Metal.
- E. Synthetic underlayment
1. Use self-sealing membrane that meets or exceeds requirements of ICC-ES 48 along roof perimeters and protrusions. Underlayment should be installed parallel to the roof eave with a 6 inch (15.24 cm) lap on the ends, a 3 inch (7.62 cm) side lap and a minimum 1/4 inch (6.35 mm) lap over eaves.
 2. Class C: ICC-ES, self-sealing membrane is required up the roof deck at least 2 feet (60.96 cm) inside the exterior wall, 6 feet (1.83 m) in the valleys and 3 feet (91.44 cm) around protrusions, gables, walls and under valley flashings. For better protection, smaller roofs, and lower slopes, self-sealing membrane may be used on the entire roof deck. High temperature underlayment is not required, but may enhance performance. Heavy granulated underlayment is not recommended.
- F. Asphalt Saturated Organic Felt No.30 Underlayment or approved synthetic underlayment: Install 2 plies underlayment over entire roof area, parallel to eaves.
1. Place first ply 18 inches (457 mm) wide at eave edge, with bottom edge extending 1/4 inch (6 mm) over lower edge of eave flashing; seal to eave flashing.
 2. Place second ply 36 inches (914 mm) wide over first ply flush at bottom and sealed to first ply.
 3. Place third ply 36 inches (914 mm) wide 15 inches (381 mm) up from bottom edge of first ply.
 4. Place 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 minimum 6 inches (152 mm), seal lap with plastic cement, then 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.
- G. Rubberized Underlayment: Install underlayment over entire roof area, parallel to eaves.
1. Install in accordance with manufacturer's printed instructions.
 2. Place 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. Place each successive ply overlapping top edge of previous ply 3 inches (76 mm).
 4. Ridges, Except at Ridge Vents: Extend underlayment over ridges 6 inches (152 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.
- H. Single Ply Roof Membrane: Install EPDM membrane over entire roof area, parallel to eaves.
 - 1. Install in accordance with manufacturer's printed instructions.
 - 2. Place first ply at eave edge, with bottom edge extending 1/4 inch (78 mm) over lower edge of eave flashing; seal to eave flashing.
 - 3. Place each successive ply overlapping top edge of previous ply 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 (75 mm) and seal to metal.
- I. 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 (12.5 mm) return hem at edge of metal.
 - 4. Form saddle flashings for protrusions through roof in accordance with manufacturer's printed instructions.
- J. 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 (7.52 cm).
 - 5. Remove the protective strip and firmly press into the tiles.
- K. Tile Battens:
 - 1. Align the batten along the pre-chalked line.
 - 2. Never space battens more than 13-1/2 inches apart.
 - 3. Nail or screw the batten 2 inches from each end.
 - 4. Nail or screw the battens every 10 inches.
 - 5. Quarrix Tile Battens are not structural support for the tile.
 - 6. Tile fasteners need to penetrate the roof deck through the battens by a minimum of 3/4 inch.
 - 7. A utility knife can be used for cutting the battens.
 - 8. When applying the battens, it is recommended to install one roof plane at a time and not leave battens exposed an extended time to heat and sun as movement may occur prior to being covered by the tile.
- L. Eave Flashings: Install metal eave flashing 1/8 inch (3 mm) beyond the fascia; lap end joints 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 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).

- M. Fasteners: Install in accordance with manufacturer's printed instructions.
- N. 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 tile each tile to battens with two Quarrix High-Low Roofing Screws, 2.75 inch #10 pan-head (.40 inch) screws per tile.
 - 4. Fasten tile each tile to battens with two 2 inch 10/11 gauge 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 shall be secured at two points or by two methods; screws, wires, adhesives and clips.
- O. Install venting as tile installation progresses; locate in accordance with manufacturer's instructions.
- P. Trim:
 - 1. Install trim pieces 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 minimum 3 inches (76 mm); seal overlapping surfaces with approved adhesives.
- Q. 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 PROTECTION

- R. Protect installed products until completion of project.
- S. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION