



SECTION 07310

SHINGLES

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Synthetic shake shingles, underlayment, flashings, fasteners, and accessories.
- B. Synthetic slate shingles, underlayment, flashings, fasteners, and accessories.
- C. Synthetic roof tiles, underlayment, flashings, fasteners and accessories.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Wood joist framing and wood deck to receive shake shingle roofing.
- B. Section 07600 - Flashing and Sheet Metal: General requirements for fabrication of sheet metal flashings and trim.
- C. Section 07600 - Flashing and Sheet Metal: General requirements for fabrication of gutters and downspouts.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D226 - Asphalt Saturated Organic Felt Used in Roofing and Waterproofing.
 - 2. ASTM D3161 - Test method for wind-resistance of asphalt shingles.
 - 3. ASTM D3462 - Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
 - 4. ASTM E108 (UL 790) - Fire Tests for Roof Coverings.
 - 5. ASTM G21 - Determining Resistance of Synthetic Polymeric Material to Fungi.
- B. Florida Building Code Testing Application Standard (TAS): TAS 125 - Test for Uplift Resistance on Roof Assemblies
- C. Underwriters Laboratories (UL):
 - 1. UL 997 - Wind Resistance of Prepared Roof Covering Materials.
 - 2. UL 2218 - Impact Resistance of Prepared Roof Covering Materials.

1.4 PERFORMANCE REQUIREMENTS

- A. Shake roof system to consist of manufactured synthetic shakes attached to structural substrate to form weather tight roof envelope with no measurable water penetration.
- B. Slate roof system to consist of manufactured synthetic slate shingles attached to structural substrate to form weather tight roof envelope with no measurable water penetration.
- C. Tiles shall be manufactured with variations in color and size, textured faces and edges, and sufficient thickness to provide a realistic installed appearance.
- D. Method of attachments shall be designed to adequately resist wind uplift for roof configuration and project location. Roof assembly meet minimum uplift resistance of 186 psf or 93 psf with a 2:1 safety patch in accordance with TAS 125.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Shingles, underlayment, flashings, fasteners, and accessories indicating composition, properties, and dimensions. Provide data showing compliance with specified requirements.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Shop Drawings: Drawings illustrating shingle layout, method of attachment, flashings, trim, conditions at eaves, intersections with adjacent materials, and other installation details.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and surface textures.
- E. Verification Samples: For each finish product specified, two samples, representing actual product, color, and texture.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturer of synthetic shingles.
- B. Installer Qualifications: Company specializing in installing shingle roof systems with 3 years minimum experience.
- 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, color, and pattern are approved by Architect.
 - 3. Rework mock-up area as required to produce acceptable work.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference at the site prior to commencing work of this Section: Require attendance of entities directly concerned with roof installation.

Agenda shall include:

1. Installation procedures and manufacturer's recommendations.
2. Safety procedures.
3. Coordination with installation of other work.
4. Availability of roofing materials.
5. Preparation and approval of substrate and penetrations through roof.
6. Other items related to successful execution of work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Ship in bundles of shingles. Collate shingles in sequence of widths and colors as required for selected color blend. Bundles shall be assembled such that sorting at job site is not required.
- B. Deliver shingles to site in manufacturer's unopened, labeled bundles. Promptly verify quantities and condition. Immediately remove damaged products from site.
- C. Store products in protected environment, clear of ground and moisture, and protected from traffic and construction activities. Store shingles flat. Do not store on site for prolonged period.
- D. Store synthetic shake products at temperature between 40 and 120 degrees F (4 degrees C and 49 degrees C).
- E. Store synthetic slate 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 local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity, and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. Warranty Requirements:
 1. Manufacturer's 50 years warranty for shingles against breakage and deterioration that causes leaks under normal weather and use conditions.
 2. Installer's 2 years total roof system warranty including underlayment, flashings, trim, and other roof components against water penetration.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: DaVinci Roofscapes, LLC, which is located at: 1413 Osage Ave. ; Kansas City, KS 66105; Toll Free Tel: 800-DAVINCI; Tel: 913-599-0766; Email: [request info \(mstone@davinciroofscapes.com\)](mailto:mstone@davinciroofscapes.com); Web: www.davinciroofscapes.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of

Section 01600.

