



SECTION 07300

COMPOSITE ROOF TILE SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof underlayment.
- B. Composite slate roofing.
- C. Composite shake roofing.
- D. Ventilation.
- E. Fasteners.
- F. Metal flashing.
- G. Snow guards.

1.2 RELATED SECTIONS

- A. Section 04050 - Basic Masonry Materials and Methods: Masonry chimneys.
- B. Section 06100 - Rough Carpentry: Roof framing and decking.
- C. Section 07400 - Roofing and Siding Panels: Siding and roofing.
- D. Section 07600 - Flashing and Sheet Metal.
- E. Section 07729 - Snow Guards.

1.3 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM C 272 - Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 2. ASTM C 666/C 666M - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
 3. ASTM C 1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissiometers.

4. ASTM C 1549 - Standard Test Method for Determination of Solar Reflectance near Ambient Temperature Using a Portable Solar Reflect meter.
 5. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 6. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
 7. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 8. ASTM D 4869 - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
 9. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.
 10. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
 11. ASTM G 155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials.
- B. Miami/Dade - Protocol TAS 100 - Test procedure for wind and wind driven rain resistance of discontinuance roof system.
- C. Underwriters Laboratories, Inc. (UL): UL 2218 - Impact Resistance of Prepared Roof Covering Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, showing compliance with requirements.
- C. Samples For Initial Selection: Two complete sets of color cards representing manufacturer's full range of available colors.
- D. Manufacturer's installation instructions, showing required preparation and installation procedures.
- E. Sample copy of manufacturer's warranty.

1.5 QUALITY ASSURANCE

- A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall have minimum 3 years experience in roofing construction and application. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual and such application shall be acceptable to the composite roof tile manufacturer.
- B. Pre-Installation Meeting: Conduct a pre-installation meeting not more than 2 weeks after the start of the roofing project and before start of roofing installation in accordance with Section 01310 Project Management and Coordination.
 1. Contractor shall schedule and arrange meeting and meeting place and notify attendees.
 2. Mandatory Attendees: Roofing installer and manufacturer's field agent, Architect's representative and prime contractor's representative.
 3. Optional Attendees: Owner's representative, Architect's representative, prime Contractor's representative.
 4. Review all pertinent requirements for achieving the warranty specified below and set schedule for final warranty inspection.

- C. Pre-Installation Meeting: Regulatory Requirements: Products must conform with the following:
 - 1. International Code Council - ESR-2745.
 - 2. ATI Evaluation Service Code Compliant Research Report – CCRR-0188
 - 3. State of Florida Approval - Report # FL7273.
 - 4. Texas Department of Insurance Evaluation - RC-155.
- D. 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, color, and texture are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened, labeled packaging until ready for installation.
- B. Promptly verify quantities and conditions.
- C. Store Product at temperatures above 45 degrees F (7.2 degrees C).
- D. Store product in protected environment, clear of moisture, and protected from construction activities. Do not store on site for prolonged period.
- E. Store products on a flat surface. Do not double stack pallets.

1.7 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.

1.8 WARRANTY

- A. Manufacturer's Standard Warranty: Transferable limited lifetime warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Inspire Roofing Products - The Tapco Group, which is located at: 29797 Beck Rd. ; Wixom, MI 48393;
- B. **** NOTE TO SPECIFIER ** Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.**
- C. Substitutions: Not permitted.
- D. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 UNDERLAYMENT

- A. Roofing Felt: Minimum 30 pound per square roofing felt in accordance with ASTM D 226 for Class C Fire Rating.

- B. Roofing Felt: For Steep slope applications; minimum 30 pound per square roofing felt in accordance with ASTM D 4869 for Class C Fire Rating.
- C. Roofing Felt: MBT-TU35 for Class a Fire Rating when tested in accordance with ASTM E 108; as supplied by InSpire Roofing Products.
- D. Roofing Felt: Manufacturer approved roofing felt.
- E. Ice and Water Barrier: Film-surfaced, self healing, bituminous leak barrier in accordance with ASTM D 1970.
- F. Ice and Water Barrier: Granule-surfaced, self healing, bituminous leak barrier in accordance with ASTM D 1970.

2.3 COMPOSITE TILES - GENERAL

- A. Composite Tiles: As manufactured by InSpire Roofing Products - The Tapco Group.
 - 1. Hail Rating: Class 4, tested in accordance to UL 2218.
 - 2. UV Exposure: Fade resistant with no trace of cracking, spalling or deformation after over 9,500 hours in Xenon Arch Chamber, tested in accordance with ASTM G 155.
 - 3. Wind Driven Rain / Wind Uplift: Up to 110 MPH - no water infiltration through sheathing. No tile blow off or tearing when tested in accordance with Miami Dade County Protocol - TAS 100.
 - 4. Freeze Thaw Cycle: No signs of damage or cracking after 350 cycles when tested in accordance with ASTM C 666 / C 666M.
 - 5. Water Absorption: No appreciable weight gain when tested in accordance with ASTM C 272.
 - 6. Water Permeation: Tile to be impermeable in accordance with ASTM E 96 / E 96M.
 - 7. Tensile Strength: Average Tensile Strength: 1,957psi / Average Modulus of Elasticity: 366,312 when tested in accordance with ASTM D 638.

2.4 COMPOSITE SLATE TILES

- A. Composite Slate Tiles: As manufactured by InSpire Roofing Products - The Tapco Group.
 - 1. Construction: Polymer composite.
 - 2. Height: 17.5 inches (445 mm).
 - 3. Width: 12 inches (305 mm).
 - 4. Weight: Class A - 1.52 lbs (0.70kg) per tile.
 - 5. Weight: Class C - 1.52 lbs (0.70kg) per tile.
 - 6. Sold in bundles; 25 tiles per bundle.
 - 7. Exposure: 6 inches (152 mm).
 - a. Approximately 200 tiles per square.
 - b. Approximately 8 bundles per square.
 - 8. Exposure: 6.5 inches (165 mm).
 - a. Approximately 185 tiles per square.
 - b. Approximately 7.39 bundles per square.
 - 9. Exposure: 7 inches (178 mm).
 - a. Approximately 172 tiles per square.
 - b. Approximately 6.86 bundles per square.
 - 10. Exposure: 7.5 inches (191 mm).
 - a. Approximately 160 tiles per square.
 - b. Approximately 6.4 bundles per square.
 - 11. Fire Resistance Classification: Class A.
 - 12. Fire Resistance Classification: Class C.

13. Compression formed to eliminate flexing of roof tiles due to cambered design.
14. Service Temperature: No warping at temperatures in excess of 180F (82 C).
15. Chemical Compatibility: Minimal reactions, if any, when exposed to asphalt, oleic acid, plus others.

B. Traditional Colors:

1. Color: Stone Black - (Color 701).
2. Color: Dover Grey - (Color 702).
3. Color: Slate Grey - (Color 703).
4. Color: Plum - (Color 706).
5. Color: Emerald Green - (Color 707).
6. Color: Pewter Grey - (Color 704).
7. Color: Charcoal Grey - (Color 705).
8. Color: Brick Red - (Color 709).
9. Color: Chestnut Brown - (Color 712).
10. Color: Moss Green - (Color 714).
11. Color: Forest Green - (Color 715).
12. Color: Grey/Black Blend - (Color 718).

C. Cool Roof Colors:

1. Color: Evergreen - (Color 730 CR).
2. Color: Ash Grey - (Color 731 CR).
3. Color: Granite - (Color 732 CR).
4. Color: Graphite - (Color 733 CR).

D. Mix Colors:

1. Color: Kingsford Grey - (Color 793).
2. Color: Manchester - (Color 794).
3. Color: Cranbrook - (Color 796).
4. Color: Greencastle - (Color 798).
5. Color: Smokey Grey - (Color 799).
6. Color: Wintergreen - (Color CR 792).

E. Slate Tile Accessories:

1. Slate Starter Tile:
 - a. Dimensions: 13.5 inches (343 mm) in height by 12 inches (305 mm) in width.
 - b. Color to match specified Composite Slate Tiles.
 - c. Sold in bundles of 25 tiles per bundle.
 - d. 1 linear foot per tile or 25 lineal feet per bundle.
2. Hip and Ridge:
 - a. Dimensions: 18 inches (457 mm) in length by 6 inches (152 mm) in width on each side of the hip or ridge.
 - b. Color to match specified Composite Slate Tiles.
 - c. Slopes to match those specified on drawings.
 - 1) 4:12 to 8:12 pitch.
 - 2) 9:12 to 14:12 pitch.
 - d. Sold in bundles of 25 tiles per bundle.
 - e. 6 inches (152 mm) of coverage per tile or 12.5 lineal feet (3810 mm) per bundle.

2.5 COMPOSITE SHAKE TILES

A. Composite Shake Tiles: As manufactured by InSpire Roofing Products - The Tapco Group.

1. Construction: Polymer composite.
2. Height: 24 inches (610 mm).

3. Widths: Standard mix of 5 inches (127 mm), 7.5 inches (191 mm), 10 inches (254 mm).
4. Weight: 5 inch (127 mm) tile - 0.833 lbs (0.378 kg) per tile.
5. Weight: 7.5 inch (191 mm) tile - 1.19 lbs (0.54 kg) per tile.
6. Weight: 10 inch (254 mm) tile - 1.58 lbs (0.717 kg) per tile.
7. Weight of One Mixed Bundle: 28.64 lbs (12.99 kb) per bundle.
8. Sold in bundles; 24 tiles per bundle.
9. Exposure: 9.25 inches (235 mm) installed in a staggered edge pattern.
 - a. Approximately 195 tiles per square.
 - b. Approximately 8.11 bundles per square.
10. Exposure: 10.25 inches (260 mm) installed in a straight edge pattern.
 - a. Approximately 176 tiles per square.
 - b. Approximately 7.32 bundles per square.
11. Fire Resistance Classification: Class A.
12. Fire Resistance Classification: Class C.
13. Injection molded with integrated cambered design to eliminate flexing of roof tiles.
14. Service Temperature: No warping at temperatures in excess of 180F (82 C).
15. Chemical Compatibility: Minimal reactions, if any, when exposed to asphalt, oleic acid, plus others.

B. Colors:

1. Color: Weathered Grey - (Color 750).
2. Color: Cedar Brown - (Color 751).
3. Color: New Cedar - (Color 752).

C. Composite Shake Tile Accessories

1. Shake Starter Tiles:
 - a. Dimensions: 14 inches (356 mm) in length by 12.5 inches (318 mm) in width.
 - b. Color to match specified Composite Shake Tiles.
 - c. Sold in bundles: 24 tiles per bundle.
 - d. 25 lineal feet per bundle.
2. Hip and Ridge:
 - a. Dimensions: 23 inches (584 mm) in length by 6 inches (152 mm) in width on each side of the hip or ridge.
 - b. Color to match specified Composite Shake Tiles.
 - c. Slopes to match those specified on drawings.
 - 1) 4:12 to 8:12 pitch.
 - 2) 9:12 to 14:12 pitch.
 - d. Sold in bundles of 10 tiles per bundle.
 - e. 10 inches (254 mm) of coverage per piece or 8.33 lineal feet (6096 mm) per bundle.

2.6 VENTILATION

A. Ridge Vent:

1. Rigid Vent: Low profile rigid plastic ridge vent specifically designed to improve the air flow in attics, crawlspaces and rafter bays.
 - a. 11 inch (279 mm) Ridge Master Plus as provided by Mid-America Building Products - The Tapco Group.
 - b. Approved alternative.
2. NFVA: _____ Square inches in total balanced at 50 percent from ridge vent (exhaust) and 50 percent from Soffits (Intake).

