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## Section 07319 Max® Slate Synthetic Slate Roofing

### **PART I – GENERAL**

#### **1.01 SUMMARY**

- A. Section includes synthetic roofing as shown on the drawings, inferable therefrom and as specified.
- B. Synthetic roofing includes synthetic roof tiles, ice damage / wind-driven rain protection, moisture shedding underlayment, eave, valley, rake and ridge protection and associated metal flashing and accessories.

#### **1.02 RELATED DOCUMENTS**

- A. All of the contract documents, including General and Supplementary General Conditions and Division 1 General Requirements apply to the work of this section.
- B. Refer to the Technical Bulletin(s) and Technical Letters with regard to specific product information.

#### **1.03 DESCRIPTION OF WORK**

**(Spec Writer)** Determine scope of work and edit or add as required for project requirements.

- A. The work of this section includes furnishing and installation of a premium composite roof tile that is up to 50% recycled and 100% recyclable, with a Class A Fire Rating, Class 4 Hail Impact Rating and Wind Up-Lift / Wind-Driven Rain Rating of 110m.p.h. The self-adhering sheet underlayment membrane shall be used at critical roof areas such as eaves, valleys, ridges, rakes, dormers, and skylights to protect the structural roof deck from water penetration created by ice dams and wind-driven rain.

#### **1.04 RELATED WORK SPECIFIED ELSEWHERE**

- A. Carefully examine all of the contract documents for requirements, which affect the work of this section.
- B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

**(Spec Writer)** Select from the items below and edit or add as required for project requirements.

1. Section 06100 – Rough Carpentry
2. Section 07110 – Roofing Underlayment
3. Section 07111 – Nail-Down Roofing Underlayment
4. Section 07600 – Flashing and Sheet Metal
5. Section 07720 – Roof Accessories
6. Section 07810 – Skylights
7. Section 07900 – Joint Fillers and Sealers

#### **1.05 QUALITY ASSURANCE**

- A. **Installers:** Firms responsible for installing the above-referenced work shall have at least three (3) years experience in roofing construction and application; shall perform work in accordance with the NRCA Roofing & Waterproofing Manual and be acceptable to the synthetic roof tile manufacturer. A list of installations should be provided, identifying when, where and for whom the installations were made.
- B. **Sources:** For the synthetic roof tile material required for the work of this section, provide primary materials, which are the products of the manufacturer.

- C. **Manufacturer's Representation:** Make all arrangements and payments necessary to have manufacturer's authorized representatives on-site at beginning of synthetic roof tile application to advise installer and to ensure compliance with manufacturer's requirements.
- D. **Regulatory Requirements:** Conform to the requirements of the local building code jurisdiction for those requirements related to fire resistance, hail impact, wind uplift and roofing application.
- E. **Conference:** Convene a pre-installation conference, at project site to comply with requirements in Division 1 Section "Project Management and Coordination", to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Representatives of the General Contractor, Architect, Roofing Contractor (to include installer), Roofing Materials Manufacturer and Underlayment Materials Manufacturer shall be present three (3) days prior to start of underlayment work to inspect substrate and review installation requirements.
  - 1. Advise other trades to ensure that no other work adversely affects bonding surfaces.

## **1.06 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. E 96-95 - Standard Test Methods for Water Vapor Transmission of Materials
  - 2. D 146 - Sampling and Testing Bitumen-Saturated Felts and Woven Fabric for Roofing and Waterproofing
  - 3. D 226 - Asphalt-Saturated Organic Felt used in Roofing and Waterproofing
  - 4. C 272 - Standard Test Methods for Water Absorption of Materials
  - 5. B 370 - Copper Sheet and Strap for Building Construction
  - 6. D 412 - Standard Test Methods for Vulcanized Rubber and Elastomeric Tension
  - 7. C 666 - Standard Test Methods for Freeze / Thaw Cycle
  - 8. C 5849 - Standard Test Methods for Heat Cycling
  - 9. D 3161 - Standard Test Methods for Nail Pull Through
  - 10. D 3161 - Standard Test Methods for Nail Tear Strength
  - 11. G 154 - Standard Test Methods for Accelerated Ultraviolet Exposure.
  - 12. D 1970 – Standard Specification for Self-adhering Polymer Modified Bituminous Sheet Material used as Steep Slope Roofing Underlayment
- B. Underwriters Laboratory (UL):
  - 13. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings
  - 14. UL 2218 - Impact Resistance of Prepared Roof Covering Material
- C. Miami-Dade County:
  - 15. Protocol TAS 100-95 - Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuance Roof System

## **1.07 DEFINITIONS**

Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this section.

## **1.08 SUBMITTALS**

- A. **Product Data:** Submit manufacturers product data, installation instructions, use limitations and recommendations for each material and system specified in this section.
- B. **Samples:** Provide a minimum of four (4) synthetic roof tiles for sample material to be used for the system described herein. Provide color range, finish texture, and pattern.

## **1.09 MOCK-UPS**

- A. Provide mock-ups before beginning work of this section at location acceptable to Architect and Architect's acceptance of visual qualities, and set quality standards for materials and execution. Protect and maintain acceptable mock-ups throughout the work of this section to serve as criteria for acceptance of this work. Acceptable mock-ups may be incorporated into the finish work.

## **1.10 DELIVERY, STORAGE AND HANDLING**

- A. Deliver material and products to the job site in original, unopened package, clearly labeled with the manufacturer's identification and printed instructions. All material shall be delivered **25** pieces per bundle, **40** bundles per pallet and shall be stored unopened until roof is ready for installation. Do not double-stack pallets. Protect from damage.
1. Synthetic roof tiles should be stored in original packaging in a storage facility where the temperature meets or exceeds **32°F**. Use protection coverage over all pallets while being temporarily stored on-site. Synthetic roof tiles must be kept at a minimum of **32°F** for twenty-four (24) hours prior to use. Do not double-stack pallets.

## **1.11 PROJECT CONDITIONS**

- A. **Conditions:** Perform work when existing and forecasted weather permit work to be performed in a safe and professional manner and when ambient conditions are within the limits established by manufacturers of the materials and products used.
- B. **Storage:** Synthetic roof tiles should not be stored on roof decks in such a manner as to over-stress and / or damage the deck and supporting structure.
- C. **Units of Work:** Units of work should be established (including removal of existing material in a re-roof project), preparation of existing surfaces, completion of penetration work, application of underlayment and related temporary and / or protected daily from the threat of inclement weather.

## **1.12 WARRANTY**

- A. Provide the written Limited Warranty signed by manufacturer agreeing to repair or replace product, which exhibits defects in materials. "Defects" is defined to include, but not limited to: abnormal aging or deterioration, delamination and failure to perform as intended for use. The warranty excludes products not manufactured by roof tile manufacturer and certain damage. Failure to comply with the installation procedures or adherence to local roofing and building requirements may void the Warranty. The Warranty period shall be as follows:
- B. **Synthetic Roof Tile:** Fifty (50) years from date of substantial completion.

## **1.13 MAINTENANCE**

**Extra Materials:** Provide a minimum of 2% of the required synthetic roof tile units for each color used in the work or a minimum of ten (10) square feet for each color used in the work.

## **PART II – PRODUCTS**

### **2.01 SYNTHETIC ROOF TILE**

- A. Provide a synthetic roof tile with a proprietary blend of natural materials (including limestone), polymers, rubber, ultra violet stabilizers, colorants that contain no asphalt and are 100% recyclable. The roof tile shall be Durable and possess a Class 4 Hail Impact Rating; Fire Resistant and possess a Class A Fire Rating; Rigid and possesses a 110 M.P.H. Wind Uplift / Wind-Driven Rain Rating, with a Fifty (50) year Limited Warranty. The synthetic roof tile shall be Max® Slate as manufactured by Max Manufacturing, LLC.
- B. The synthetic roof tile properties shall be as follows:

<b>PARAMETER</b>	<b>STANDARD</b>	<b>VALUE</b>
Moisture Absorption	ASTM C-272	No appreciable weight gain
Freeze / Thaw Cycling	ASTM C-666	No signs of dimensional change after 300 cycles
Water Permeation	ASTM E-96-95	Shown to be impermeable and no signs of splitting or cracking
Accelerated Ultra Violet Exposure	ASTM G-154	Virtually no surface fade exhibited after 95,00 hours
Fire Rating	ASTM E-108 UL - 790	Class A rating with 30# felt with ½" minimum plywood deck
Hail Impact	UL-2218	Class 4 rating—no sign of indentation nor damage
Wind Driven Rain	TAS 100-95 Dade County	110 mph—neither water infiltration nor roof tile blow offs
Nail Pull Through	ADTM D-3161-03	Requires force greater than 350 psi
Nail Tear Strength	ASTM D-3161-03	Requires force greater than 300 psi
Heat Cycling	ASTM D-5849-95	No signs of cracking, spalling, curling or deformation

### C. Product Characteristics:

- a. Thickness: ¼" at exposed area, tapering to 1/8" at opposite end.
  - b. Surface Texture: Rough.
  - c. Size: 18" long by 12" wide with 1/8" spacer tabs.
  - d. Profile: Six (6) distinct surface edges.
  - e. Shape and Edge: Square cut, weathered edge.
  - f. Design: Combined shape with recessed fastener ports ½" in diameter.
  - g. Color: Using a color-through process, color shall be specific blend to match Architect's sample.
  - h. Weight: 1.4 lbs. each (approximate).
  - i. Fitness for purpose: No broken or cracked shingles, exposed corners and no broken corners on covered ends that could sacrifice nailing strength or application of a water-tight roof.
  - j. Manufacturer: Compression formed and not injection molded.
  - k. Chemical Compatibility: reaction minimal, if any, when exposed to asphalt, oleic acid plus others.
  - l. Contraction and Expansion: coefficient of movement not to exceed .06% in mass and <.1% in thickness.
  - m. In Service Temperature: no warping at temperatures in excess of 295°F.
  - n. Composition: Recycled, virgin resins ensure high quality and consistency in raw materials.
- D. Provide pre-formed hip and ridge units to match color of the roof tiles at the appropriate roof pitch. Two Ridge cap tiles will be required for every twelve (12) inches of ridge.

### 2.02 Underlayments

- A. **Ice dam / wind-drive rain protection:** ASTM D 1970, minimum of 40 mils thick; slip resisting, polyethylene film reinforced top surface laminated to SBS-modified asphalt adhesive, with treated release-paper backing; cold applied. Provide primer for adjoining concrete or masonry surface to receive underlayment.
- B. **Saturated felt underlayment:** ASTM D 226, Type II, asphalt-saturated 30# organic felt, unperforated.

## PART III – EXECUTION

### 3.1 Safety & Building Code

Good and proven safety practices should be followed, as with all general construction and roofing. All roofing procedures should be performed in accordance with the local building codes for the area. Failure to comply may void the Warranty. Personnel who are working on the roof should wear proper footwear, which will not damage the Product, and footwear soles shall be made of a material, which will aid in preventing falls.

### 3.2 Examination & Preparation

Examine substrates, areas and conditions, with the installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

- A. Examine roof of sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerance.
- B. Verify that substrate is sound, firm, dry, smooth, clean, sloped for drainage and completely anchored and foreign particles shall be cleaned from interlocking areas to ensure proper seating and to prevent ice and water damming and that provision has been made for flashings and penetrations through roofing.
- C. Do not proceed until unsatisfactory conditions have been corrected.
- D. Class A Fire Rated projects require installation on a minimum of ½" plywood deck.

### 3.3 Roof underlayment Installation

- A. **Single-Layer 30# Felt Underlayment:** Felt should be preserved unbroken, tight and whole. Install perpendicular to roof slope in parallel courses. Lap sides a minimum of 3" over underlying course. Lap ends a minimum of 6". Stagger end laps between succeeding courses at least 72". Fasten with felt underlayment nails.

1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than 3" in direction to shed water. Lap ends of felt not less than 6" over self-adhering sheet underlayment.
- B. **Self-adhering Sheet Underlayment – Rake & Eave:** Install wrinkle free, complying with low temperature installation restrictions of underlayment manufacturer, if applicable. Install at locations indicated on drawings and described below, lapped in direction to shed water. Lap sides not less than 4". Lap ends not less than 6", staggered 24" between courses. Roll all laps with a roller. Cover underlayment within the manufacturers' requirement period. Roof tile manufacturer does not warrant underlayment.
1. For ice and water dam protection, membranes shall be applied to reach a point above the highest expected level of ice dams.
  2. Membrane shall not be folded onto an exposed face of the roof edge.
  3. Prime concrete and masonry surfaces to receive the self-adhering membrane sheet.
  4. Extend from edges of eaves 24" beyond the interior face of exterior walls.
  5. Extend 18" beyond penetrating elements (Dormers, Chimneys, Skylights, and Other penetrating elements), and return vertically against penetrating elements not less than 6".
- C. **Metal-Flashed Open-Valley Underlayment:** Install 2 layers of 36" wide 30# felt underlayment centered in the valley. Stagger end laps between layers at least 72". Lap ends of each layer at least 12" in direction to shed water and seal with asphalt roofing cement. Fasten each layer to roof deck with felt underlayment nails.
1. Lap felt underlayment over first layer of valley felt underlayment at least 6".
- D. **Self-Adhered Sheet Underlayment—Valley & Ridge:** Apply the membrane according to the Manufacturers' installation instructions. Membrane shall be peeled and centered over the valley or ridge, then draped and pressed in place, working from the center of the valley or ridge outward and in each direction. For valleys, membrane shall be applied, starting at the low point of the valley and working upward. All laps should be rolled with a roller.

