

SECTION 073216 - CONCRETE ROOF TILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Concrete roof tiles.
2. Tile accessories
3. Self-adhering sheet underlayment.
4. Ridge Ventilation System
5. Drip Metal at Eave

- B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood Decking, Blocking, and Fascia's.
2. Division 07 Section "Sheet Metal Flashing and Trim" for metal not part of this Section.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079, glossaries in RTI/WSRCA's "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions," and NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS:

- A. Samples for Initial Selection: For each type of concrete tile and concrete tile accessory indicated.

1. Include similar Samples of trim involving color selection.

- B. Samples for Verification: For the following products, of sizes indicated, to verify color selected.

1. Concrete Tile: Full size.
2. Concrete Tile Accessories: Full size.
3. Fasteners: Stainless Steel, or Hot Dipped Galvanized, Ring Shak
4. Self-Adhering Underlayment: 12 inches square.

- C. Material Test Reports: For each type of tile.
- D. Research/Evaluation Reports: For concrete tiles, fasteners, and fastener systems.
- E. Maintenance Data: For concrete tile roofing to include in maintenance manuals.
- F. Warranties: Special warranties specified at the end of this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain concrete tiles and concrete tile accessories through one source from a the manufacturer.
- B. Fire-Test-Response Characteristics: Provide concrete tiles and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; UL 790 or ASTM E 108 for application and roof slopes indicated.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution, if requested.
 - 1. Approval of mockups is also for material and construction qualities specifically approved by Architect in writing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.
 - 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress. Stack Rolls on Ends only.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
 - 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

- A. Special Concrete Roof Tile Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace tile that fails in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.
 - 1. Material Warranty Period: 50 years from date of Substantial Completion.
- B. Special Roofing Installer's Warranty: Roofing Installer's warranty, on warranty form at end of this Section, signed by roofing Installer, covering Work of this Section, in which roofing Installer agrees to repair or replace components of concrete tile roofing that fail in materials or workmanship within the following warranty period:
 - 1. Warranty Period of Installer: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but may not be limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide the products specified.
 - 3. Manufacturers: Subject to compliance with requirements, provide products by of the manufacturers specified.

2.2 CONCRETE TILE

- A. Products:
 - 1. Bartile Roofs Inc; Legendary Roof Tile: Slate or Shake Design.
- B. Concrete Tile: ASTM C 1492, extruded-concrete roof tile units of shape and configuration indicated, with integral color, and free of surface imperfections. Provide with fastening holes predrilled at factory when manufactured.

1. Weight: Standard weight.
Low-Profile Shape: Flat Style Interlocking Concrete Roof Tile
2. Side Configuration: Interlocking
3. Size: 16" x 16"
4. Colors, Blends, and Textures: As selected by Architect from manufacturer's Standard Color Selection in either Legendary Slate or Shake Profiles.

ACCESSORIES

- C. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.
- E. Elastomeric Sealant: Polyurethane based joint sealant; of Grade NS, Class 25, Use NT related to exposure, and, as applicable to joint substrates indicated.
- F. Roofing Asphalt: DO NOT USE.
- G. Cold-Applied Adhesive: DO NOT USE.
- H. Foam Adhesive: Two-component polyurethane expanding adhesive as recommended for application by tile manufacturer.
- I. Mortar: Synthetic Mortar, similar color to selected tile, for concealed-from-view mortar.
- J. Eave Closure, Tile Riser: Manufacturer's standard eave closure/Booster formed to shape of tile.
- K. Ridges and Hips: Use Manufacturer's standard Ridge/Hip tile, and Hip Starter Tile.
- L. Ventilating Battens: Synthetic Ventilating Battens by Battens Plus.
- M. Hip and Ridge Storm-block Rolls: 9' by 25' Self Adhesive Butyl Adhesive Backed Colored Aluminum corrugated 25' Rolls.

2.3 FASTENERS

- A. Roofing Nails: ASTM F 1667, Hot-dipped galvanized steel, or Stainless Steel, sharp-pointed, roofing nails with barbed shanks; minimum 7/16-inch diameter head; and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or sheathing.
 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing, or Stainless Steel.
- B. Self-adheared Underlayment Nails: None normally needed, otherwise use (A) roofing nails.

