

**SECTION 073233  
POLYMERIC SHINGLES**

**PART 1 – GENERAL****1.01 SECTION INCLUDES**

- A. Polymeric roofing tiles of [shake][slate] profile.
- B. Sheet membranes for eave protection, underlayment, and valley protection.
- C. Metal flashing.
- D. Accessories.
- E. Nailer systems for proper installation geometry.

**1.02 RELATED SECTIONS**

- A. Section 061000 - Rough Carpentry: Roof deck preparation, structural support, and nailer installation.
- B. Section 076200 - Flashing and Sheet Metal: Roof flashings, valley metals, and trim accessories.
- C. Section 077123 - Manufactured Gutters and Downspouts.
- D. Section 077200 - Roof Accessories: Snow guards.
- E. Section 079113 - Compression Seals: Joint sealants and weatherization materials.
- F. Section 079200 - Joint Sealants.
- G. Section \_\_\_\_: Attic space vent within shingled roof area.
- H. Section \_\_\_\_: Chimney flue within shingled roof area.
- I. Section \_\_\_\_: Mechanical work projecting through roof.

**1.03 PRICE AND PAYMENT PROCEDURES**

- A. Allowances:
  - 1. Include cash, testing, and quantity allowance for [\_\_\_\_].
- B. Unit Prices:
  - 1. Basis of Measurement for [\_\_\_\_]: By linear foot.
  - 2. Basis of Measurement for [\_\_\_\_]: Per unit.
  - 3. Basis of Payment for [\_\_\_\_]: Include purchase, delivery, and installation.
- C. Alternates:
  - 1. This section includes base bid items.

**1.04 REFERENCES STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
  - 2. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
  - 3. ASTM D2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2021.
  - 4. ASTM D3909 - Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules; 2021.
  - 5. ASTM D8257 - Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing; 2022.

6. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2025.
7. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials; 2021.
- B. Florida Building Code Testing Application Standard (TAS):
  1. TAS 100 - Standard Test Method for Wind and Wind Driven Rain Resistance of Discontinuous Roof Systems; 2020.
  2. TAS 125 - Test for Uplift Resistance on Roof Assemblies; 2020.
- C. International Code Council (ICC):
  1. ICC-ES Acceptance Criteria AC07 - Acceptance Criteria for Polymeric Roofing Tiles.; 2014, with Editorial Revision (2021)
- D. International Building Code (IBC).
  1. ICC (IWUIC) International Wildland-Urban Interface Code.
- E. Insurance Institute for Business & Home Safety (IBHS): FORTIFIED Roof Standards.
- F. Underwriters Laboratories (UL):
  1. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
  2. UL 2218 - Impact Resistance of Prepared Roof Covering Materials.

### 1.05 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data:
  1. Manufacturer's data sheets for each product specified.
  2. Installation instructions and application guidelines.
  3. Performance test reports and third-party certifications.
  4. Code evaluation reports and approval listings.
- C. Sustainable Design Documentation:
  1. Recycled content verification per requirements cited in Part 2.
  2. End-of-life recyclability documentation.
  3. Cool roof compliance documentation for Title 24 requirements.
- D. Shop Drawings:
  1. Installation details showing relationship to adjacent construction.
  2. Flashing and trim configurations.
  3. Color and pattern layout plans for complex roof geometries.
- E. Samples:
  1. Selection Samples: Provide [two][three][ ] samples showing full range of products, colors, and finishes available.
  2. Verification Samples: Provide [two][three][ ] samples representing actual products, colors, and finishes selected for project.
  3. Texture Samples: Samples demonstrating compression-molded surface detail and dimensional characteristics.
- F. Manufacturer's Certificates: Certify that shingles supplied for project meet or exceed specified requirements.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Wildland-Urban Interface (WUI) compliance documentation.
  1. Evidence of compliance with the WUI Code, where applicable.
- J. FORTIFIED compliance documentation:
  1. Evidence of FORTIFIED Roof designation compliance where applicable.
- K. Miami-Dade County compliance documentation:

1. Evidence products are approved for use in Miami-Dade County, where applicable.
- L. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  1. Company specializing in manufacturing plastic roofing products using compression-molding technology.
    - a. Minimum ~~five~~~~ten~~       years documented experience in synthetic shingle production.
  2. Member of PEPA (Polymeric Exterior Products Association).
  3. ISO 9001 certified manufacturing processes or equivalent quality management system.
- B. Installer Qualifications:
  1. Company specializing in performing work of the type specified and with at least ~~three~~~~five~~       years of ~~documented~~       experience.
  2. Company is part of manufacturer's Preferred Contractor program ~~or equivalent manufacturer-certified installer program~~.
- C. Source Limitations:
  1. Obtain polymeric shingles from single manufacturer.
  2. Provide accessories, nailers, and flashing trim components from polymeric shingle manufacturer or sources approved by polymeric shingle manufacturer.
- D. Wildland-Urban Interface Compliance (IWUIC):
  1. Products and installation to achieve Class A fire rating when installed with approved fire-resistant underlayment for IWUIC compliance.
  2. Installation shall comply with Chapter 7A of California Building Code or local IWUIC requirements, where applicable.
  3. Contractor shall demonstrate familiarity with IWUIC construction requirements and ignition-resistant construction practices.
  4. Submit fire classification test reports and code evaluation reports demonstrating IWUIC compliance.
- E. FORTIFIED Roof Compliance:
  1. Products and installation shall comply with the FORTIFIED Roof requirements per Insurance Institute for Business & Home Safety (IBHS) standards.
  2. Engage FORTIFIED Evaluator for third-party verification of installation compliance.
  3. Contractor shall be FORTIFIED-trained or work with FORTIFIED-certified installer.
- F. Miami-Dade County Compliance:
  1. Products and installation shall comply with the current Miami-Dade County Product Control Division requirements for use in High Velocity Hurricane Zone (HVHZ).
  2. Contractor shall demonstrate experience with Miami-Dade County inspection requirements and HVHZ construction practices.

## 1.07 MOCK-UPS:

- A. Mock-Up: Provide a mock-up for evaluation of shingle installation workmanship, including typical eave, rake, valley, and ridge details.
- B. Construct mock-up ~~as indicated on Drawings~~minimum 100 square feet (9.3 sq m) demonstrating installation quality, nailer placement, and appearance.
  1. Locate mock-up where directed by ~~Architect~~Owner.
  2. Obtain ~~Architect's~~Owner's acceptance before proceeding with installation.
- C. Mock-up ~~may~~may not remain as part of the work.

## 1.08 PRE-INSTALLATION CONFERENCE

- A. Convene conference minimum [five][ten][ ] days before commencement of installation.
- B. Attendees:
  - 1. [Architect][Owner's representative][ ].
  - 2. General Contractor.
  - 3. Roofing Contractor.
  - 4. Manufacturer's representative or certified technical support.
  - 5. Nailer installation subcontractor.
- C. Agenda:
  - 1. Project schedule and sequencing including nailer installation.
  - 2. Material delivery and storage requirements.
  - 3. Nailer layout and installation procedures.
  - 4. [Shake][Slate] shingle installation procedures and quality requirements.
  - 5. Weather protection and temporary roofing.
  - 6. Inspection procedures and responsibilities.

### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Delivery:
  - 1. Deliver materials in manufacturer's original packaging with labels intact.
  - 2. Coordinate delivery to minimize on-site storage time and prevent damage.
- C. Storage: Store materials in strict accordance with manufacturer's requirements.
  - 1. Protect from damage due to weather, temperature extremes, and construction operations.
  - 2. Store polymeric shingles on level surfaces with adequate ventilation.
  - 3. Store and dispose of solvent-based materials, and materials used with solvent based materials, in accordance with requirements of local authorities having jurisdiction.
  - 4. Do not store materials directly on ground or concrete surfaces.

### 1.10 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
- B. Do not install polymeric shingles, [eave protection][membrane][or][underlayment] when surface, ambient air, or wind chill temperatures are outside manufacturer's recommended limits.
- C. Roof Deck Conditions:
  - 1. Verify roof deck consists of minimum 15/32-inch CDX plywood or 7/16-inch OSB.
    - a. [Permissible use of OSB: Verify with local authorities and required tested assemblies.][ ].][n/a]
  - 2. Verify deck surface is clean, smooth, and free of protruding fasteners.
  - 3. Confirm deck is properly constructed, dry, and ready to receive roofing materials.

### 1.11 WARRANTY

- A. Manufacturer's Standard Limited Warranty:
  - 1. Minimum 50-year limited warranty against material defects causing leaks under normal weather and use conditions.
    - a. Warranty terms based on compliance with manufacturer's installation requirements and specified wind speed design.
  - 2. Warranty coverage includes material replacement and installation costs.
  - 3. Warranty transferable in accordance with manufacturer's standard transfer procedures.
  - 4. Color durability warranty: Maximum 4 Hunter units ( $\Delta E$ ) for first 10 years.

5. Impact Warranty: Warranty coverage against hail damage from hailstones 1-1/2 inches diameter or smaller.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

Basis of Design manufacturer and model/series: Brava Roof Tile;[Cedar Shake Series][Slate Roof Tile Series]: [www.bravarooftile.com](http://www.bravarooftile.com).

2. Substitutions: [Not permitted.]
- B. Other acceptable manufacturers - Bidders to verify equally conforming products to Basis of Design manufacturer/model/series/selection:
  1. Ecostar Roofing: [www.ecostarllc.com](http://www.ecostarllc.com).
  2. DaVinci Roofscapes: [www.davinciroofscapes.com](http://www.davinciroofscapes.com).
  3. [ ]: [www.](http://www.)[ ]
  4. Substitutions: See Section 016000 - Product Requirements.

### 2.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance:
  1. Design roof system to resist wind uplift, live loads, and dead loads in accordance with applicable building codes.
  2. Lightweight design eliminates need for additional structural support typically required for traditional materials.
- B. Weather Resistance:
  1. Roof system to provide weather-tight envelope with no measurable water penetration.
  2. Materials to withstand exposure to UV radiation, temperature cycling, and moisture without degradation.
  3. Tested for compliance with high-wind resistance requirements and test standards.
- C. Fire Resistance:
  1. Class A fire rating when installed with Class A material over approved fire-resistant underlayment in accordance with ASTM E108 and UL 790.
  2. Class C fire rating when installed over standard organic felt or synthetic underlayment meeting ASTM D226 Type II or ASTM D8257.
- D. Physical Durability:
  1. Tensile Strength: Maximum 10 percent loss of tensile strength after [2,500][4,500] hours exposure per ASTM G155.
  2. Impact Resistance:
    - a. UL 2218 Class 4 impact resistance in accordance with UL 2218 test procedures.
      - 1) Impact resistance capable of withstanding impact from 2-inch (51 mm) diameter steel ball weighing 1.2 pounds (0.54 kg) dropped twice on each of two different spots of the sample from 20 feet (6.1 m) without cracking, splitting, or other failure.
  3. Accelerated Weathering Performance: No visible cracking, crazing, chalking, checking, or delamination after accelerated weathering exposure.
- E. Wind Resistance:
  1. Wind-driven rain resistance: System tested in accordance with TAS 100.
    - a. Pass wind-driven rain test at [35][70][90][110] mph wind speeds with no water penetration through roof deck.
  2. Wind uplift resistance: System tested in accordance with TAS 125.
    - a. Pass wind uplift test at [90][110][130] mph wind speeds with specified fastening methods and no structural failure.

- F. Thermal Performance:
  - 1. Freeze-thaw resistance: No crazing, cracking, or delamination after temperature cycling from -40°F to +180°F (-40°C to +82°C) in accordance with ICC-ES AC07.
  - 2. UV resistance: Color stability demonstrated through accelerated weathering testing per ASTM G155.
  - 3. [Cool roof compliance where required by local energy codes.]
- G. Color Durability:
  - 1. Color stability achieved through mineral-infusion manufacturing process.
  - 2. UV resistance: Color stability demonstrated through accelerated weathering testing per ASTM G155.
    - a. Color change not to exceed [4][6] Hunter units ( $\Delta E$ ) after [2,500][5,000] hours accelerated weathering exposure.

## 2.03 POLYMERIC SHINGLES

- A. Description:
  - 1. Lightweight polymeric roofing shingles replicating appearance, texture, and dimensional characteristics of traditional materials.
  - 2. Compression-molded construction using sand-casted molds for authentic surface detail and dimensional accuracy.
- B. Materials:
  - 1. Engineered plastic formulated from up to 85% recycled plastic and are 100% recyclable.
  - 2. Mineral (inorganic) pigments for superior color durability and fade resistance.
  - 3. UV stabilizers integrated throughout material for long-term performance.
  - 4. Impact modifiers for enhanced durability and crack resistance.
- C. Physical Properties:
  - 1. Installed weight: Maximum [304/310] pounds per 100 square feet (15 kg/sq m) at maximum exposure.
  - 2. Profile thickness: [0.5 to 1.0] inches (12.7 to 25.4 mm).
- D. Profile and Appearance:
  - 1. [Shake][Slate] profile with exposed upper surface and edges replicating traditional wood/slate tile appearance.
  - 2. Compression-molded surface detail providing authentic dimensional characteristics and shadow lines.
  - 3. Molded-in nail guidelines and exposure markers for installation accuracy.
- E. System Components:
  - 1. Eave Starter Components:
    - a. Designed for proper eave closure and first course alignment.
    - b. Sized to provide adequate weather protection at eave conditions.
  - 2. Hip components: [Low profile caps][Standard profile caps][or][Steep profile caps].
  - 3. Ridge components: [Low profile caps][Standard profile caps][or][Steep profile caps].
  - 4. Rake and Valley components: Solid shake edge profile.
- F. Colors:
  - 1. [As selected by [Architect][Owner]]
  - 2. [As indicated on Drawings]
  - 3. [Custom colors if available].
  - 4. Shake tile Basis of Design color: Brava standard color: [Aged Cedar][Aspen][Canyon Gray][Lake Forest][Natural Cedar][Weathered].
  - 5. Shake tile Basis of Design color: Brava premium color: [Arendale][Light Arendale][New Cedar][Onyx][Sierra].
  - 6. Shake tile Basis of Design color: Brava "cool color": [Cool Lake Forest][Cool Weathered][Cool Western Cedar][Cool White].

7. Slate tile Basis of Design color: Brava standard color: [Arendale][Atlantic][Cottage][Graphite][Light Arendale][Onyx][Washington].
  8. Slate tile Basis of Design color: Brava premium color: [European][Pine Green][Tuscan Clay][Victorian].
  9. Slate tile Basis of Design color: Brava “cool color”: [Cool Arendale][Cool Atlantic][Cool Light Arendale][Cool Weathered][Cool White].
- G. Sustainability Features:
1. Recycled Content: Up to 85% recycled polymer content that is 100% recyclable.
  2. End-of-Life: Fully recyclable material suitable for reprocessing into new products.
  3. Transportation Impact: Lightweight design reduces shipping weight and associated emissions.
  4. Durability: Extended service life reduces replacement frequency and waste generation.
  5. “Cool colors” to reduce heat island effect.
  6. Documentation: Submit recycled content verification and end-of-life recyclability documentation for green building certification requirements.

## 2.04 SHEET MATERIALS

- A. Underlayment:
1. Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D226/D226M, Type II, No. 30 per ASTM D2178.
  2. Synthetic underlayment of woven or spun polyethylene or polypropylene complying with ASTM D3909/D3909M or D8257/D8257M.
    - a. Performance Requirements:
      - 1) Minimum Thickness 20 mils (0.51 mm) per ASTM D1777.
      - 2) Water vapor permeance: Variable permeance ranging from 0.05 perms (vapor barrier) to >1.0 perms (breathable) per ASTM E96.
      - 3) Water Transmission: Passes ASTM D4869.
    - b. Approved products:
      - 1) PolyGlass; [Poly Anchor]
      - 2) Owens Corning; [Titanium UDL 50]
      - 3) FT Synthetics; [Hydra]
      - 4) Eco-Chief; [SOLARHIDE-SRW]
      - 5) [ ].
      - 6) Substitutions: See Section 016000 - Product Requirements.
- B. Ice Dam Protection and Eave Protection Membrane
1. Cold applied, self-adhering waterproof membrane composed of polyethylene film coated one side with rubberized asphalt adhesive
  2. Self-adhering polymer-modified bituminous membrane complying with ASTM D1970.
  3. Minimum 40 mils (1.0 mm) thickness per ASTM D1777.
  4. Performance Requirements:
    - a. Minimum tensile strength: 250 psi (1,724 kPa) per ASTM D1970.
    - b. Low temperature flexibility: Unaffected at minus 32°F (minus 36°C) minimum.
    - c. Vapor permeance: 0.05 perms maximum per ASTM E96.
  5. Approved products:
    - a. Mapei Polyglass; [TU Polystick]
    - b. Owens Corning; [Titanium PSU-30]
    - c. GCP Applied Technologies; [Grace Ice & Water Shield]
    - d. FT Synthetics; [Platinum HT-B]
    - e. GAF StormGuard; [Film-Surfaced Leak Barrier]
    - f. [ ].
    - g. Substitutions: See Section 016000 - Product Requirements.

## 2.05 FLASHINGS



- A. Flashing Materials:
  - 1. Fabricate from sheet to profiles and dimensions indicated on drawings and approved shop drawings.
    - a. [16-ounce copper][26-gauge (0.455 mm) galvanized steel][24-gauge aluminum][Stainless steel][\_\_\_\_\_].
    - b. Install in accordance with Section 07 60 00 - Flashing and Sheet Metal.
  - 2. [Refer to Section 076200 - Flashing and Sheet Metal.]
- B. Performance Requirements:
  - 1. Resistance to UV degradation and thermal cycling.
  - 2. Compatibility with plastic roofing shingle expansion characteristics.
  - 3. Corrosion resistance appropriate for project environment.
- C. Base Flashings:
  - 1. Install over or under roof coverings and turn up on vertical surfaces.
  - 2. Extend under uppermost row of shingles full depth of tile or minimum 4 inches (102 mm) over tile immediately below.
  - 3. Vertical leg turned up minimum 4 inches (102 mm) and extend 4 inches (102 mm) on polymeric shingles as laid.
- D. Valley Flashing:
  - 1. Open Valley: Double W-style configuration with minimum 2-1/2-inch (64 mm) enter crimps.
  - 2. Closed Valley: W-style configuration with minimum 2-1/2-inch (64 mm) enter crimp.
  - 3. Minimum 24-inch (610 mm) width extending 11 inches (279 mm) each direction from centerline.
  - 4. Self-supporting design compatible with polymeric shingle installation methods.
- E. Flexible Flashing Systems:
  - 1. Lead-free moldable flashing for complex penetrations and transitions.
  - 2. Self-sealing properties with weather-resistant construction.
  - 3. Compatible with shingle thermal movement characteristics.
  - 4. [Wakaflex][or][approved equal meeting performance requirements].
- F. Weather Blocking Materials:
  - 1. Hip and ridge weather barriers preventing wind-driven rain infiltration.
  - 2. Polyisobutylene (PIB) construction with aluminum composite facing.
  - 3. Butyl adhesive strips for secure attachment and sealing.
  - 4. [Compatible products include Zephyr Block systems][or][approved equal].
- G. Ridge Vent Integrated Flashing:
  - 1. Combined ventilation and weather protection systems.
  - 2. Prevents wind-driven rain while maintaining airflow.
  - 3. Flexible design conforming to roof contours.
  - 4. [Systems such as Zephyr Roll][or][approved equal].

## 2.06 ACCESSORIES

- A. Nailer Systems:
  - 1. Hip and Ridge Nailers: Required for all hip and ridge installations.
    - a. Code-approved wood or metal nailers and as recommended by the shingle manufacturer.
    - b. Maximum 24-inch (610 mm) on-center spacing.
    - c. Hold hip nailers back 4 inches (102 mm) from outside corners.
  - 2. Rake Nailers: [as recommended by the polymeric shingle manufacturer][not required].
- B. Fasteners:
  - 1. Standard Installation Nails: [not permitted][(2) 0.120-inch (3.0 mm) x ≥ 1-3/4-inch (44 mm) ring shank roofing nails].



2. Screw Installation: No. 10 x 2-inch (51 mm) or 2-1/2-inch (64 mm) wood screws with corrosion-resistant coating.
3. High-Wind Installation Screws:
  - a. Field Tile: (2) No. 8 x 2-inch (51 mm) wood screws with corrosion-resistant coating.
  - b. Hip/Ridge: (2) No. 8 x 3-inch (76 mm) wood screws with corrosion-resistant coating.
  - c. Materials: [Polymer-coated steel][305 stainless steel][316 stainless steel for coastal applications].
  - d. Drive type: T25 Torx drive head.
- C. Solar Mounting Systems:
  1. Base-and-post style mounting systems designed for shingle roofing applications.
    - a. Installation per manufacturer's instructions with appropriate waterproofing.
    - b. Multi-purpose design accommodating various tile profiles and exposures.
  2. Engineered for structural loads and waterproof installation.
  3. Compatible products include [QBase systems][or][approved equal].
- D. Snow Retention Systems:
  1. Pad-style snow guards with optional rod systems.
  2. Metal snow guards with custom-length mounting plates.
  3. Bracket-style retention systems designed for specific tile profiles.
  4. Approved manufacturers include [Alpine][Snow Gem][TRA][or][approved equal].
- E. Ventilation Components:
  1. [Shake][Slate]-profile exhaust vents with corrosion-resistant mesh screening.
  2. Ridge ventilation systems compatible with shingle installation.
  3. Powered ventilation with appropriate mounting systems.
  4. Compatible products available from [AtticBreeze][O'Hagin][GAF][AIR VENT][or][approved equal].
- F. Installation Hardware:
  1. Cap Nails: 1-3/4-inch (44 mm) 12-gauge (2.7 mm) electro-galvanized plastic cap nails for underlayment attachment.
  2. Seam Tape: Pure aluminum foil tape with reinforced scrim mesh and Class 1 fire rating.
  3. Weather Sealing: Appropriate sealants and gaskets per manufacturer's specifications.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Site Verification:
  1. Verify roof structure is complete, properly braced, and meets design loads.
    - a. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
  2. Confirm roof deck consists of minimum 15/32-inch CDX plywood or 7/16-inch OSB.
  3. Plywood is preferable for high wind environments.
  4. [For Miami-Dade County [new construction][reroof] projects:
    - a. Verify requirements for minimum 19/32-inch plywood sheathing for polymeric shingle applications.]
  5. Verify deck surface is clean, dry, level, and free of protruding fasteners.
- B. Environmental Conditions:
  1. Only install when products have a measured temperature is of 32°F (0°C) or higher.
  2. Do not install during precipitation or when deck surfaces are wet.
    - a. Tiles may become slippery when wet.

### 3.02 PREPARATION

- A. Layout and Verification:

1. Confirm roof dimensions are square within acceptable tolerances.
  2. Establish reference lines for proper tile alignment and exposure.
  3. Avoid using red or blue chalk as it can stain the tiles.
  4. Verify compliance with applicable building codes for exposure requirements.
- B. Material Inspection:
1. Inspect tiles for conformity with approved samples and specifications.
  2. Blend materials from multiple pallets to achieve uniform color distribution.
  3. Set aside non-conforming or damaged materials.

### 3.03 INSTALLATION - GENERAL REQUIREMENTS

- A. Compliance:
1. Install in strict accordance with manufacturer's current published installation instructions.
  2. Install using only qualified installers per Part 1 of this Section.
  3. **FORTIFIED Roof Compliance:**
    - a. Engage FORTIFIED Roof Evaluator for third-party verification and documentation of installation compliance with IBHS FORTIFIED Roof standards.
  4. **Miami-Dade County Compliance:**
    - a. Installation subject to Miami-Dade County building department inspection procedures and Notice of Acceptance (NOA) requirements.
  5. **Wildland-Urban Interface (IWUIC) Compliance:**
    - a. Verify installation meets Chapter 7A of California Building Code or local IWUIC requirements with appropriate inspection and documentation.
  6. Submit compliance documentation and inspection reports for applicable programs before final acceptance.
- B. Roof Slope Requirements:
1. Minimum slope: 4:12 for warranty coverage and optimal performance.
  2. Slopes 3:12 to 4:12: Install ice dam protection membrane (commonly referred to as Ice & Water Shield) over entire roof area.
- C. Fastening Requirements:
1. Install two corrosion-resistant fasteners per shingle at designated locations.
  2. Achieve minimum 3/4-inch (19 mm) penetration into deck or complete penetration.
  3. Drive fasteners flush with shingle surface without overdriving.
  4. No exposed fasteners permitted in completed installation.
  5. No smooth nails. Ring-shank roofing nails only.
  6. Install at eaves using the starter tile.

### 3.04 INSTALLATION TOLERANCES

- A. Exposure Limits:
1. **[Shake][Slate]:** Maximum 10 inches (254 mm), minimum 4 inches (102 mm).
- B. Spacing Requirements:
1. Maintain minimum 3/16-inch (4.8 mm) gap between shingle for thermal movement.
  2. Recommended spacing: 3/8-inch (9.5 mm) for optimal performance.
- C. Alignment Standards:
1. Courses shall be straight and parallel to eave line within 1/4 inch per 10 feet.
  2. Vertical alignment maintained within manufacturer's published tolerances.
  3. Sidelap for all shingles: Provide  $\geq 1\frac{1}{2}$ " field tiles and accessories.

### 3.05 INSTALLATION REQUIREMENTS

- A. Nailer Installation:
1. Install hip and ridge nailers before field tile installation.

2. Maximum 24-inch (610 mm) on-center fastener spacing.
  3. Calculate nailer heights per manufacturer's specifications for roof slope.
- B. Valley Installation:
1. Do not fasten polymeric shingles within 5 inches (127 mm) of valley centerline.
  2. Maintain minimum 3/16-inch (4.8 mm) expansion gap at valley flashing.
  3. Solid shakes at rakes and valleys recommended.
- C. Penetration Protection:
1. Install ice dam protection membrane around all roof penetrations.
  2. Professional flashing installation per industry standards and applicable codes.

### **3.06 FIELD QUALITY CONTROL**

- A. Inspection Requirements: Owner may provide separate contract for installation oversight.
1. Coordinate with Owner's inspectors per agreed schedule or after first 200 square feet (18.6 sq m) installation.
  2. Coordinate with Owner's inspectors for periodic inspections during installation progress.
  3. Coordinate with Owner's inspectors for final inspection upon completion.
- B. Acceptance Criteria:
1. Installation meets manufacturer's published standards.
  2. Weather-tight performance at all roof details.
  3. Uniform appearance and color distribution.
  4. Compliance with specified exposure and spacing tolerances.
- C. Defective Work:
1. Remove and replace work not meeting specified requirements.
  2. Replace tiles showing damage or excessive color variation.

### **3.07 COMPLETION**

- A. Final Cleaning:
1. Remove installation debris and temporary materials.
  2. Clean tile surfaces per manufacturer's recommendations.
- B. Project Documentation:
1. Provide manufacturer's warranty documentation.
  2. Submit installer certification records.
  3. Provide maintenance instructions to Owner.

**END OF SECTION**