### **3.4 Metal Flashing Installation**

- A. Install metal flashing and other sheet metal to comply with requirements in Division 7 Section, "Sheet Metal Flashing and Trim."
1. Install metal flashings according to recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
  2. Metal flashing shall be shown at intersections of vertical or projecting surfaces through the roof or against which the roof abuts, such as walls, parapets, dormers, skylights and sides of chimneys.
  3. Roof tile manufacturer recommends flashing metal to be from copper, stainless steel or an equally long-term material.
  4. Flashing installation shall be in accordance with Division 7 Section 07600 for sheet metal work.

### **3.5 Synthetic Roof Tile Installation**

- A. After installing the underlayment and before installing the roof tiles, clean the surface of debris and dirt. Foreign particles shall be cleaned and removed from interlocking areas to ensure proper seating of the product and to prevent moisture intrusion and ice damming. All roof protrusions shall be properly flashed and secured into position, with deck and underlayment fasteners properly driven and not protruding, prior to installing the roof tile product.
1. Starter tiles must be cut, if not ordered pre-cut. Cut the amount off the exposed end of the roof tile for the desired amount of exposure.
  2. These cut roof tiles will be used as the first row at the eave of the roof.
  3. To create the offset from row to row, use the center mark provided on each roof tile and cut the roof tile lengthwise. This ensures that the nail holes are covered with the next row of roof tiles.
  4. Strike the blue chalk lines horizontally, at the exposure level desired, to ensure that the roof tiles are installed straight and uniform.
  5. Spacer Tabs are provided on each roof tile to ensure consistent spacing between roof tiles.
  6. There shall be no through joints from the roof surface to the underlayment.
  7. Severe weather conditions may require increased bonding of the roof tiles.
  8. The application of MaxPrime primer and MaxSeal adhesive/sealant to the underside and surface of the roof tiles may be required in order to achieve this result.

- B. Each synthetic roof tile shall be fastened with a minimum of two copper or stainless nails or two stainless screws of sufficient length to penetrate the roof decking at least  $\frac{3}{4}$ ".
  - 1. It is recommended that the fasteners be placed in the receiving area as provided on each roof tile.
  - 2. Caution should be taken where the underside of the roof decking is exposed to view, such as in an overhanging eave, where the nails should be long enough to penetrate the roof decking but not so long that they may be driven through the decking.
  - 3. Exposed roof nails are permissible only in top courses, where unavoidable, and should be covered with elastic cement, but preferably with our MaxSeal adhesive/sealant.
- C. Hip & Ridge Slate installation requires the roof tile to be nailed or screwed in place.
  - 1. Cover heads of fasteners with elastic cement, but preferably with our MaxSeal adhesive/sealant.
  - 2. Preformed Ridge roof tiles require a 6" exposure and may require longer length fasteners than those used in the field of the roof.
  - 3. Fasteners deck penetration must be a minimum of  $\frac{3}{4}$ " in depth.
- D. Either an open or closed valley design may be used.
  - 1. With an open valley design leave a minimum of 2" on each side of the center of the valley exposed and uncovered by the roof tiles. V—Style or W—Style Valley metal may be used.
  - 2. With a closed valley design cut the roof tiles in a straight line to fit no closer than  $\frac{3}{8}$ " against the roof tile of adjoining roof slope.

### **3.6 Precautions and Limitations**

- A. Roof tiles may be slippery when wet or covered with frost. Fall protection equipment is required when working on a roof deck.
- B. Roof tiles should be stored in temperatures above 32°F and the ambient temperature of the Product must be at a minimum of 32°F during installation in order to avoid splintering and / or cracking of the roof tiles.
- C. Do not leave debris under the tiles while installing that will prevent the cambered design of the roof tile from overlapping on the course below, thus allowing the potential to build up from moisture and or ice dams.
- D. Use accessory products with a life cycle as equally long-term as the roof tiles.

### **3.7 Repair and Clean Up**

- 1. Repair and replace damaged and / or broken roof tiles.
- 2. Remove excess roof tiles and debris from jobsite.

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**End of Section**