- C. Ventilating Batten Fasteners: ASTM F 1667, Minimum ½" Crown steel wire staples, gun driven.
- D. Wire Ties: For supporting small Valley cut tile pieces, use Stainless Steel if required..
- E. Twisted-Wire-Tie System: Continuously twisted two-wire unit with loops formed 6 inches apart, minimum diameter stainless-steel wire and 0.037-inch diameter stainless steel tie wires with matching-metal folding clip anchors if required
 - 1. Tile Wire Products:
 - a. Newport Fastener Company, Inc.; Twisted Wire Tyle Tye.
 - b. Wire Works, Inc. (The); Twisted Wire Works System.
- F. Storm Clips: Stainless steel strap-type, 0.04-by-1/2-inch (1.0-by-13-mm) L-shaped retainer clips designed to secure side edges of tiles. Provide with two fastener holes in base flange.
 - 1. Hurricane resistive Products:
 - a. Newport Fastener Company, Inc.; Storm Lock Side Clips.
 - b. Wire Works, Inc. (The); Grip McClips.

2.4 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40 mils thick, or greater; slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.
 - 1. Products:
 - a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; WIP-300HT

2.5 SHEET METAL FLASHING AND TRIM

- B. Sheet Metal Flashing and Trim: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."
 - 1. Sheet Metal: Stainless Steel, or by Architect..
- C. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.
 - 1. Apron Flashings: Fabricate with lower flange extending a minimum of 6 inches over and 4 inches beyond each side of downslope tile roofing and [**6 inches** up the vertical surface.
 - 2. Step Flashings: Fabricate with a 3-inch (75-mm) headlap extending a minimum of 4 inches 5 inches over the underlying tile roofing and 4 inches up the vertical surface.

3. Channel Flashings: Fabricate with vertical surface extending a minimum of 4 inches above the tile and 6 inches beneath the tile roofing and with a 1-inch high vertical return to form a runoff channel. Retain subparagraph below for metal pan or channel flashings acting as an internal gutter at rake edge fasciae. Revise dimensions to suit Project.
 4. Chimney Saddle Flashings: Fabricate with concealed flange extending a minimum of 18" beneath upslope tile roofing, 4 inches beyond each side of chimney or skylight, and 6 inches above the roof plane.
 5. Closed-Valley Flashings: Fabricate in lengths not exceeding 10 feet, with 1-inch-or more high, inverted-V Rib at center of valley and with equal flange widths of 16 inches.
 6. Drip Edges: Fabricate in lengths not exceeding 10 feet, with 6-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.6-mm) drip at lower edge.
- D. Vent-Pipe Flashings: Stainless Steel or Lead Type L51121, at least 1/16 inch (1.6 mm) thick. Provide sleeve sized to slip over or turn down into pipe, soldered to skirt at slope of roof and extending at least 6 inches beyond pipe onto roof (FHA Rated).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through roof.
 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayments according to tile manufacturer's written recommendations
1. Cover **ridge** and/or **hip** wood nailers with underlayment strips.
- B. Single-Layer Roof Self Adhearing Membrane Underlayment: Install perpendicular to roof slope in parallel courses. Lap sides a minimum of 3-1/2 inches or to Manufacturers marked line, over underlying course. Lap ends a minimum of 6 inches. Stagger end laps between succeeding courses at least 4'. Verify that underlayment is sealed to deck.
- C. Self-Adhering Sheet Underlayment: Install wrinkle free, complying with low-temperature installation restrictions of underlayment manufacturer if applicable. Install on entire roof

surface, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm), staggered 24 inches (600 mm) between succeeding courses. Roll laps with roller. Cover underlayment with tile within thirty days.

1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
2. Install self-adhering sheet underlayment over entire roof deck.

D. Metal-Flashed Closed Valley Underlayment: Install 1 additional layer of 36-inch- (914-mm-) wide self-adhering underlayment centered in valley. Stagger end laps between layers at least 72 inches (1830 mm). Lap ends of each layer at least 12 inches (300 mm) in direction to shed water.

1. Lap roof-deck underlayment over previously installed layer of valley underlayment at least 6 inches.

3.3 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

1. Install metal flashings according to tile manufacturer's written recommendations and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope tile roofing and up the vertical surface.

C. Step Flashings: Install with 3-inch headlap extending over the underlying tile and up the vertical surface. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying tile. Fasten to roof deck only.

D. Chimney or Cricket Flashings: Install against roof-penetrating elements, extending concealed flange beneath upslope tile roofing and beyond each side.

E. Closed Valley Flashings: Install centrally in valleys, lapping ends at least 8 inches (200 mm) in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

1. Secure hemmed flange edges with metal cleats spaced 18 inches apart and fastened to roof deck.
2. Adhere 18 wide strips of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.

F. Channel Flashings: Install over underlayment and fasten to roof deck.

G. Rake Drip Edges: Install over underlayment and fasten to roof deck.

H. Eave Drip Edges: Install beneath underlayment and fasten to roof deck.

I. Pipe Flashings: Form flashing around pipe penetrations and tile roofing. Fasten and seal to tile roofing.

- J. Ridge Ventilation System: Install centrally and mechanically fasten to ridge. Adhere each side to roof tile in elastomeric sealant.
 - 1. Install Ridge Vent fabric mesh over roof deck air ventilation gaps to prevent insect entry.

3.4 BATTENS

- A. Install 2x wood nailers at ridges and hips, and securely fasten to roof deck.
- B. Install Ventilated Battens at Eave (tile riser) course, and on all roof slopes 7/12 and higher.

3.5 CONCRETE TILE INSTALLATION

- A. General: Install roof tiles according to manufacturer's written instructions and recommendations in RTI/WSRCA's "Concrete Roof Tile Design requirements."
 - 1. Maintain uniform exposure and coursing of tiles throughout roof.
 - 2. Extend tiles 1-2 inches (50 mm) over eave fasciae.
 - 3. Nail Fastening: Hand fasten nails to clear the tile so the tile hangs from the nail and is not drawn up.
 - a. Install wire through nail holes of cut tiles that cannot be nailed directly to roof deck, such as at valleys, and fasten to nails driven into deck.
 - 4. Install storm clips to capture edges of longitudinal sides of tiles and securely fasten to roof deck, if directed by Architect for high winds.
 - 5. Cut and fit tiles neatly around roof vents, pipes, ventilators, and other projections through roof. Fill voids with synthetic mortar.
 - 6. Install tiles with color blend approved by Architect.

Legendary Flat Tile Installation:

- 1. Maintain minimum 3-inch head lap between succeeding tile courses.
- 2. Offset joints in succeeding courses according to manufacturer's guidelines.
- 3. Extend tiles 1 inch minimum over fascia, at eaves.
- 4. Install ridge tiles in V-ridge configuration with laps facing away from prevailing wind.
- 5. Install Hip and Ridge tiles in a V-ridge configuration. Anchor each Ridge tile with 2 fasteners to Ridge nailer boards.
- 6. Install Legendary tile with a one-quarter tile offset on each succeeding course. Each Legendary tile has the appearance of TWO tile in each tile individual piece.
- 7. Install L-shaped gable Rake tile on Gables..

- C. Closed Valleys: Cut tiles at valleys to form straight lines, trimming upper concealed corners of tiles. Maintain uniform gap of 1/4 to 3/4 inch at centerline of valley.
 - 1. Drill or notch cut valley tiles and wire tie to fastener placed clear of valley metal flashing. Do not nail tiles to metal flashing.

3.6 ADJUSTING AND CLEANING

- A. Remove and replace damaged or broken tiles.
- B. Remove excess tile and debris from Project site.

3.7 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work on the following project:
 - 1. Owner:
 - 2. Address:
 - 3. Building Name/Type:
 - 4. Address:
 - 5. Area of Work:
 - 6. Acceptance Date:
 - 7. Warranty Period:
 - 8. Expiration Date:
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period, of
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 100 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

- f. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this ____ day of _____Month, 20__ __.

1. Authorized Signature:
2. Full Name:
3. Title:

END OF SECTION 073216