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USACE / NAVFAC / AFCEC **UFGS-07 31 26 (August 2025)**

Preparing Activity: USACE **Superseding**
UFGS-07 31 26 (August 2009)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2025

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SLATE SHINGLES

08/25

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SECTION 07 31 26

SLATE SHINGLES
08/25

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NOTE: This guide specification covers the requirements for slate roofing on new construction and on historic buildings which require replacement, reinstallation, or repair of slate roofs.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

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NOTE: Coordinate this section with other system components specifications such as Section 05 30 00 STEEL DECKS and Section 07 60 00 FLASHING AND SHEET METAL. Also coordinate this section with the criteria of UFC 3-110-03, as it relates to the specific project and service exeception indicated therein.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A240/A240M	(2025a) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A480/A480M	(2025a) Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
ASTM B101	(2022) Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction
ASTM B370	(2022) Standard Specification for Copper Sheet and Strip for Building Construction
ASTM C406/C406M	(2022) Standard Specification for Roofing Slate
ASTM D146/D146M	(2004; R 2020) Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing
ASTM D412	(2016; R 2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

FM GLOBAL (FM)

FM 4473	(2005) Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice

Balls

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA RoofMan (2025) The NRCA Roofing Manual

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793 (2012) Architectural Sheet Metal Manual, 7th Edition

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-110-03 (2012; with Change 5, 2020) Roofing

UL SOLUTIONS (UL)

UL 2218 (2010; Reprint May 2024) UL Standard for Safety Impact Resistance of Prepared Roof Covering Materials

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy and Air Force projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for

Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Sample Warranty Certificates; G, [_____]

SD-02 Shop Drawings

Drawings; G, [_____]

SD-03 Product Data

Slate

Qualifications

Nails

SD-04 Samples

Shingle Samples

Accessories for Slate Roofs

Sealants

Underlayment Membrane

Fastener

SD-07 Certificates

Materials

SD-11 Closeout Submittals

Contractor's Warranty

Manufacturer's Warranty

EXTRA STOCK

ROOF INFORMATION CARD

1.3 QUALITY CONTROL

Provide qualified workers, trained and experienced in installing slate roofing systems of this configuration, and submit documentation of 5 consecutive years of work of this type. Show familiarity with and perform work in accordance with [SMACNA 1793] [and] [NRCA RoofMan]. As proof of Qualifications, submit documentation showing qualifications of personnel proposed to perform the roofing work, and a list of installations made identifying when, where, and for whom the installations were made. Submit drawings showing slate installation and appearance details, flashing details, and nailing patterns for the slates.

1.3.1 Pre-roofing Conference

After approval of submittals and before performing roofing system installation work, hold a pre-roofing conference to review the following:

a. Drawing, specifications, and submittals related to the roof work.

b. Roof system components installation.

c. Procedure for the roof manufacturer's technical representative's onsite inspection and acceptance of the roofing substrate, the name of the manufacturer's technical representatives, the frequency of the onsite visits, distribution of copies of the inspection reports from the manufacturer's technical representative.

d. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components impacting the roof.

e. Quality control plan for the roof system installation.

f. Property protection measures.

g. Safety requirements.

Coordinate and schedule a pre-roofing conference with the Contracting Officer and attended by the Contractor, the Contracting Officer's designated personnel, personnel directly responsible for the installation of roof system, related sheet metal works, [[mechanical][and][electrical] work], other trades interfacing with the roof work, and a representative of the tile material manufacturer. Before beginning roofing work, provide a copy of meeting notes and action items to all attending parties. Note action items requiring resolution prior to start of roof work.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials in manufacturer's unopened bundles and containers with the manufacturer's brand and name marked clearly thereon. Store shingles in accordance with manufacturer's printed instructions and roll goods on-end in an upright position. Immediately before installing, store underlayment for 24 hours in an area maintained at a temperature not lower than 10 degrees C 50 degrees F.

Do not store materials on roof decks in such a manner as to overstress [and][or] damage the deck and supporting structure. Avoid placing loads at midspans of framing. Superimposed loads are required to be well distributed.

1.5 PROJECT/SITE CONDITIONS

Perform slate roofing operations when existing and forecasted weather conditions permit work in accordance with manufacturer's recommendations and warranty requirements. Apply elastomeric membrane underlayment only in fair weather when air and surface temperatures are above 5 degrees C 40 degrees F. Provide temporary protection materials maintained on the site at all times for temporary roofing, flashing, and other protection when delays and/or changed weather conditions do not permit completion of each

unit of work prior to the end of each working day. Remove and discard materials which have been used for temporary roofing, flashing and other protection.

1.6 WARRANTY

Warranties must begin on the date of Government acceptance of the work. Submit sample warranty certificates during the pre-construction phase to prove all warranty requirements will be achieved.

1.6.1 Contractor's Warranty

The Contractor is required to warrant for five years that the tile roofing system, as installed, is free from leaks and defects in workmanship. When repairs due to defective workmanship are required during the Contractor's warranty period, the Contractor is to make such repairs within 72 hours of notification.

1.6.2 Manufacturer's Warranty

Provide manufacturer's no dollar limit (NDL) material and labor warranty against defects in material and workmanship that affect the appearance, leak resistance, and attachment of slate roof assembly, including related metal flashing, for a minimum period of 30 years from date of final acceptance of the work.

1.7 EXTRA STOCK

Provide an extra two percent of each type and color of slate used in clean marked containers. In the extra stock provided, include hip, ridge, and other special shapes in the same proportion as used on the project.

1.8 ROOF INFORMATION CARD

Provide a typewritten information card for facility records and an engraved aluminum or dense plastic plaque containing the roof assembly type and makeup, system installer, system manufacturer, installation completion date and warranty period. Display at interior roof access points or an exterior location if no such interior access point exists.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Provide a roofing system of natural rock slate, underlayment, and associated materials on steep-slope roof structures to shed water and protect the roof deck. Roofing systems must be in accordance with UFC 3-110-03. Establish units of work, including preparation of surfaces and application of underlayment, nailers, and related temporary and/or permanent flashing.

2.2 MATERIALS

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NOTE: Edit these paragraphs to meet project requirements.
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Submit certificates of compliance attesting that the materials meet

specification requirements.

2.2.1 Slate

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NOTE: Include bracketed sentence requiring impact resistance requirements when project is located in a hail-prone area.
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Provide slate conforming to ASTM C406/C406M. Slate must be Grade A, (ASTM S1), hard, dense rock, punched or drilled for two nails each.[Slate must meet UL 2218 or FM 4473, Class 4, impact resistance requirements.] Do not use cracked slate. Exposed corners must be full. Broken corners on covered ends which sacrifice nailing strength or the laying of a watertight roof are not allowed. Submit three representative shingle samples to show color range.

2.2.1.1 Standard Thickness Roofing Slate

Slate must be [smooth texture][rough texture] [5 to 6 mm 3/16 to 1/4 inch thickness] [all [_____] thickness] [[_____] and [_____] intermingled thicknesses]. Slate must be the following sizes: [[_____] by [_____]] [graduated lengths] [and] [random widths].

2.2.1.2 Graduated Roof Slate

Slate must be [smooth texture][rough texture] and vary in thickness from [_____] at eave to [_____] at ridge; the percentage of each thickness to be respectively [_____]. Intermingle the thicknesses in the various courses, modulating from the heavier and thicker slates in the lower courses of the roof to the thinner slates at the ridge. Provide slate in standard random widths graduated in length from [_____] at eave to [_____] at ridge, and apply with standard 75 mm 3 inch lap and exposures.

2.2.1.3 Slate Colors

Provide [unfading][semi-weathering] slate. Select color from manufacturer's standard samples.

2.2.2 Underlayment Membrane

Provide an underlayment membrane on all surfaces to be covered with slate consisting of high strength elastomeric self-adhering membrane.

2.2.2.1 Elastomeric Membrane Underlayment

Provide a cold applied composite self-adhering membrane of not less than 1.02 mm 0.040 inch thick high strength polyethylene film with slip resistant embossing, coated on one side with a thick layer of adhesive-consistency rubberized asphalt, interwound with a disposable silicone coated release sheet. Ensure the tensile strength and elongation values provided are no less than 1.7 MPa 250 psi when tested in accordance with ASTM D412 are not acceptable and do not affect pliability when testing in accordance with ASTM D146/D146M.

2.2.2.2 Elastomeric Membrane Accessories

Provide membrane manufacturer's approved two component urethane, mastic

and primer. Provide membrane manufacturer's recommended flashing, expansion joint covers, temporary UV protection and corner fillets.

2.2.3 Nails

Use large-headed slater's solid copper nails or stainless steel, minimum 10 gauge metal, minimum 8 mm 5/16 inch head of sufficient length to adequately penetrate the nailing surface. Thicker slates will require longer and heavier gauge nails. Determine the proper size by adding 25 mm 1 inch to twice the thickness of the slate. Use ring shank nails to retain copper flashing and slate at rake edges, hips, ridges, and eaves prone to wind damage.

2.2.4 Flashing

Provide a minimum 0.57 kg 20 ounce, light cold-rolled temper (H00) copper flashing conforming to ASTM B370, minimum 0.57 kg 20 ounce lead-coated copper in accordance wit ASTM B101, or minimum 26 gauge .018 inch stainless steel in accordance with ASTM A240/A240M and ASTM A480/A480M. Use like metals on all components of fastening systems and flashing in order to avoid galvanic action. Provide flashing in accordance with Section 07 60 00 FLASHING AND SHEET METAL.

2.2.5 Elastic Cement

Provide an approved brand of waterproof elastic slater's cement and match color as nearly as possible to the general color of the slate.

2.2.6 Acid Neutralizing Wash

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NOTE: In areas of the country where past burning of fossil fuels has caused acid staining of slate roofs and existing portions of the roof are being reused or are to remain in place, application of an acid neutralizing wash is recommended. Edit specification to meet project requirements.

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Provide non-destructive wash formulated to neutralize the effects of acid deposits resulting from the past burning of fossil fuels (particularly coal). The wash must not change the color, appearance, or life of the slate roof, copper flashing and accessories, underlayment, adhesives or the wall surfaces of the building.

2.2.7 Sealants

Where required, provide sealanta in accordance with the slate manufacturer's recommendations.

2.3 ACCESSORIES FOR SLATE ROOFS

2.3.1 Crickets or Saddles

Provide crickets of light rafter construction covered with sheathing, underlayment, and copper sheet metal specified in Section 07 60 00 FLASHING AND SHEET METAL. If the cricket area is large and exposed to view, slate it the same as other roof areas.

2.3.2 Snow Guards

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NOTE: Snow guards are necessary accessories for most slate roofs in sections of the country where masses of snow and ice accumulate on the roof that can slide from the roof onto lower roof surfaces and gutters. Snow guards are manufactured in various forms, and each type requires different methods of application. They may be obtained from slate distributors, quarriers of roofing slate, or manufacturers. Edit to meet project requirements.

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Provide nonferrous metal snow guards, as indicated.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection of Roof Surfaces

Lay out and present the work plan to the Project Superintendent to prevent other trades from working on or above completed roofing. Use equipment (such as padded ridge ladders) and techniques to prevent damage to roof as a result of foot or material traffic. Contractor is responsible for controlling breakage of new or existing slate beyond what is indicated. Personnel who are working on the roof are required to wear proper shoes which does not further damage slates and have soles made of a material which aids in preventing falls.

3.1.2 Protection of Elastomeric Membranes

Do not leave elastomeric membrane underlayment exposed to sunlight. Cover exposed membrane with slate roofing as soon as possible, not to exceed the maximum exposure limit published by the manufacturer, and in no case longer than 120 days. Patch membrane damaged due to exposure to sunlight prior to the application of final roof covering.

3.1.3 Preparation Of Roof Deck Surfaces

Ensure roof deck surfaces are smooth, clean, firm, dry, and free from loose boards, large cracks, and projecting ends that might damage the roofing. Clean foreign particles from interlocking areas to ensure proper seating and to prevent water damming. Prior to installation of slate, properly finish and secure in position vents and other projections through roofs and drive projecting nails firmly home.

3.1.4 Surface Preparation for Elastomeric Membrane Underlayment

Remove dust, dirt, loose nails or other protrusions. Priming is not required for wood or metal surfaces but is necessary on concrete or masonry surfaces.

3.1.5 Slate Removal

here work involves partial replacement or repair of roof, verify each slate for tightness and continued use. Perform testing with broad, flat-nosed, slater's pliers. Mark slates which have been identified for

replacement or re-installation with a non-destructive color mark removable by solvent, rather than water, and for approval within 30 days after Notice to Proceed. Submit representative samples of each fastener with identifying tags.

3.2 INSTALLATION

3.2.1 Primer for Elastomeric Membrane Underlayment

Apply primer at a coverage rate of 6-9 sq. meters/L 250-350 sq. ft./gal. Apply the primer by spray or paint roller. Cover pine wood decks with minimum 6 mm 1/4 inch plywood prior to receiving membrane coverage.

3.2.2 Membrane Application

Apply membrane according to manufacturer's instructions and adhere it directly to roof deck. Peel the release paper back 300 to 600 mm 1 to 2 feet; align the membrane on the lower edge of the roof when the first 300 to 600 mm 1 to 2 feet are placed. Peel the release paper under the membrane from the membrane and press the membrane in place. Roll lower edges firmly with a wallpaper or hand roller. For ice dam protection, apply the membrane to reach a point above the highest expected level of ice dams; refer to drawings for extent. Overlap ends and edges a minimum of 150 mm 6 inches. Folded membrane onto the exposed face of the roof edge to be trim as necessary to prevent the edge of the membrane from showing after the permanent edge metal flashing is installed.

3.2.3 Valley and Ridge Application

Peel the release paper sheet and center over the valley or ridge, then drape and press in place, working from the center of the valley or ridge outward in each direction. For valleys, apply membrane starting at the low point and working upwards. Overlap all sheets a minimum of 150 mm 6 inches.

3.2.4 Vertical Membrane Flashings

Vertical wall installations are to receive primer prior to the application of membrane. Apply primer at a coverage rate of 6-9 sq. meters/L 250-350 sq. ft./gal. Turn membrane up walls and dormers as indicated. Mechanically fasten vertical membrane terminations and trowel with a mastic as approved by the membrane manufacturer. It is allowable to fold the membrane onto the fascia as long as it is covered by a gutter metal edge or other material.

3.2.5 Metal Flashing

Provide metal flashing as shown at intersections of vertical or projecting surfaces through the roof or against which the roof abuts, such as walls, parapets, dormers, and sides of chimneys. Install flashing in accordance with Section 07 60 00 FLASHING AND SHEET METAL.

3.2.6 Slating

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NOTE: The best guide to traditional slating installation procedures is "Slate Roofs", published in 1925 by the National Slate Association. A reprint was issued in 1977 by the Vermont Structural

Slate Co. The Steep Roofing Section of the National Roofing Contractors Association Roofing Manual contains a section on Slate Roofing which is essentially an abridged and edited version of the original 1925 publication.

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3.2.6.1 Repair and Replacement

Salvage and reuse intact and serviceable existing slate materials whenever possible. Ensure new slate being incorporated into existing slate roofs matches the existing as closely as possible. Use slate from the same quarry or manufacturer as the original, if possible. Intermingle existing reusable slates removed from the repair area with new slates to provide a smooth visual transition between new and existing areas. Apply slating as indicated.

3.2.6.2 Slate Coursing

Ensure the slate projects 50 mm 2 inches at the eaves and 25 mm 1 inch at gable ends, and lay it in horizontal courses with 75 mm 3 inch headlap (unless otherwise indicated), break joints with the preceding course by at least 75 mm 3 inches. Double slates at the eaves or cornice line cant 6 mm 1/4 inch by a wooden cant strip, using same thickness slate for under-eaves at first exposed course. Install under-eave slate approximately 75 mm 3 inches longer than exposure of first course. Through joints from the roof surface to the underlayment are not allowed.

3.2.6.3 Nailing

Fasten each slate with a minimum of two nails of sufficient length to penetrate the nailing surface at least 19 mm 3/4 inch or through the decking thickness, whichever is less. Where the underside of the roof decking is exposed to view, such as in overhanging eaves, ensure the nails are long enough to penetrate the roof decking but not so long that they may be driven through the decking. The heads of the slating fasteners are required to just touch the slate and not driven "home" or draw the slate, but left with the heads just clearing the slate so that the slate hangs on the fastener. Do not allow fasteners in slates overlapping sheet metalwork to puncture the sheet metal. Exposed fasteners are permissible only in top courses where unavoidable, but covered with elastic cement. Lay hip slates and ridge slates in elastic cement spread thickly over unexposed surface of under courses of slate, fastened securely in place and pointed with elastic cement.

3.2.6.4 Vertical Surfaces

Fit slate neatly around pipes, ventilators, chimneys and other vertical surfaces. Fit vertical surfaces with project through the roof surface at a right angle to the slope of the roof with a cricket built into the roof to divert water away from the back of the vertical member.

3.2.6.5 Hips

Lay hips to form a [fantail][saddle][mitered][Boston] hip[as indicated].

3.2.6.6 Ridges

Lay ridges to form [comb][saddle][strip saddle] ridges. Pass the

fasteners of the combing slate through the joints of the slate below. Lay the combing slate with the same exposure as the next course down. Project combing slates sloping away from the direction of the prevailing storms 25 mm 1 inch above the combing slate on the opposite side of ridge.

3.2.6.7 Valleys

Lay valleys to form [closed][open][round] valleys. Form open-type valleys with the main roof at cricket areas.

3.3 INSPECTION

Contractor's quality control inspections and inspections by the Government are to take place as the Work progresses to coordinate with the installation and removal of the work access devices. Notify the Contracting Officer a minimum of 48 hours in advance of requested inspections and maintain work access devices in place to provide access to uninspected areas until final acceptance by the Government.

-- End of Section --