

SECTION 07 31 39

SYNTHETIC SLATE SHINGLES

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by the following method in Microsoft Word:

Display the FILE tab on the ribbon, click OPTIONS, then DISPLAY. Select or deselect HIDDEN TEXT.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Synthetic slate shingles, underlayment, flashings, fasteners, and accessories.
- B. Related Requirements:
 - 1. Division 01 - General Requirements: Administrative, procedural, and temporary work requirements.
 - 2. Section [07 62 00 - Sheet Metal Flashing and Trim.] [____ - ____.]
 - 3. Section [07 92 00 - Joint Sealers.] [____ - ____.]

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM) (www.astm.org):
 - 1. D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - 2. D3161/D3161M - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
 - 3. D3462/D3462M - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
 - 4. E108 - Standard Test Methods for Fire Tests of Roof Coverings.
 - 5. G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. California Department of Forestry and Fire Prevention (Cal-Fire) (www.fire.ca.gov) - Listing Service.
- C. Florida Building Code (FBC) (www.floridabuilding.com) Testing Application Standard (TAS) 125 - Test for Uplift Resistance on Roof Assemblies.
- D. Miami Dade County, FL. (www.miamidade.gov)
- E. National Research Council Canada, Canadian Construction Materials Centre (NRCC CCMC) (www.nrc-cnrc.gc.ca) - Evaluation Report 14094-R.
- F. Texas Department of Insurance. (www.tdi.texas.gov)
- G. Underwriters Laboratories (UL) (www.ul.com):
 - 1. 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings.
 - 2. 2218 - Standard for Impact Resistance of Prepared Roof Covering Materials.
- H. International Code Council (ICC) (www.iccsafe.org) - ES Acceptance Criteria AC07 Section 4.9.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Convene at Project site [2] [] weeks prior to beginning work of this Section.
 - 2. Attendance: [Architect,] [Contractor,] [Construction Manager,] installer, and related trades.
 - 3. Review and discuss:
 - a. Installation procedures and manufacturer's recommendations.

- b. Safety procedures.
- c. Coordination with installation of other work.
- d. Availability of materials.
- e. Preparation and approval of substrate and penetrations through roof.
- f. Other items related to successful execution of work.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Show shingle layout, method of attachment, flashings, trim, conditions at eaves, intersections with adjacent materials, and other installation details.
 - 2. Product Data: Manufacturer's data sheets on each product including:
 - a. Shingles, underlayment, flashings, fasteners, and accessories:
 - 1) Indicate composition, properties, and dimensions.
 - 2) Show compliance with specified requirements.
 - b. Preparation instructions and recommendations.
 - c. Storage and handling requirements and recommendations.
 - d. Installation methods.
 - 3. Samples:
 - a. Selection Samples: Two sets of color chips representing manufacturer's full range of available colors and surface textures.
 - b. Verification Samples: After selection, submit two samples representing actual product, color, and texture.
- B. Sustainable Design Submittals: Refer to Division 01.
- C. Maintenance Material Submittals: Provide [] square feet of extra shingles.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of synthetic shingles.
- B. Installer Qualifications: Minimum [3] [] years experience in work of this Section.
- C. Mockup:
 - 1. Provide mockup of shingles, underlayment, and related flashings.
 - 2. Size: Minimum [8 x 8] [] x [] feet.
 - 3. Locate [where directed.] [].
 - 4. Approved mockup [may] [may not] remain as part of the Work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Ship shingles in bundles:
 - 1. Collate in sequence of widths and colors as required for selected color blend.
 - 2. Assemble bundles so that sorting at job site is not required.
- B. Deliver shingles to site in manufacturer's unopened, labeled bundles.
 - 1. Verify quantities and condition upon delivery.
 - 2. Remove damaged products from site.
- C. Store products in protected environment, off ground, protected moisture, traffic, and construction activities.
- D. Store shingles flat. Do not store on site for prolonged period.
- E. Store products at temperature between 40 and 120 degrees F (4 degrees C and 49 degrees C).
- F. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

1.7 SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Observe manufacturer's temperature, humidity, and moisture limits.
 - 2. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTIES

- A. Furnish manufacturer's 50 years warranty against breakage and deterioration resulting in leaks under normal weather and use conditions.
- B. Furnish installer's 2 years total roof system warranty against water penetration, including underlayment, flashings, trim, and other roof components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: DaVinci Roofscapes, LLC, 800-DAVINCI, www.davinciroofscapes.com.
- B. Substitutions: [Refer to Division 01.] [Not permitted.]

2.2 MATERIALS

- A. Performance Requirements:
 - 1. Roof system: Manufactured synthetic shingles attached to structural substrate to form weather tight roof envelope with no measurable water penetration.
 - 2. Method of attachments designed to adequately resist wind uplift for roof configuration and Project location.
 - 3. Meet minimum uplift resistance of [93] [186] PSF with 2:1 safety factor in accordance with TAS 125.
- B. Synthetic Slate Shingles:
 - 1. Description: Lightweight, synthetic slate shingles with appearance, color, texture, and thickness of quarried shakes.
 - 2. Product: Multi-Width Slate by DaVinci Roofscapes, LLC.
 - 3. Material: Engineered polymer formulated from 100 percent virgin plastic resins; recycled materials not acceptable.
 - 4. Performance characteristics:
 - a. Fire resistance, installed over one ply ASTM D226/D226, No. 30 asphalt saturated felt: Class A, tested to ASTM E 108.
 - b. Class A rated by Cal-Fire.
 - c. Water absorption: 0.18 percent by weight, tested to ASTM D471.
 - d. Impact resistance: Class 4, tested to UL 2218.
 - e. Nail pull through resistance: 138 foot-pounds at 72 degree F (187 joules at 22 degrees C) and 166 foot-pounds at 32 degrees F (225 joules at 0 degrees C), tested to ASTM D3462/D3462M.
 - f. Freeze-thaw resistance: No crazing, cracking, delamination of coating, or other deleterious surface changes after one month exposure with temperature cycled from minus 40 to plus 180 degrees F (0 degrees to 82 degrees C) in 22 hours, tested to ICC ES Acceptance Criteria AC07 Section 4.9.
 - g. Accelerated weathering: Little change after 2,500 hours exposure to ultraviolet radiation, elevated temperature, moisture, and thermal shock.
 - h. Fungus resistance: No algae growth when inoculated with blue green algae in warm, damp environment for 4 to 6 weeks, tested to ASTM G21.
 - i. Approved by NRCC CCMC.
 - 5. Installed weight:
 - a. 6 inch (152 mm) exposure: 342 pounds per 100 square feet (16.5 kg/sq. m).

- b. 7 inch (178 mm) exposure: 293 pounds per 100 square feet (14.3 kg/sq. m).
- c. 7-1/2 inch (191 mm) exposure: 273 pounds per 100 square feet (13.3 kg/sq. m).
- 6. Profile:
 - a. Rectangular shape with exposed-to-view upper surface and edges textured to resemble natural slate.
 - b. Underside formed with reinforcing ribs.
- 7. Size:
 - a. Thickness: Varies from 1/8 inch (3 mm) at top to 1/2 inch (13 mm) at bottom.
 - b. Length: 18 inches (457 mm).
 - c. Widths: Variable widths from 6, 7, 9, 10, and 12 inches (152, 178, 229, 254, and 305 mm) to create appearance of random sized natural slate.
 - d. 4 inch (102 mm) wide shingles for roofing turrets and domes.
- 8. Starter shingle: 12 inches (305 mm) long x 12 inches (305 mm) wide.
- 9. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guide lines for different exposure lengths.
- 10. Color:
 - a. Provide shingles in multiple colors comparable to natural slate.
 - b. Provide ultraviolet protection consisting of internal stabilizer.
- 11. Shingle pattern:
 - a. Provide shingles factory blended in multiple colors and widths.
 - b. Blend: [Aberdeen.] [Canyon.] [Castle Gray.] [European.] [Evergreen.] [Slate Black.] [Slate Gray.] [Smokey Gray] [Sonora.] [Vineyard.] [Weathered Green.] [Custom.]

*** OR ***

C. Synthetic Slate Shingles:

- 1. Description: Lightweight, synthetic slate shingles with appearance, color, texture, and thickness of natural quarried slate.
- 2. Product: Single Width Slate by DaVinci Roofscapes, LLC.
- 3. Material: Engineered polymer formulated from 100 percent virgin plastic resins; recycled materials not acceptable.
- 4. Performance characteristics:
 - a. Approvals:
 - 1) ICC-ES ESR-2119.
 - 2) Texas Department of Insurance.
 - 3) Miami Dade County, FL.
 - 4) Class A rated by Cal-Fire.
 - b. Fire resistance rating: Class A, tested to ASTM E108.
 - c. Impact resistance rating: Class 4, tested to UL 2218.
 - d. Wind resistance rating: 110 MPH, tested to ASTM D3161/D3161M.
 - e. Approved by NRCC CCMC.
- 5. Profile:
 - a. Rectangular shape with exposed-to-view upper surface and edges textured to resemble quarried slate.
 - b. Underside formed with reinforcing ribs.
- 6. Size:
 - a. Thickness: 1/2 inch (13 mm) at butt end, 1/8 inch (6 mm) at top.
 - b. Length: 18 inches (457 mm).
 - c. Width: 12 inches (305 mm).
- 7. Starter shingle: 12 inches (305 mm) long x 12 inches (305 mm) wide.
- 8. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guidelines for different exposure lengths.
- 9. Color:
 - a. Multiple colors comparable to quarried slate.
 - b. Provide internal ultraviolet stabilizers.
- 10. Shingle pattern:
 - a. Provide shingles factory blended in multiple colors and widths:
 - b. Blend: [Canyon] [Castle Gray] [European] [Evergreen] [Slate Black] [Slate Gray] [Smokey Gray] [Sonora] [Weathered Green] [Custom]

2.3 ACCESSORIES

- A. Underlayment: ASTM D226/D226M, Type II, No. 30 non-perforated saturated asphalt felt.
- B. Underlayment: ASTM D3909, coated cap sheet.
- C. Waterproof Sheet Membrane: Cold applied, self-adhering waterproof membrane composed of polyethylene film coated one side with rubberized asphalt adhesive.
 - 1. Thickness: 40 mils (1 mm).
 - 2. Low temperature flexibility: Unaffected at minus 32 degrees F (minus 36 degrees C).
 - 3. Minimum tensile strength: 250 PSI (1724 kPa).
 - 4. Minimum elongation: 250 percent.
 - 5. Permeance: Maximum 0.05 perms.
- D. Flashing:
 - 1. Fabricate from sheet to profiles and dimensions indicated on Drawings and approved **Shop Drawings, in accordance with Section [07 60 00.] [_____.]**
 - 2. Material: **[16 ounce copper.] [26 gage (0.455 mm) galvanized steel.]**
 - 3. Linear components: Form in longest possible lengths, 8 feet (2.5 m) minimum.
 - 4. Counterflashings: Extend minimum 4 inches (102 mm) up vertical surfaces and minimum 4 inches (102 mm) under shingles.
 - 5. Valley flashings: Minimum 24 inches (610 mm) wide, extending minimum 10 inches (254 mm) from valley center line.
 - 6. Eave flashings: Fabricate with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- E. Fasteners:
 - 1. 3/8 inch (9.5 mm) flat head nails, 1-1/2 inches (38 mm) long.
 - 2. Material: **[Copper.] [Stainless steel.] [Hot-dipped galvanized steel.]**
- F. Snow Guards: **[_____.]**

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect roof framing and substrate.
 - 1. Verify that roof is complete, rigid, and braced, and that deck members are securely fastened.
 - 2. Ensure that proper ventilation has been provided for roof space.
 - 3. Verify that roof deck is clean, dry, and ready to receive shingles.
 - 4. Remove dirt, loose fasteners, and protrusions from roof surface.

3.2 INSTALLATION - GENERAL

- A. Install self-adhered waterproof sheet membrane on eaves. Cover waterproof sheet membrane and remaining portions of roof with approved underlayment. Install waterproof sheet membrane in valleys, along walls, and around projections terminating on top of underlayment.
- B. Underlayment:
 - 1. Stripping ply: Install full sheet of self-adhered waterproof sheet membrane in valleys, and minimum 18 inch (457 mm) width on gable ends, against walls, and around projections.
 - 2. In areas where January average daily temperature is 25 degrees F (minus 4 degrees C) or lower or where ice buildup is possible, install self-adhered waterproof sheet membrane from bottom edge extending two feet (610 mm) above exterior wall line on eaves.
 - 3. Install waterproof sheet membrane over full roof area.

- a. Apply waterproof sheet membrane at temperatures of 40 degrees F (4 degrees C) or higher.
 - b. Adhere and attach as recommended by manufacturer of waterproof sheet membrane.
 - c. Start underlayment installation at lower edge of roof. Install perpendicular to roof slope with minimum 4 inch (102 mm) side laps and minimum 6 inch (152 mm) end laps.
 - d. Extend underlayment minimum 4 inches (102 mm) up vertical wall intersections.
 - e. Do not leave underlayment membrane exposed in excess of time limit required by manufacturer. Do not puncture or tear underlayment.
- C. Underlayment/Slip Sheet: Install one ply asphalt felt over full roof area, with ends weather lapped minimum 4 inches (102 mm). Nail in place with roofing nails spaced in accordance with manufacturer's recommendations.

3.3 FLASHING INSTALLATION

- A. Install drip edge on eaves, gable ends, and metal flashings at valleys, ridges, hips, roof curbs, penetrations, and intersections with vertical surfaces, in accordance with Section [07 62 00.] [____.]
- B. Weather lap joints minimum 2 inches (52 mm) and seal with sealant as specified in Section [07 92 00.] [____.]
- C. Secure in place with clips, nails, or other fasteners.

3.4 SHINGLE INSTALLATION

- A. Install shingles in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Install shingles so that breaks between shingles in adjacent courses are offset of 1-1/2 inches (38 mm).
- C. Do not install shingles of same color in contact or shingles of same width side by side.
- D. Exposure: [Install shingles in straight pattern with exposure specified and bottom shingle edges evenly aligned.] [Install shingles in staggered pattern with exposure specified and bottom edges of adjacent shingles staggered 1 inch (25 mm).]
- E. Spacing: Provide 3/16 to 3/8 inch (4.76 to 9.5 mm) gap between shingles.
- F. Stagger shingle joints in one course minimum 1-1/2 inches (38 mm) from joints in course below.
- G. Eaves:
 - 1. Install row of starter shingles at eaves as base layer.
 - 2. Project eave shingles approximately 1 inch, as required to allow water to drain, or 1/8 inch (3 mm) past overhanging drip edge.
- H. Gables: Project shingles approximately 3/4 inch (19 mm) beyond gable rakes or 1/8 inch (3 mm) past overhanging drip edge.
- I. Ridges and Hips:
 - 1. After field shingle installation is complete, install double row of shingles over 6 inch (152 mm) wide metal flashing.
 - 2. Ridges: Use 7 inch (178 mm) wide shingles with 6 inch (152 mm) exposure. Start ridge shingles at leeward end. Face shingle laps away from prevailing wind.
 - 3. Hips: Use 7 inch (178 mm) wide shingles with 6 inch (152 mm) exposure. Start hip course at eave.
- J. Fastening: Attach each shingle to deck with two nails:
 - 1. Place nails at locations indicated on shingles.

2. Ensure full penetration but do not overdrive nails.
 3. Do not nail at an angle.
 4. Ensure that nail head is flush with shingle surface.
 5. At valleys do not nail shingles within 5 inches (127 mm) of valley center line.
- K. In areas where snow accumulation is possible, snow guards are recommended.

3.5 FIELD QUALITY CONTROL

- A. Inspect units as they are installed. Do not install cracked, broken, twisted, curled, or otherwise damaged units.
- B. As work progresses, exercise care not to scratch or mar installed shingles. Replace damaged shingles.
- C. After approximately 200 units have been installed, inspect roof from ground. Verify proper layout and appearance. Repeat inspection every 200 shingles.
- D. Visually inspect completed installation for weathertight condition.

3.6 PROTECTION

- A. Protect installed roofing until completion of Project.
- B. Do not allow traffic on completed roof.

3.7 ADJUSTING

- A. Replace damaged shingles prior to Substantial Completion.

END OF SECTION