B. Intake Vents:

1. Intake Vents: Already existing or CapMASTER as provided by Mid-America

Building Products or approved friction fit alternate. Units shall be installed by others and shall have an equal NFVA as the exhaust vent specified.

2. Color: Black - (Color 002).
3. Color: Brown - (Color 010).
4. Color: Light Grey - (Color 017).
5. Color: Dark Grey - (Color 018).

2.7 FASTENERS

- A. Fasteners: Corrosion-resistant ring shank fasteners which achieve a minimum 3/4 inch (19 mm) penetration into roof deck and with a minimum 3/8 inch (10 mm) flat head.
1. Stainless Steel Nails.
 2. Copper Nails.
 3. Hot-Dipped Galvanized Nails.

2.8 METAL FLASHING

- A. Metal Flashing:
1. Material: 16 oz. (450g) Copper.
 2. Material: 26 gauge Corrosion Resistant Metal such as Stainless Steel.
 3. Material: Color Clad Steel.
 4. Material: Color Clad Aluminum.
 5. Material: Galvanized Steel.
- B. Install metal flashing and other sheet metal to comply with requirements specified in Section 07600 - Flashing and Sheet Metal.

2.9 SNOW GUARDS

- A. Snow Guards: Supplied by a manufacturer regularly engaged in manufacturing of snow guards. Locate and position in accordance with manufacturer's requirements.
1. Material: Copper.
 2. Material: Stainless steel.
 3. Material: Galvalume.
 4. Material: Zinc.
 5. Material: Manufacturer approved material.

PART 3 EXECUTION

3.1 PREPARATION

- A. Removal of Existing Roofing:
1. Remove all existing roofing down to the roof deck.
 2. Verify that deck is dry, sound, clean and smooth, free of depressions, waves and projections.
 3. Repair all holes over 1 inch (25 mm) diameter and all cracks over 1/2 inch (12 mm) in width.
 4. Replace rotted or otherwise damaged decking with new materials of equal thickness.
- B. Prepare roof deck using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Roof surface must be free of water, ice, and snow prior to and during roofing project. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
1. Clean all work surfaces thoroughly prior to installation of underlayment.

2. Install crickets on the upslope side of any chimney located on a roof steeper than 6:12, or wider than 24 inches (610 mm).
 3. Where practical, install all plumbing vents and other roof penetrations prior to installation of tiles.
- C. Do not proceed with installation until roof deck has been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.2 UNDERLAYMENT INSTALLATION

- A. Install using methods recommended by manufacturer and requirements of local building code.
- B. Install leak barrier at the following locations:
1. Eaves: On all roofs, install leak barrier at least 24 inches (610 mm) beyond the interior face of the warm exterior wall.
 2. Valleys: Install a 36 inch (914 mm) wide leak barrier centered on valley.
 3. Vent Pipes: Extend leak barrier at least 24 inches (610 mm) around all roof penetrations.
 4. Rake Edges: install leak barrier along the entire length of all rake edges prior to the installation of metal drip edges.
 5. Hips and Ridges: Install leak barrier along entire lengths. Cut slots where ridge vents are present to allow proper ventilation.
- C. Felt Underlayment:
1. Install one layer of felt underlayment over all locations not covered with leak barrier. Run sheets horizontally and staple or nail in place.
 2. Where roof slope exceeds 4:12, horizontal laps shall be at least 3 inches (76 mm).

3.3 COMPOSITE SLATE INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local building code.
1. 4:12 slope: Install with 6 inch (152 mm) or 6.5 inch (165 mm) tile exposure for Class A and Class C applications.
 2. 5:12 slope and greater: Install with 6 inch (152 mm), 6.5 inch (165 mm) 7 inch (178 mm) or 7.5 inch (191 mm) tile exposure - for Class C applications.
 3. 5:12 slope and greater for Class A applications - Install with 6 inch (152 mm), 6.5 inch (165 mm) 7 inch or 7.5 inch (178 mm) tile exposure.
- B. Secure using two fasteners per tile. Where local building code requires additional fasteners, install such that they are at least 2 inches (52 mm) from all keyways, penetrations, flashings or other vertical seams. Fasteners must be long enough to penetrate at least 3/4 inch (19 mm) through plywood, into solid wood, or dimensional lumber.
- C. Install hip and ridge tiles over all hips, ridges or ridge vents. Preformed Ridge Tiles require 6 inch (152 mm) exposure and may require longer length fasteners.
- D. At all valleys, install metal flashings in accordance with manufacturer's instructions.
- E. Embed step flashings with every course of slate at all sidewalls. "L" flashings are not recommended.
- F. Flash all roof penetrations so moisture flows outward. Does not face nail exposed

metal.

- G. Follow NRCA flashing guidelines where unique flashing conditions exist or methods are not specifically addressed in the application instructions.
- H. Hand nail all Roof Tiles with ambient temperatures less than 45 degrees F (7.2 degrees C).
- I. Do not install Roof Tiles with ambient temperatures less than 32 degrees F (0 degrees C).

3.4 COMPOSITE SHAKE INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local building code.
 - 1. 4:12 slope: Install with 9.25 inch (235 mm) tile exposure for Class A and Class C applications.
 - 2. 5:12 slope and greater: Install with 9.25 inch (235 mm) or 10.25 inch (260 mm) tile exposure for Class A and Class C applications.
- B. Secure using two fasteners per tile. Where local building code requires additional fasteners, install such that they are at least 2 inches (52 mm) from all keyways, penetrations, flashings or other vertical seams. Fasteners must be long enough to penetrate at least 3/4 inch (19 mm) through plywood, into solid wood, or dimensional lumber.
- C. Install hip and ridge tiles over all hips, ridges or ridge vents. Preformed Ridge Tiles require 10 inch (254 mm) exposure and may require longer length fasteners.
- D. At all valleys, install metal flashings in accordance with manufacturer's instructions.
- E. Embed step flashings with every course of slate at all sidewalls. "L" flashings are not recommended.
- F. Flash all roof penetrations so moisture flows outward. Do not face nail exposed metal.
- G. Follow NRCA flashing guidelines where unique flashing conditions exist or methods are not specifically addressed in the application instructions.
- H. Hand nail all Roof Tiles with ambient temperatures less than 45 degrees F (7 degrees C).
- I. Do not install Roof Tiles with ambient temperatures less than 32 degrees F (0 degrees C).

3.5 VENTILATION INSTALLATION

- A. Ridge Vent:
 - 1. Cut continuous vent slot through sheathing, stopping 6 inches (150 mm) from each end of ridge.
 - 2. Cut opening at ridge 1-1/2 (36 mm) to 2 inches (51 mm) wide, centered on ridge. Stop at least 6 inches (152 mm) from rakes or valleys.
 - 3. Install ridge vent material full length of ridge, including uncut areas.
 - 4. Cover ridge vent with hip and ridge tiles as required by application instructions.

3.6 ROOF PROTECTION AND PROJECT CLOSE OUT

- A. Stage work progress to avoid foot traffic over completed sections of roofing.
- B. Where practical provide protection of installed materials from potential damage through work from other trades.
- C. Provide owner with an appropriate amount of contingency tiles for future modification or repair needs.

3.7 INSPECTION AND MAINTENANCE

- A. Inspect and clean all gutters and leaders annually. Roof tiles may become slippery when wet or covered with frost. Fall protection is recommended when working or inspecting the roof deck.
- B. Inspect roof surfaces and flashings annually and perform maintenance as necessary.
- C. Inspect all areas where flashing cement has been applied annually and re-apply as necessary.
- D. Where repairs are necessary or roof fixtures are added, do not reuse tiles that are removed. Replace tiles with those of the same type, size and color.

END OF SECTION