2.2 SYNTHETIC SHAKE SHINGLES

- A. Lightweight, synthetic shake shingles with the appearance, color, texture, and thickness of natural wood shakes.
1. Product: DaVinci Shake as manufactured by DaVinci Roofscapes, LLC.
 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable.
 3. Attributes:
 - a. Fire resistance when installed over one ply Elk Versashield Interlayment: Class A tested in accordance with ASTM E108/UL 790.
 - b. Fire resistance when installed over two plies MB Technology TU 35 underlayment: Class A tested in accordance with ASTM E108/UL 790.
 - c. Fire resistance when installed over two plies Fontana VulcaSeal G4; Class A Tested in accordance with ASTM E108/UL 790.
 - d. Water absorption: 0.18 percent by weight tested in accordance with ASTM D47 1.
 - e. Impact resistance: Class 4 to withstand two drops of 2 inches (52 mm) diameter, 1.2 pounds (0.54 kg) steel ball dropped from 20 feet (6 m) tested in accordance with UL2218.
 - f. 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 in accordance with ASTM D3462.
 - g. Freeze-thaw resistance: No crazing, cracking, delamination of coating, or other deleterious surface changes after one month exposure with temperature cycled from -40 to +180 degrees F (0 degrees to 82 degrees C) in 22 hours tested in accordance with International Code Council (ICC) - ES Acceptance Criteria AC07 Section 4.9.
 - h. Accelerated weathering: Little change after 2,500 hours exposure to ultraviolet (UV) radiation, elevated temperature, moisture, and thermal shock.
 - i. Fungus resistance: No algae growth when inoculated with blue green algae in warm, damp environment for 4 to 6 weeks tested in accordance with ASTM G21.
 - j. Installed weight:
 - 1) At 9 inches (229 mm) exposure: 342 pounds per square (16.5 kg/sq. m).
 - 2) At 10 inches (254 mm) exposure: 304 pounds per square (15 kg/sq. m).
 4. Profile: Rectangular shape with exposed to view upper surface and edges textured to resemble natural wood shake. Underside formed with reinforcing ribs for added strength and stability.
 5. Size: Shake.
 - a. Thickness: Varies from 1/4 inch (6 mm) at top to 5/8 inch (16 mm) at bottom.
 - b. Length: 22 inches (559 mm).
 - c. Variable widths: 4, 6, 7, 8, and 9 inches (102, 152, 178, 203 and 229 mm) to create appearance of random sized natural wood shake.
 6. Starter Shingle: Provide 12 inches (305 mm) long by 12 inches (305 mm) wide.
 7. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guide lines for different exposure lengths.
 8. Color: Provide shingles in multiple colors comparable to natural wood shakes. Provide internal UV stabilizers to provide durable color stability.

9. Shingle Pattern: Provide shingles factory blended in multiple colors and widths to create installed appearance designated as follows:
 - a. Autumn Blend by DaVinci Roofscapes, LLC.
 - b. Mountain Blend by DaVinci Roofscapes, LLC.
 - c. Tahoe Blend by DaVinci Roofscapes, LLC.
 - d. Weathered Gray Blend by DaVinci Roofscapes, LLC.
 - e. New Cedar Blend by DaVinci Roofscapes, LLC.
- B. Lightweight, synthetic shake shingles with the appearance, color, texture, and thickness of natural wood shakes.
1. Product: DaVinci Fancy Shake as manufactured by DaVinci Roofscapes, LLC.
 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable.
 3. Attributes:
 - a. Fire resistance when installed over one ply MB Technology TU 35 underlayment: Class A tested in accordance with ASTM E108/UL 790.
 - b. Water absorption: 0.18 percent by weight tested in accordance with ASTM D47 1.
 - c. Impact resistance: Class 4 to withstand two drops of 2 inches (52 mm) diameter, 1.2 pounds (0.54 kg) steel ball dropped from 20 feet (6 m) tested in accordance with UL2218.
 - d. 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 in accordance with ASTM D3462.
 - e. Freeze-thaw resistance: No crazing, cracking, delamination of coating, or other deleterious surface changes after one month exposure with temperature cycled from -40 to +180 degrees F (0 degrees to 82 degrees C) in 22 hours tested in accordance with International Code Council (ICC) - ES Acceptance Criteria AC07 Section 4.9.
 - f. Accelerated weathering: Little change after 2,500 hours exposure to ultraviolet (UV) radiation, elevated temperature, moisture, and thermal shock.
 - g. Fungus resistance: No algae growth when inoculated with blue green algae in warm, damp environment for 4 to 6 weeks tested in accordance with ASTM G21.
 - h. Installed weight: At 7 inch (178 mm) Exposure: 304 pounds per square (16.5 kg/sq. m).
 4. Profile: Rectangular shape with exposed to view upper surface and edges textured to resemble natural wood shake. Underside formed with reinforcing ribs for added strength and stability.
 5. Size: Fancy Shake.
 - a. Thickness: 7/16 inch (11 mm) at butt end.
 - b. Length: 18 inches (457 mm).
 - c. Variable widths: 5, 7 and 12 inches (127, 178 and 305 mm).
 6. Starter Shingle: Provide 12 inches (305 mm) long by 12 inches (305 mm) wide.
 7. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guidelines for different exposure lengths.
 8. Color: Provide shingles in multiple colors comparable to natural wood shakes. Provide internal UV stabilizers to provide durable color stability.
 9. Shingle Pattern: Provide shingles factory blended in multiple colors and widths to create installed appearance designated as follows:
 - a. Autumn Blend by DaVinci Roofscapes, LLC.
 - b. Mountain Blend by DaVinci Roofscapes, LLC.

- c. Tahoe Blend by DaVinci Roofscapes, LLC.
 - d. Weathered Gray Blend by DaVinci Roofscapes, LLC.
- C. Lightweight, synthetic shake shingles with the appearance, color, texture, and thickness of natural wood shakes.
- 1. Product: Valore Shake as manufactured by DaVinci Roofscapes, LLC.
 - 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable.
 - 3. Attributes:
 - a. Approval/Compliance:
 - 1) ICC-ES ESR-2119.
 - 2) TDI.
 - 3) Miami Dade County, FL.
 - b. Fire Test, ASTM E 108: Class A.
 - c. Impact Test, UL 2218: Class 4.
 - d. Wind Test, ASTM D 3161: Certified to 110 MPH.
 - 4. Sizes:
 - a. Width: 9 inches.
 - b. Length: 22 inches (559 mm).
 - c. Thickness: Butt, 5/8 inch (16 mm).
 - d. Thickness: Top, 1/4 inch (6 mm).
 - 5. Starter Shingle: Provide 12 inches (305 mm) long by 12 inches (305 mm) wide.
 - 6. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guidelines for different exposure lengths.
 - 7. Color: Provide shingles in multiple colors comparable to natural wood shakes. Provide internal UV stabilizers to provide durable color stability.
 - 8. Shingle Pattern: Provide shingles factory blended in multiple colors to create installed appearance designated as follows:
 - a. Valore Tuscano by DaVinci Roofscapes, LLC.
 - b. Valore Abruzzo by DaVinci Roofscapes, LLC.
 - c. Valore Espresso by DaVinci Roofscapes, LLC.
 - d. Valore Verona by DaVinci Roofscapes, LLC.

2.3 SYNTHETIC SLATE SHINGLES

- A. Lightweight, synthetic slate shingles with the appearance, color, texture, and thickness of natural quarried slate; DaVinci Slate as manufactured by DaVinci Roofscapes, LLC.
- 1. Product: DaVinci Synthetic Slate as manufactured by DaVinci Roofscapes, LLC.
 - 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials, use of recycled materials is not acceptable.
 - 3. Attributes:
 - a. Fire resistance when installed over one ply 30# ASTM D226 asphalt saturated felt: Class A tested in accordance with ASTM E108.
 - b. Water Absorption: 0.18 percent by weight tested in accordance with ASTM D47 1.
 - c. Impact Resistance: Class 4 to withstand two drops of 2 inches (52 mm) diameter, 1.2 pounds (0.54 kg) steel ball dropped from 20 feet (6 m) tested in accordance with UL2218.
 - d. 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 in accordance with ASTM D3462.

- e. Freeze-Thaw Resistance: No crazing, cracking, delamination of coating, or other deleterious surface changes after one month exposure with temperature cycled from -40 to +180 degrees F (0 degrees to 82 degrees C) in 22 hours tested in accordance with International Code Council (ICC) - ES Acceptance Criteria AC07 Section 4.9.
 - f. Accelerated Weathering: Little change after 2,500 hours exposure to ultraviolet (UV) radiation, elevated temperature, moisture, and thermal shock.
 - g. Fungus Resistance: No algae growth when inoculated with blue green algae in warm, damp environment for 4 to 6 weeks tested in accordance with ASTM G21.
4. Installed Weight:
 - a. At 6 inches (152 mm) exposure: 342 pounds per square (16.5 kg/sq. m).
 - b. At 7 inches (178 mm) exposure: 293 pounds per square (14.3 kg/sq. m).
 - c. At 7-1/2 inches (191 mm) exposure: 273 pounds per square (13.3 kg/sq. m).
 5. Profile: Rectangular shape with exposed to view upper surface and edges textured to resemble natural slate. Underside formed with reinforcing ribs for added strength and stability.
 6. Sizes:
 - 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. Variable widths: 6, 7, 9, 10, and 12 inches (152, 178, 229, 254 and 305 mm) to create appearance of random sized natural slate.
 - d. Provide 4 inches (102 mm) wide shingles for roofing turrets and domes as indicated.
 7. Starter shingles: Provide 12 inches (305 mm) wide by 12 inches (305 mm) long shingles to install as first course at eaves.
 8. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guide lines for different exposure lengths.
 9. Color: Provide shingles in multiple colors comparable to natural slate. Provide Ultraviolet (UV) protection consisting of internal stabilizer to provide durable colorfast finish.
 10. Shingle Pattern: Provide shingles factory blended in multiple colors and widths to create installed appearance designated as follows:
 - a. Aberdeen Blend by DaVinci Roofscapes, LLC.
 - b. Brownstone Blend by DaVinci Roofscapes, LLC.
 - c. European Blend by DaVinci Roofscapes, LLC.
 - d. Castle Gray Blend by DaVinci Roofscapes, LLC.
 - e. Weathered Green Blend by DaVinci Roofscapes, LLC.
 - f. Evergreen Blend by DaVinci Roofscapes, LLC.
 - g. Slate Black by DaVinci Roofscapes, LLC.
 - h. Slate Gray by DaVinci Roofscapes, LLC.
 - i. Vineyard Blend by DaVinci Roofscapes, LLC.
- B. Lightweight, synthetic slate shingles with the appearance, color, texture, and thickness of natural quarried slate.
1. Product: Valore Slate as manufactured by DaVinci Roofscapes, LLC.
 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable.
 3. Attributes:

- a. Approval/Compliance:
 - 1) ICC-ES ESR-2119.
 - 2) TDI.
 - 3) Miami Dade County, FL.
 - b. Fire Test, ASTM E 108: Class A.
 - c. Impact Test, UL 2218: Class 4.
 - d. Wind Test, ASTM D 3161: Certified to 110 MPH.
4. Sizes:
- a. Width: 12 inches (305 mm)
 - b. Length: 18 inches (457 mm).
 - c. Thickness: Butt, 1/2 inch (13 mm).
 - d. Thickness: Top, 1/8 inch (6 mm).
5. Starter Shingle: Provide 12 inches (305 mm) long by 12 inches (305 mm) wide.
6. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guidelines for different exposure lengths.
7. Color: Provide shingles in multiple colors comparable to natural wood shakes. Provide internal UV stabilizers to provide durable color stability.
8. Shingle Pattern: Provide shingles factory blended in multiple colors and widths to create installed appearance designated as follows:
- a. Villa by DaVinci Roofscapes, LLC.
 - b. Verde by DaVinci Roofscapes, LLC.
 - c. Slate Gray by DaVinci Roofscapes, LLC.
 - d. Slate Black by DaVinci Roofscapes, LLC.

2.4 SYNTHETIC ROOF TILES

- A. Lightweight, synthetic roof tiles with the appearance, color, texture, and thickness of natural quarried slate shingles.
1. Product: Bellaforte Slate as manufactured by DaVinci Roofscapes, LLC.
 2. Material: Engineered polymer formulated from 100 percent virgin plastic resins. To ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable.
 3. Attributes:
 - a. Fire resistance when installed over two plies of Fontana VulcaSeal G-40; Class A tested in accordance with ASTM E108.
 - b. Fire resistance when installed over two plies of MB Technology T-U35; Class A tested in accordance with ASTM E108.
 - c. Impact Test, UL 2218: Class 4.
 - d. Wind Test, ASTM D 3161: Certified to 110 MPH.
 - e. Hurricane Zone Force Wind: 175 MPH - TAS 125..
 4. Sizes:
 - a. Width 12 inches (305 mm).
 - b. Length 15-1/2 inch (397 mm).
 - c. Thickness: Butt 1/2 inch (13 mm).
 - d. Thickness: Top 3/8 inch (9.5 mm).
 5. Starter Shingle: Provide 3.5 inches (89 mm) long by 11.5 inches (292 mm) wide.
 6. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guidelines.
 7. Color: Provide shingles in color comparable to natural slate. Provide internal UV stabilizers to provide durable color stability.
 8. Colors: Provide shingles factory blended in multiple colors to create installed appearance designated as follows:
 - a. Villa by DaVinci Roofscapes, LLC.
 - b. Verde by DaVinci Roofscapes, LLC.

- c. Slate Gray by DaVinci Roofscapes, LLC.
- d. Slate Black by DaVinci Roofscapes, LLC.

2.5 ACCESSORIES

- A. Underlayment: ASTM D226 No. 30 un-perforated asphalt saturated felt.
- B. 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 (-36 degrees C).
 - 3. Minimum tensile strength: 250 psi (1724 kPa).
 - 4. Minimum elongation: 250 percent.
 - 5. Permeance: 0.05 perms maximum.
- C. Flashing: Fabricate from sheet to profiles and dimensions indicated on Drawings and approved shop drawings and in accordance with general requirements specified in Section 07600 - Flashing and Sheet Metal.
 - 1. Material: 16 ounce copper.
 - 2. Material: 26 gage (0.455 mm) galvanized steel.
 - 3. Linear components: Form in longest possible lengths with 8 feet (2.5 m) as minimum.
 - 4. Counter Flashings: Extend 4 inches (102 mm) minimum up vertical surfaces and 4 inches (102 mm) minimum under shingles.
 - 5. Valley flashings: 24 inches minimum width and extending 10 inches (254 mm) minimum from valley center line.
 - 6. Fabricate eave flashings with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- D. Fasteners: 3/8 inch (9.5 mm) flat head nails 1-1/2 inches (38 mm) long.
 - 1. Material: Copper.
 - 2. Material: Stainless steel.
 - 3. Material: Hot-dipped galvanized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Coordinate synthetic shake installation with provision of gutters and downspouts specified in Section 07600 - Flashing and Sheet Metal.
- B. Inspect roof framing and plywood or OSB substrate. Verify roof is complete, rigid, braced, and deck members are securely fastened. Ensure proper ventilation has been provided for roof space. Do not proceed with roofing until deficiencies are addressed.
- C. Verify roof deck is clean, dry, and ready to receive synthetic shake shingles.
- D. Remove dirt, loose fasteners, and other protrusions from roof surface.

3.3 UNDERLAYMENT INSTALLATION

- A. Underlayment: ASTM D226 30# un-perforated asphalt saturated felt.
- B. Install one-ply asphalt felt over full roof area, with ends weather lapped 4 inches (102 mm) minimum. Nail in place with roofing nails spaced in accordance with manufacturer's recommendations.
- C. Install waterproof sheet membrane over full roof area. Apply underlayment membrane in fair weather at temperatures of 40 degrees F (4 degrees C) or higher. Adhere and attach as recommended by manufacturer of underlayment.
- D. Start underlayment installation at lower edge of roof. Install perpendicular to roof slope with 4 inches (102 mm) minimum side laps and 6 inches (152 mm) minimum end laps. Extend underlayment 4 inches (102 mm) minimum up vertical wall intersections.
- E. Do not leave underlayment membrane exposed for lengthy period of time. Exercise care not to puncture or tear underlayment barrier with subsequent roofing operations.

3.4 FLASHING INSTALLATION

- A. Install overhanging drip edge on eaves and gable ends and metal flashings at valleys, ridges, hips, roof curbs, penetrations, and intersections with vertical surfaces in accordance with Section 07600 - Flashing and Sheet Metal and as detailed on Drawings and approved shop drawings.
- B. Weather lap joints 2 inches (52 mm) minimum and seal with sealant as specified in Section 07900 - Joint Sealers.
- C. Secure in place with clips, nails, or other fasteners.

3.5 INSTALLATION - GENERAL

- A. Install synthetic shingles in accordance with manufacturer's instructions and approved shop drawings.
- B. Accurately layout shingles. Ensure that edges are parallel and perpendicular to roof eaves.
- C. Cutting: Layout work to avoid cutting shingles.
 - 1. At gables and vertical intersections, vary combination of shingle widths and spacing of shingles to avoid cutting.
 - 2. If cutting is required, place shingle such that cut edge is not exposed.
 - 3. Use circular saw or straight edge and utility knife if cuts are necessary.

3.6 SHAKE SHINGLE INSTALLATION

- A. Install shingles in a rack or pyramid style from factory assembled bundles.
- B. Exposure: Install shingles in straight pattern with 10 inches (254 mm) exposure and bottom shingle edges evenly aligned.
- C. Exposure: Install shingles in staggered pattern with 9 inches (229 mm) exposure and bottom edges of adjacent shingles staggered 1 inch (25 mm).
- D. Spacing: Provide 3/16 - 3/8 inch (4.76 - 9.5 mm) gap between shingles to allow for

expansion and contraction.

- E. Stagger shingle joints in one course 1-1/2 inches (38 mm) minimum from joints in course below.
- F. Eaves: Install row of starter shingles at eaves as base layer. Project eave shingles approximately 1 inch (25 mm) , 1/8 inch (3 mm) past overhanging drip edge, or as required to allow water to drain into gutter or off eave as indicated or required.
- G. Gables: Project shingles approximately 3/4 inch beyond gable rakes or 1/8 inch (3 mm) past overhanging drip edge.
- H. Ridges and Hips: After field shingle installation is complete, install double row of shingles over 6 inches (152 mm) wide metal flashing.
 - 1. Ridges: Use 6 inches (152 mm) wide shingles with 10 inches (254 mm) exposure. Start ridge shingles at leeward end. Face shingle laps away from prevailing wind.
 - 2. Hips: Use 6 inches (152 mm) wide shingles with 10 inches (254 mm) exposure. Start hip course at eave.
- I. Fastening: Attach each shingle to wood deck with 2 nails using hammer or pneumatic nail gun.
 - 1. Place nails at locations indicated on shingles.
 - 2. Ensure good penetration but do not overdrive nail. Do not nail at angle. Ensure head is flush with shingle surface to avoid creating craters.
 - 3. At valleys do not nail shingles within 5 inches (127 mm) of valley center line.

3.7 SLATE SHINGLE INSTALLATION

- A. Install shingles so that breaks between shingles in adjacent courses are offset by a minimum of 1-1/2 inches (38 mm). Exercise care not to install shingles of the same color in contact or shingles of the same width side by side.
- B. Exposure: Install shingles in straight pattern with exposure specified and bottom shingle edges evenly aligned.
- C. Exposure: Install shingles in staggered pattern with exposure specified and bottom edges of adjacent shingles staggered 1 inch (25 mm).
- D. Spacing: Provide 3/16 - 3/8 inch (4.76 - 9.5 mm) gap between shingles to allow for expansion and contraction.
- E. Stagger shingle joints in one course 1-1/2 inches (38 mm) minimum from joints in course below.
- F. Eaves: Install row of starter shingles at eaves as base layer. Project eave shingles approximately 1 inch or as required to allow water to drain into gutter or off eave or 1/8 inch (3 mm) past overhanging drip edge as indicated or required.
- G. Gables: Project shingles approximately 3/4 inch (19 mm) beyond gable rakes or 1/8 inch (3 mm) past overhanging drip edge.
- H. Ridges and Hips: After field shingle installation is complete, install double row of shingles over 6 inches (152 mm) wide metal flashing.
 - 1. Ridges: Use 7 inches (178 mm) wide shingles with 6 inches (152 mm) exposure. Start ridge shingles at leeward end. Face shingle laps away from prevailing wind.
 - 2. Hips: Use 7 inches (178 mm) wide shingles with 6 inches (152 mm) exposure.

Start hip course at eave.

- I. Fastening: Attach each shingle to wood deck with 2 nails using hammer or pneumatic nail gun.
 1. Place nails at locations indicated on shingles.
 2. Ensure good penetration but do not overdrive nail. Do not nail at angle. Ensure head is flush with shingle surface to avoid creating craters.
 3. At valleys do not nail shingles within 5 inches (127 mm) of valley center line.

3.8 ROOF TILE INSTALLATION

- A. Exposure: Install roof tiles in pattern below with exposure specified and bottom tile edges evenly aligned.
 1. Pattern: Random, joints staggered a minimum of 1-1/2 inches(38 mm) from joint in course below.
 2. Pattern: 5 inch (127 mm) offset.
 3. Pattern: 6 inch (152 mm) offset; alignment every other course.
- B. Eaves: Install row of starter tiles at eaves as base layer. Project eave tiles approximately 1 inch or as required to allow water to drain into gutter or off eave or 1/8 inch (3 mm) past overhanging drip edge as indicated or required.
- C. Gables: Cut tiles flush with the gable end. Install a rake tile on the gable end.
- D. Ridges and Hips: After field tile installation is complete, install the one piece hip and ridge tile over 6 inches (152 mm) wide metal flashing.
 1. Ridges: The one piece hip and ridge tile should be installed at a 12 inch exposure (305 mm). The hip and ridge should be nailed approximately 12-1/2 inches (318 mm) from the butt of the tile so that it just covers the tile on top of it.
 2. Hips: The one piece hip and ridge tile should be installed at a 12 inch exposure (305 mm). Start hip course at eave.
- E. Fastening: Attach each tile to wood deck with 2 nails using hammer or pneumatic nail gun.
 1. Place nails at locations indicated on tiles.
 2. Ensure good penetration but do not overdrive nail. Do not nail at angle. Ensure head is flush with tile surface to avoid creating craters.
 3. At valleys do not nail tiles within 5 inches (127 mm) of valley center line.

3.9 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 units. Units damaged during installation shall be immediately removed and discarded.
- 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 complete installation to ensure that it is weather tight.

3.10 CLEANING AND PROTECTION

- A. Remove excess materials and debris from finished surfaces and adjacent roof areas.

- B. Do not allow work force on completed roof.
- C. Protect installed products until completion of project.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION