JOINT BASE LEWIS McCHORD DESIGN STANDARDS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION SECTION 07 32 13

ROOF TILES

# 07/18

PART 1 GENERAL

**Note: No mechanical equipment on roof**. **Recommend mechanical equipment on the ground.**

* 1. REFERENCES

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.

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C1 (2003) All Timber Products – Preservative Treatment by Pressure Processes

ASTM INTERNATIONAL (ASTM)

ASTM C1167 (2011; R 2017) Standard Specification for Clay Roof Tiles

ASTM C1177/C1177M (2017) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

ASTM C270 (2014a) Standard Specification for Mortar for Unit Masonry

ASTM C67 (2017) Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile

ASTM D2178/D2178M (2015a) Asphalt Glass Felt Used in Roofing and Waterproofing

ASTM D226/D226M (2017) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

ASTM D412 (2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

ASTM D4586/D4586M (2007; E 2012; R 2012) Asphalt Roof

Cement, Asbestos-Free

ASTM E108 (2011) Fire Tests of Roof Coverings

ASTM E84 (2018) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA 0437 (2017) The NRCA Roofing Manual: Steep-slope Roof Systems

* 1. SUBMITTALS

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NOTE: If 01 33 29 is incorporated in the specifications, select that option below. If not, select the option for 01 57 19. Include items noted at SD-01 and SD-11 as applicable, based on project scope.

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Government approval is required for submittals with a “G” designation; submittals not having a “G” designation are for Contractor Quality Control approval. When used, a designation following the “G” designation identifies the office that will review the submittal for the Government. [Submittals with an “S” are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING]‌[Environmental Records Binder, in conformance to Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS]. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Concrete tile (Recycled Content); S

Fiber Underlayment (Recycled Content); S

SD-02 Shop Drawings

Clay tile roofing system SD-03 Product Data

Clay tile

Underlayment membrane

Flexible hip and ridge flashing Glass mesh mortar units

Fiberglass-faced gypsum roof board

Submit data including tile properties, styles, and configurations.

SD-04 Samples

Manufacturer’s color charts for Clay tile; G

Clay tile; G

Submit an appropriate number of tiles for each type to illustrate the full range of colors and surface finish.

SD-06 Test Reports

Self-adhering membrane underlayment Glass mesh mortar units

Fiberglass-faced gypsum roof board Preservative-Treated lumber

SD-07 Certificates

Qualifications of roofing personnel SD-08 Manufacturer’s Instructions

Installation

SD-11 Closeout Submittals

Concrete tile (Recycled Content); S

Fiber Underlayment (Recycled Content); S

* 1. DELIVERY AND STORAGE

Deliver materials in the manufacturer’s unopened bundles and containers bearing the manufacturer’s brand name. Keep materials dry, completely covered, and protected from the weather. Store according to manufacturer’s written instructions.

* 1. WARRANTIES
		1. Contractor’s Warranty

The Contractor shall warrant for 5 years that the tile roofing system, as installed, is free from defects in workmanship. When repairs due to defective workmanship are required during the Contractor’s warranty period, the Contractor shall make such repairs within 72 hours of notification.

When repairs are not performed within the specified time, emergency repairs performed by others will not void the warranty.

* 1. COORDINATION

Coordinate with the installation of flashing and gutters provided under Section 07 60 00 FLASHING AND SHEET METAL to ensure proper sequencing. Do not install roofing materials until vent stacks and other penetrations through roof deck have been installed.

* 1. EXTRA STOCK

Provide an extra two percent of each type and color of tile 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. QUALITY ASSURANCE
		1. Qualifications of Roofing Personnel

Submit documentation showing qualifications of personnel proposed to perform the roofing work and a listing identifying prior installations completed by the Contractor.

* + 1. Clay Tile Roofing System Drawings

Submit drawings showing clay tile roofing installation and details for appearance, flashing and fastening of tiles.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Clay Tile

ASTM C1167, Grade 1, Machine formed natural clay tiles, One Piece “S” Mission or Two Piece Spanish Mission consisting of a cover and pan tile, depending on the area specified by PW Planning, kiln-fired to vitrification and free from surface imperfections. Provide specially shaped, color-matched units as indicated including hip and ridge covers, rake covers and birdstops. Provide with fastening holes preformed at factory prior to firing.

2.1.2 Concrete Tile.

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Not recommended unless specified or approved by PW Planning Architect**.** If specified or approved, provide products and documentation in accordance with Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS] paragraph RECYCLED CONTENT. For more information see https://sftool.gov/greenprocurement/green-products/1/construction-materials/231/roofing-materials/0?addon=False and https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program.

2.2 UNDERLAYMENT MEMBRANE

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Provide underlayment membrane on surfaces that will be covered with tile. Membrane shall consist of asphalt glass felt or asphalt-saturated felt. Provide products and documentation in accordance with Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS] paragraph RECYCLED CONTENT. For more information see https://sftool.gov/greenprocurement/green-products/1/construction-materials/231/roofing-materials/0?addon=False and https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program.

2.2.1 Asphalt Glass Felt ASTM D2178/D2178M, Type VI.

2.2.2 Asphalt-Saturated Felt

Provide Type II, No. 30 asphalt felt in accordance with ASTM D226/D226M.

2.2.3 Flexible Hip and Ridge Flashing

SBS modified rubberized asphalt adhesive on a lineal, low density polyethylene membrane with a 1.52 mm 60 mil total thickness.

* + 1. Self-Adhering Membrane Underlayment

ASTM D412, high strength polyethylene-sheet-backed, rubberized asphalt membrane, 1.02 mm 40 mil thickness.

* + 1. Primer for Self-Adhering Membrane Underlayment

VOC compliant primer as recommended by membrane manufacturer for application on concrete substrates.

* 1. SUBSTRATE PANELS FOR APPLICATION OVER STRUCTURAL METAL DECK
		1. Fiberglass-Faced Gypsum Roof Board

ASTM C1177/C1177M, non-structural, fiberglass faced, silicone treated core gypsum panels, 1200 by 2400 by 13 mm 48 by 96 by 1/2 inch thickness.

* 1. FASTENERS
		1. Nails For Applying Felt Underlayment

Hot dip galvanized steel, 2.9 mm thick 11 gage, sharp pointed, conventional roofing nails with barbed shanks, minimum 9.5 mm 3/8 inch diameter head, and of sufficient length to penetrate 19 mm 3/4 inch into nailable through substrate panels. Verify that nails are compatible with flashing materials to prevent galvanic action.

* + 1. Nails for Installation of Tile

Copper ring shank nails, 3.3 mm 10 gage, with minimum 11 mm 7/16 inch diameter head or 3.3 mm 10 gage stainless steel ring shank nails with minimum 9.5 mm 3/8 inch head and of sufficient length to penetrate 19 mm 3/4 inch into wood ridge and hip boards or battens. Verify that chemicals used in pressure treatment of ridge and hip boards are compatible with copper nails.

* + 1. Single-Line Wire Tie System

2.5 mm 12 gage galvanized steel or 2.13 mm 0.084 inch stainless steel pre-formed wire ties with a hook on one end and a loop on the other end. Lengths as required for manufacturer’s recommended exposure.

* + 1. Wind Locks

2.5 mm 12 gage galvanized steel or 2.13 mm 0.084 inch diameter stainless steel formed wire clips. Select material type as recommended by manufacturer for specific locations.

* + 1. Hurricane Clips

Tile edge clips fabricated from 1.05 mm 19 gage galvanized steel or 1.07 mm 0.042 inch, type 302 stainless steel strips, 13 mm 1/2 inch wide. Provide with two nail holes in horizontal leg for anchorage to deck or substrate. Select material type as recommended by manufacturer for specific locations.

* 1. PRESERVATIVE-TREATED LUMBER

AWPA C1, provide treated ridge and hip boards, eave starter strips and battens.

* 1. MORTAR

ASTM C270, Proportion specification for Type M mortar mix.

* 1. ASPHALT PLASTIC CEMENT ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

* 1. EXAMINATION

Examine structural roof deck for compliance with requirements of selected system. Verify that roof penetrations and openings are installed in their proper location.

* 1. PREPARATION

3.2.1 Cleaning

Clean structural deck surfaces to receive substrate panels or underlayment.

* 1. INSTALLATION

Comply with manufacturer’s installation instructions and recommendations, but not less than recommended by NRCA 0437. Comply with local building code requirements for special fastening requirements such as wind locks and hurricane clips in high wind areas.

* + 1. Substrate Panels

Install fiberglass-faced gypsum roof boards] over corrugated metal structural deck as recommended by panel manufacturer.

* + 1. Felt Underlayment

For tile roof installations over concrete and wood roof decks with a slope of 4:12 or greater. Apply one layer of felt underlayment horizontally over entire surface to receive roofing tile, lapping succeeding courses a minimum of 50 mm 2 inches, end laps a minimum of 150 mm 6 inches, and hips and valleys a minimum of 300 mm 12 inches. Fasten felt with sufficient number of roofing nails to hold underlayment in place until roofing tile installation. Provide additional layer of felt underlayment when recommended by roof tile manufacturer.

* + 1. Clay Roofing Tile Installation

Beginning at eaves, install roofing tiles as indicated and in accordance with recommendations of the tile manufacturer and fastening system manufacturer. Sawcut tiles at hips valleys and ridges. Cut tile at valleys to form a straight border. Taper valleys from a 50 mm 2 inch

exposure on each side of valley at top and increase exposure 25 mm one inch, each side, per 2400 mm 8 feet of valley length. Set ridge and hip tile in a full bed of mortar and strike mortar flush with face of cover tiles. Nail hip and ridge tiles to hip and ridge boards.

Install 19 by 38 mm one by 2 inches treated wood battens with 13 mm 1/2 inch drain slots at 1200 mm 4 feet o.c. horizontally. At eave provide 38 by 38 mm 2 by 2 inches treated wood starter strip. Provide sheet metal birdstops at eave for “S” Type mission tile. At metal structural decks, attach battens with self-tapping screws through substrate panels into metal deck.

* + 1. CLEANING

Remove mortar and asphalt plastic cement spatter from exposed surfaces of tiles. Upon completion of work, remove excess materials and all refuse generated by the work of this section.

* 1. SCHEDULE

Some metric measurements in this section are based on mathematical conversion of English unit measurement, and not on metric measurement commonly agreed to by the manufacturers or other parties. The English and metric units for the measurements shown are as follows:

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| Products | English Units | Metric Units |
| Nails – diameter | 11 gage | 2.9 mm |
| head diameter | 3/8 inch | 9.5 mm |
| Nails – diameter | 10 gage | 3.3 mm |
| head diameter | 7/16 inch | 11 mm |
| Wire | 10 gage | 3.3 mm |
| 12 gage | 2.5 mm |
| 14 gage | 1.8 mm |
| 0.037 inch | 9.4 mm |
| 0.084 inch | 2.13 mm |
| Edge Clips | 18 gage | 1.2 mm |
| 19 gage | 1.05 mm |
| 0.042 inch | 1.07 mm |
| 1/2 inch | 13 mm |
| Birdstop | 26 gage | * 1. mm
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* End of Section --