

DESIGN STANDARDS

1. **GENERAL:** The intent of these standards is to provide general guidelines for the design and installation of tile roofs.
2. **Roof Design:**
 - 2.1 Clay tile roofs are a significant contributor to campus architecture and are the preferred sloped roof.
 - 2.2 All clay tile roofs shall utilize roof tiles of the Spanish One-piece S-design.
3. **Submittals:**
 - 3.1 Provide product data for each product specified for the tile roofing system. Include manufacturer's recommended construction details.
 - 3.2 **Samples for Initial Selection:** Provide manufacturer's color charts or sample kits showing the full range of colors and textures for each tile specified.
 - 3.3 **Samples for Verification:** Provide a minimum of three (3) each tiles for each tile selection to demonstrate the full range of texture and color expected in the full roof installation.
 - 3.4 Provide additional samples for accessory projects including underlayment, fasteners, and hurricane clips, metal, and sealants.
4. **Quality Assurance:**
 - 4.1 **Mock-up:** The Architect shall work with the University's Project Manager to determine the need for a field mock-up. If required, the Architect shall provide a detailed description of mock-up requirements.
 - 4.1.1 Typical requirements include size and location. Mock-up may include construction of hips, valleys or ridges, or any special or unique details included in the project. Determine if the mock-up is to be an independent construction to be demolished at the completion of the project or if the mockup can be on the building and incorporated as part of the final building construction.
 - 4.1.2 Special attention shall be paid to unique construction conditions related to expansion joints, edge conditions, lightning protection system, and coordination with gutters and downspouts.
 - 4.2 Architect shall require contractor to engage a roof installer to perform the work of this section who has 5 years minimum experience in the installation of clay or concrete tile roofing.
 - 4.3 Always use hurricane clips on tile roofing systems.

**DIVISION 7 – THERMAL AND MOISTURE PROTECTION
TILE ROOFING**

07320-2

4.4 Architect to review areas of roof or roof-mounted equipment that will require periodic access across clay tiles and require treated wood sleeper supports under tiles to prevent damage to tiles.

4.5 Warranty: Require the contractor to provide a warranty signed by the General Contractor and his roofing subcontractor agreeing to repair or replace all components of the tile roofing system that fail to perform, whether the fault of facility workmanship or materials for a period of 5 years at no additional cost to the Owner.

4.5.1 For purposes of the contractor's warranty, components of the tile roofing system shall include mechanical fasteners, metal flashings, mortar, sealants, and other materials utilized in the installation.

PRODUCTS

1. Roof Tiles: The historic standard roof tile is the clay S-tile as manufactured by Ludowici Roof Tile: color: (Need Rice's typical Ludowici selection). Another acceptable clay tile is the "One-piece S Tile" by US Tile. Tiles are to be kiln fired to vitro flashing and free of surface imperfections. Include special shape. Provide color blend and pattern consistent with those already on the campus and as approved by the University's Project Manager.

2. Sheet Metal Flashings:

2.1 Provide flashing fabricated from the following materials and installed per Section 7650 and SMACNA's "Architectural Sheet Metal Manual" and CDA's Copper In Architecture Handbook

2.1.1 Copper Sheet: ASTM B370, cold rolled (temper H00) unless temper 060 is required for forming; 2402/sf unless otherwise required.

2.2 Fasteners: Nails – copper or stainless steel; hurricane clips – stainless steel; eaves closures – clay bird stops.

2.3 Mortar: Use Portland Cement mortar and natural or synthetic iron oxides and chroming oxides to color match selected roof tiles.

2.4 Underlayment:

2.4.1 Clay tile roofs shall be installed over ¾" exterior structural grade plywood substrate with modified bitumen overlay as described below.

2.4.2 Modified Bitumen Overlay:

- 90 lb. fiberglass vented base sheet with C 90 mechanical fasteners.
- Smooth surface SBS sheet run horizontally perpendicular to slope with 4" overlay.

**DIVISION 7 – THERMAL AND MOISTURE PROTECTION
TILE ROOFING**

07320-3

- Granulated SBS cap sheet run vertically (parallel to the slope) with 4” overlap.

PERFORMANCE STANDARDS

1. Pre-roofing Conference: A pre-roofing conference attended by the University’s Project Manager, Architect, general contractor, and the roofing subcontractor shall be scheduled prior to ordering materials and beginning work. The following issues shall be reviewed and discussed.
 - 1.1 City of Houston, FM, and UL requirements, as applicable.
 - 1.2 Flashing requirements.
 - 1.3 Shop drawings revisions.
 - 1.4 Define work and storage areas.
 - 1.5 Conditions that require a temporary roof, if any.
 - 1.6 On-site monitoring by Owner, Architect, and local authorities.
 - 1.7 Changes procedure and written agreement, if any.
2. Coordination:
 - 2.1 Require the contractor to not start setting tiles until all trades have completed work requiring traffic on or across roof surfaces.
 - 2.2 If lightening protection is required, ensure that placement of air terminal devices and routing of cables, including associated details are coordinated with clay tile installation.
 - 2.3 Coordinate strap supports installation with roof tile installation. Avoid strap placement aligning with clay tile valley discharge to gutter.