

SECTION 07 31 26
SLATE SHINGLE ROOFING AND SIDING

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1.GENERAL

1.1. SECTION INCLUDES

- A. Slate shingle roofing.
- B. Slate shingle solar roofing.
- C. Slate shingle solar raised flooring.
- D. Slate shingle ventilated facade cladding system.
- E. Self-adhering underlayment and accessories.

1.2. RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.
- B. Section 07 22 16 - Roof Board Insulation.
- C. Section 07 60 00 - Flashing and Sheet Metal.
- D. Section 07 71 23 - Manufactured Gutters and Downspouts.
- E. Section 07 72 63 - Waste Containment Assemblies.
- F. Section 08 60 00 - Roof Windows and Skylights.
- G. Division 15 - Mechanical.
- H. Division 16 - Electrical.

1.3. REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

1.4. SUBMITTALS

- A. Submit in accordance with Division 01 Section "Submittal Procedures".
- B. Product Data: Submit manufacturers data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Certificates: Manufacturer and independent testing agency test certifications.

- D. Shop Drawings:
 - 1. Dimensioned scale drawings and details indicating tile layout, location of cut outs, penetrations and roof mounted equipment, special shapes and trims, with all thicknesses and interface between materials and adjacent construction.
 - 2. Size and location of flashing, fasteners, joint locations, installation details, tile layouts, wind pressures and thermal movements.
 - 3. Installation details including flashing, roof edges, roof slope limitations, penetrations, and drainage paths.
- E. Verification Samples: Three to five full size units indicating full range of color and texture to be expected in the final installation.
- F. Qualifications: For installer and manufacturer.
- G. Close Out Submittals: Maintenance data, executed warranty.

1.5. QUALITY ASSURANCE

- A. Comply with local building codes and regulations.
- B. Source Limitations: Obtain components for roofing or siding system from a single primary manufacturer. Secondary products and accessories must be acceptable to the primary manufacturer.
- C. Manufacturer Qualifications:
 - 1. Minimum 10 years of experience producing slate systems of the size and complexity of this project
 - 2. With the production facilities capable of meeting the project schedule.
- D. Installer Qualifications:
 - 1. Minimum 5 years documented experience installing products specified in this section.
 - 2. Supervision shall be performed by manufacturer's authorized representative or supervisor acceptable to manufacturer.
- E. Pre-Installation Meeting: Convene on the Project site minimum two weeks before beginning work to:
 - 1. Verify project requirements and site logistics.
 - 2. Coordinate between trades.
 - 3. Review manufacturers installation instructions and warranty requirements.
- F. Mock-Up:
 - 1. Provide mock-up of each type of assembly including associated components, accessories, and methods of adjoining construction.
 - 2. Minimum size: 9 x 9 feet (3 x 3 meters).
 - 3. Accepted mock-up may remain as part of the completed work and shall establish the standard of workmanship and aesthetics for remaining work.

1.6. DELIVERY, STORAGE AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging identified with the manufacturer and brand name until ready for installation. Coordinate delivery schedule with the project schedule to minimize on site storage.
- B. Distribute materials uniformly. Do not exceed structural loading with workers or installation materials.
- C. Protect underlayment during placement.

1.7. PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit system to be installed according to manufacturer's written instructions and warranty requirements.

1.8. WARRANTY

- A. Warranty: Provide manufacturer's standard limited warranty for CUPA products designated as "Excellence" and having A1/T1/S1 classification.

2.PRODUCTS

2.1. MANUFACTURERS

- A. Acceptable Manufacturer: CUPA PIZARRAS, which is located at: 1 University Plaza Suite 309; Hackensack, NJ 07601; Tel: 201-880 9370 ; Fax: 201-880 9372; Email: [request info \(usa.cupa@cupagroup.com\)](mailto:usa.cupa@cupagroup.com); Web: www.cupapizarra.com/usa
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2. MATERIALS

- A. Slate: Noncarbonated tectonic compression slate with the following properties confirmed precisely for each project in the company's barcode technology listing the quality, composition, and source of each slate to enable traceability and future matching. Physical properties, which vary based on product selections, include:
 - 1. Deviation from Length and Width: Within +/- 0.19 inch (5 mm).
 - 2. Deviation from Squareness: Within +/- 1 percent.
 - 3. Deviation from Edge Straightness: Within +/- 1 percent.
 - 4. Deviation from Flatness: Very flat, 0.9 percent.
 - 5. Nominal Thickness and Variation: Normal, 3.5, within +/- 25 percent.
 - 6. Modulus of Rupture: Transverse 47 MPA, Longitudinal 55 MPA.
 - 7. Water Absorption: 0.18 to 0.37 percent.
 - 8. Freeze / Thaw Test: 0.4 percent.

2.3. SLATE SHINGLE ROOFING

- A. Slate Shingle Roofing:
 - 1. Slate Shingle Roofing: CUPA 7, Unfading black slate by CUPA PIZARRAS
 - a. Thickness: Nominal 1/8 inch (3.5 mm).
 - b. Thickness: Nominal 3/16 inch (5 mm).
 - c. Thickness: Nominal: 1/4 inch (7.5 mm).
 - d. Thickness: Nominal: 3/8 inch (9 mm).
 - 2. Slate Shingle Roofing: CUPA 12, Unfading Dark Gray slate with thin laminations and a smooth surface by CUPA PIZARRAS.
 - a. Thickness: Nominal 3/16 inch (5 mm).
 - b. Thickness: Nominal 4/16 (6 mm).
 - 3. Slate Shingle Roofing: CUPA 14, Unfading black slate with thin laminations and a riven surface by CUPA PIZARRAS.
 - a. Thickness: Nominal 3/16 inch (5 mm).
 - b. Thickness: Nominal 4/16 inch (6 mm).
 - c. Thickness: Nominal 1/4 inch (7.5 mm).
 - d. Thickness: Nominal 3/8 inch (9 mm).
 - 4. Slate Shingle Roofing: CUPA 98, Unfading dark gray slate with thin laminations and a riven surface by CUPA PIZARRAS.
 - a. Thickness: Nominal 3/16 inch (5 mm).
 - b. Thickness: Nominal 4/16 inch (6 mm).

- c. Thickness: Nominal 1/4 inch (7.5 mm).
- d. Thickness: Nominal 3/8 inch (9 mm).
- 5. Profile (Format): Rectangular.
- 6. Type:
 - a. Excellence.
 - b. Ardoisier
 - c. Heavy.
- 7. Installation Method:
 - a. Nailed.
 - b. Hooks.
- 8. Holes: Provide with factory made holes for head fixing in manufacturer's standard size and locations, unless otherwise indicated. Typically two holes, one on each long side, approximately 1/3 the distance down from the head (top) of slate shingles.

2.4. SOLAR SLATE SHINGLE ROOFING

- A. Description: THERMOSLATE solar collectors by CUPA PIZARRAS, not visible once installation is complete, fully integrated into exterior design. Provide to meet the following:
 - 1. Installation Location: _____ solar zone.
 - 2. Number of Occupants: _____.
 - 3. Configuration: As shown on the Drawings.
 - 4. Solar Power Storage and Distribution System: Refer to the Drawings; not provided by solar slate shingle roofing supplier.
 - 5. Average Solar Contribution: 50 to 60 percent.
 - 6. Solar Collector: Complete with top and bottom integration frames, ready for field connection to solar cylinders and control units.
 - a. Weight: 4.09 pounds per square foot (20 kilograms per square meter).
 - 7. Provide with manufacturers connections between panels, retaining clips, flexible hose connection, nuts, washers and reducers, and waterproof flashings and components between panel.
- B. Slate Shingle Solar Roofing - Sloped: Provide THERMOSLATE by CUPA PIZARRAS to meet the following:
 - 1. Slate Shingles: As specified above.
 - 2. Installation Method: Nailed.
 - 3. Installation Method: Hooks.
- C. Slate Shingle Solar Roofing - Horizontal (Flat): Provide THERMOSLATE by CUPA PIZARRAS to meet the following:
 - 1. Slate Shingles: As specified above.
 - 2. Installation Method: Nailed.
 - 3. Installation Method: Hooks.

2.5. SOLAR SLATE SHINGLE RAISED FLOORING

- A. Description: THERMOSLATE solar collectors by CUPA PIZARRAS, not visible once installation is complete, fully integrated into exterior design. Provide to meet the following:
 - 1. Installation Location: _____ solar zone.
 - 2. Number of Occupants: _____.
 - 3. Configuration: As shown on the Drawings.
 - 4. Solar Power Storage and Distribution System: Refer to the Drawings; not provided by solar slate shingle roofing supplier.
 - 5. Average Solar Contribution: 50 to 60 percent.
 - 6. Solar Collector: Complete with top and bottom integration frames, ready for field connection to solar cylinders and control units by others.
 - a. Weight: 4.09 pounds per square foot (20 kilograms per square meter).
 - 7. Provide with manufacturers connections, thermal adhesive, and insulation core.
- B. Technical Solar Floor: Provide THERMOSLATE by CUPA PIZARRAS to meet the following:

1. Slate Shingles: As specified above.
2. Installation Method: Manufacturer's adhesive.

2.6. SLATE SHINGLE VENTILATED FACADE CLADDING SYSTEM

- A. Ventilated Facade Cladding System, Invisible Fastening: Provide CUPACLAD 101 - Logic, by CUPA PIZARRAS to meet the following:
 1. Slate Size: 16 by 8 inch (400 by 200 mm).
 2. Average Thickness: 1/4 to 3/8 inch (7.65 mm).
 3. Color and Type: As selected by the Architect.
- B. Ventilated Facade Cladding System, Invisible Fastening: Provide CUPACLAD 101 - Random, by CUPA PIZARRAS to meet the following:
 1. Slate Sizes:
 - a. 20 by 10 inch (500 by 250 mm).
 - b. 20 by 8 inch (500 by 200 mm).
 - c. 20 by 6 inch (500 by 150 mm).
 2. Average Thickness: 1/4 to 3/8 inch (7.65 mm).
 3. Color and Type: As selected by the Architect.
- C. Ventilated Facade Cladding System, Invisible Fastening: Provide CUPACLAD 101 - Parallel, by CUPA PIZARRAS to meet the following:
 1. Slate Size: 16 by 10 inch (400 by 250 mm).
 2. Average Thickness: 1/4 to 3/8 inch (7.65 mm).
 3. Color and Type: As selected by the Architect.
- D. Ventilated Facade Cladding System, Visible Fastening: Provide CUPACLAD 201 - Vanguard, by CUPA PIZARRAS to meet the following:
 1. Slate Size: 24 by 12 inch (610 by 305 mm).
 2. Average Thickness: 1/4 to 3/8 inch (7.65 mm).
 3. Color and Type: As selected by the Architect.

2.7. ACCESSORIES

- A. Self-Adhering Underlayment:
 1. Provide flexible waterproofing sheets to ASTM D1970 with the following characteristics:
 - a. Type: Vapor permeable roofing underlay for discontinuous roofing.
 - b. Weathertightness: Resist passage of water, wind-blown snow, and dust into building interiors.
 - c. Applications: Suitable for warm non-ventilated, or cold ventilated pitched roof systems.
 - d. Wind Loading: When installed on appropriately spaced battens, the product's physical properties are adequate to resist wind loads imposed on the underlay and will reduce wind uplift forces on the roof covering.
- B. Fasteners:
 1. Nails:
 - a. Typically aluminum or copper. Provide silicone bronze or stainless steel in coastal or corrosive areas.
 - b. Unless otherwise required by the local building code, nail gauge typically equals the length of slate minus the lap, divided by 2.
 2. Hooks:
 - a. Type 316 stainless steel, crimped shank hooks formed of stainless steel wire.
 - b. Unless otherwise required by the local building code, hook gauge typically equals the length of slate plus 0.39 inch (10 mm), divided by 2.
- C. Mortar for Bedding and Pointing: 1:3 cement / sand pigmented to match the color of the slate.

- D. Eave Carrier: Purpose made protection strip to overhang fascia board and gutter as shown on the drawings.

3.EXECUTION

3.1. EXAMINATION

- A. Verification of Conditions:
 - 1. Verify surfaces are uniform, smooth, clean and dry.
 - 2. Confirm work by others is installed per the project requirements.
 - 3. Commence installation after required inspections. Do not cover work by others prior to inspection or acceptance.
- B. Do not proceed until unacceptable conditions are corrected.

3.2. PREPARATION

- A. Slates are supplied in pallets stacked on the long side. Once removed from pallets, grade and sort slates into thicknesses of 3 or 4 shingles. Tap each slate to confirm soundness. Once slates have been graded and checked for imperfections, installation can begin.
- B. Clean and prepare surfaces in accordance with the manufacturer's instructions to achieve the best results under the project conditions.
- C. Verify overall roof design, including whether ventilation will occur downwards at the ceiling joist level and soffits ("cold roof" with insulation at ceiling level), or upwards at rafters and ridges ("warm roof" with insulation at the rafter level).
 - 1. Coordinate accessories and installation sequencing as required to ensure ventilation will not be compromised.
 - 2. Confirm additional ventilation requirements, including the use of continuous vents, with the drawings and local building code.

3.3. UNDERLAYMENT APPLICATION

- A. Self-Adhering Underlayment:
 - 1. Install over the entire exterior surface unless indicated otherwise on the Drawings.
 - 2. Overlap no less than 6 inches (150 mm). Leave a 2 inch (50 mm) gap at vents, coordinate with vent accessory manufacturer instructions to tie in and finish underlayment with vent flanges or profiles.

3.4. FLASHING INSTALLATION

- A. Install flashings to shed water and prevent water penetration include corners, edges, window frames, doors and other openings, and as indicated in manufacturer's details.

3.5. SLATE SHINGLE ROOFING INSTALLATION

- A. Nailing Installation:
 - 1. Install two nails per shingle through holes. If single head nailing is permitted by the local building code, at least every third course shall be double nailed to resist wind uplift.
- B. Hook Installation:
 - 1. Install in accordance with the hook manufacturers instructions.
 - 2. Perimeter slates shall be hook fixed and nailed.
 - 3. Verge slates shall be nailed.
- C. Layout:
 - 1. Once battens are fixed, mark every second perpendicular line for slate joints.
 - 2. Install the thickest slates at the lowest courses and thinnest slates towards the ridge.

3. Lay all courses slate with thicker end at the bottom (tail).
 4. Leave a gap of 0.1 to 0.2 inch (3 to 5 mm) between each slate.
 5. Install head laps and side laps to match patterns shown on the drawings.
 6. Comply with manufacturer's details for changes in pitch and interface with adjacent materials.
- D. Eave Slates:
1. Extend bottom course over gutters approximately 2 inches (50 mm).
 2. Head of the eave should sit on the first batten underneath the first full course's fastener holes and be fixed in position at the second batten.
 3. Eave slates should be inverted and fixed face down.
 4. Head nail under course slates to the under eaves battens.
- E. Hips and Valleys:
1. Ensure the width of cut slate is sufficient to allow adequate fastening. Where necessary use a slate and a half or larger pieces to avoid the use of pieces smaller than a half-shingle.
- F. Ridges:
1. Cut top slate to maintain the lap and double nail to the last batten.
 2. Make watertight by laying either ridge slates or metal capping to a true line with edges and joints bedded in mortar. Separate pointing is not recommended.
 3. Fill ridge ends with mortar, finish slate slips flush.
- G. Centerline of ridges (verges) and abutments to vertical surfaces:
1. Begin every other course with a slate and a half.
 2. No slate beginning a course should be less than 5-3/4 inch (145 mm).

3.6. SOLAR SLATE SHINGLE ROOFING INSTALLATION

- A. Install in accordance with the manufacturers details and instructions including:
1. Install panel support profiles spaced 23.6 inch (600 mm) apart. Fasten with WURTH type screws spaced in accordance with the manufacturer's details.
 2. Install support profiles for integration parts, typically 5 inch (130 mm) and 5-1/2 inch (140 mm) spacing.
 3. Install remaining profiles over entire raised floor area.
 4. Install 2 inch high (50 mm) insulation boards, minimum 12 inch (300 mm) wide. Fit between profiles as indicated in manufacturers details.
 5. Install solar collectors in sequence using screwdriver with 1/2 inch (13 mm) socket and self-drilling screws in spacing pattern recommended by the manufacturer.
 6. Connect collectors using manufacturer provided corrugated tubes.
 7. Place reinforcement parts over tubes.
 8. Install integration parts with 1/2 inch (13 mm) socket and self-drilling screws in spacing pattern recommended by the manufacturer.
 9. Connect maximum 8 modules either in series or parallel connections as recommended by the manufacturer depending on layout, installation conditions, and to maximize solar radiation hours. Connect with seal fitting to ensure watertightness at joints. Two wrenches are required to tighten the joints so one secures the fixed parts and the other tightens the sliding nuts.
 10. Each collector batter consists of a series of elements which must be installed in accordance with the manufacturer's instructions for proper operation, maintenance, and verification. Batteries must be hydraulically balanced either by balancing the valves, or connecting batteries with the same number of collectors and using inverted return tubes.
 11. Comply with manufacturer's instructions for working fluid, water with additives, to serve as the primary circuit. The fluid must be in the correct proportion to protect against frost.
 12. Place shut-off valve at the battery input to insulate the battery from the rest of the installation, along with a safety valve with 6 bar calibration.

13. Place deaerator at each battery output and the shut-off valve to insulate the battery in the event of a breakdown or maintenance.
14. Control installation by installing a sensor at the battery output.
15. Install an extendable anti-vibration hose at the battery input to absorb thermal expansions.
16. Install manufacturer's thermal adhesive around perimeter.
17. Fasten slate panels to patterns and layout indicated on the drawings.

3.7. SOLAR SLATE SHINGLE RAISED FLOORING INSTALLATION

- A. Install in accordance with the manufacturers details and instructions including:
 1. Install over waterproofed structure sloped to drain, topped with leveling mortar.
 2. Install panel support profiles spaced 23.6 inch (600 mm) apart. Fasten with WURTH type screws spaced in accordance with the manufacturer's details.
 3. Install support profiles for integration parts, 5 inch (130 mm) and 5-1/2 inch (140 mm) spacing.
 4. Install remaining profiles over entire raised floor area.
 5. Install 2 inch high (50 mm) insulation boards, minimum 12 inch (300 mm) wide. Fit between profiles as indicated in manufacturers details.
 6. Install solar collectors in sequence using screwdriver with 1/2 inch (13 mm) socket and self-drilling screws in spacing pattern recommended by the manufacturer.
 7. Connect collectors using manufacturer provided corrugated tubes.
 8. Place reinforcement parts over tubes.
 9. Install integration parts with 1/2 inch (13 mm) socket and self-drilling screws in spacing pattern recommended by the manufacturer.
 10. Connect maximum 8 modules either in series or parallel connections as recommended by the manufacturer depending on layout, installation conditions, and to maximize solar radiation hours. Connect with seal fitting to ensure watertightness at joints. Two wrenches are required to tighten the joints so one secures the fixed parts and the other tightens the sliding nuts.
 11. Each collector batter consists of a series of elements which must be installed in accordance with the manufacturer's instructions for proper operation, maintenance, and verification. Batteries must be hydraulically balanced either by balancing the valves, or connecting batteries with the same number of collectors and using inverted return tubes.
 12. Comply with manufacturer's instructions for working fluid, water with additives, to serve as the primary circuit. The fluid must be in the correct proportion to protect against frost.
 13. Place shut-off valve at the battery input to insulate the battery from the rest of the installation, along with a safety valve with 6 bar calibration.
 14. Place deaerator at each battery output and the shut-off valve to insulate the battery in the event of a breakdown or maintenance.
 15. Control installation by installing a sensor at the battery output.
 16. Install an extendable anti-vibration hose at the battery input to absorb thermal expansions.

3.8. SLATE SHINGLE VENTILATED FACADE CLADDING SYSTEM INSTALLATION

- A. Invisible Fixing Installation (CUPACLAD 101):
 1. Install metal brackets in alternate course on each side of the vertical profile. Use both fixed point metal brackets on the upper end of each profile, and brackets with a sliding point to allow for expansion of the profile.
 2. Install insulation in accordance with insulation manufacturer's instructions. Ensure sufficient attachment to prevent sagging over time.
 3. Install L shaped profiles to the metal brackets allowing at least 3/4 inch (2 cm) air cavity.
 4. Verticals must be perfectly level before fitting the remainder of the system components.
 5. Install horizontal profiles, fastening at each intersection.

6. Horizontal profiles must be perfectly level as their position will determine the final position of the slates.
 7. Fit inverted horizontal profile in the first course to install the first course of slate.
 8. Install ventilation flashing at the first course of the cladding and metal flashing at corners, edges, window frames, doors and other openings.
 9. Install the first course slate, cut to a height of approximately 3 inch (80 mm). Fit inverted matching the bottom edge of the slate with the first horizontal profile.
 10. Fasten slates using manufacturer's specially designed self-drilling stainless steel screws with large flat head.
 11. Each slate must be aligned with the upper edge of the profile and fitted with two screws.
 12. Minimum headlap 2 inches (50 mm).
 13. Maintain exposed slate margin by cutting slates at the top course.
 14. Install full slate and a half in alternate courses, next to openings, and external edges. Coordinate with flashing as required.
- B. Visible Fixing Installation (CUPACLAD 201):
1. Install metal brackets in alternate course on each side of the vertical profile. Use both fixed point metal brackets on the upper end of each profile, and brackets with a sliding point to allow for expansion of the profile.
 2. Install insulation in accordance with insulation manufacturer's instructions. Ensure sufficient attachment to prevent sagging over time.
 3. Install L shaped profiles to the metal brackets allowing at least 3/4 inch (2 cm) air cavity.
 4. Verticals must be perfectly level before fitting the remainder of the system components.
 5. Install horizontal profiles, fastening at each intersection. Leave gap as recommended by the manufacturer.
 6. Horizontal profiles must be perfectly level as their position will determine the final position of the slates.
 7. Install ventilation flashing at the first course of the cladding and metal flashing at corners, edges, window frames, doors and other openings.
 8. Fix the slates with CUPACLAD Vanguard clips, fitted to the holes in the horizontal profiles. Each slate shall be supported by two clips on the lower edge and fitted with another two on the top.
 9. Fix the top slates using the 201-V top profile, fasten using two self-drilling screws

3.9. CLEANING

- A. Remove all broken slate shingles, debris and excess materials from the project site.
- B. Sweep or brush slate shingles clean.

3.10. REPAIR AND REPLACEMENT

- A. Damaged Shingles:
1. Break out damaged materials.
 2. Repair torn underlayment if required.
 3. Drive fastener flush.
 4. Apply minimum 3/8 inch (10 mm) by 2 inch (51 mm) bead of approved adhesive in course below replacement slate shingle.
 5. Immediately set replacement slate shingle in position assuring proper contact.

3.11. PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION