

Concrete Tile Roofing (07 32 16)

1. All applicable parts of the General Roofing Specification (section 07 30 00) shall be included in this section.
2. Assessment of concrete tile roofs
 - 2.1. A concrete tile roofing system shall be determined as a failed roof when any of the following conditions exist:
 - 2.1.1. Valleys, hips, and ridges leaking beyond repair.
 - 2.1.2. Note all soft or springy deck areas of the existing roof.
 - 2.1.3. Failed underlayment constitutes a failed concrete tile roofing system.
 - 2.2. A concrete tile roofing system shall not be deemed failed when any of the following conditions exists:
 - 2.2.1. Damaged or missing drip edge on an otherwise good concrete tile roof shall be repaired / replaced.
 - 2.2.2. Damaged or missing fascia / barge boards on an otherwise good concrete tile roof shall be repaired / replaced.
 - 2.2.3. Damaged or missing gutters / rain diverters / snow (ice) guards on an otherwise good concrete tile roof shall be repaired / replaced.
 - 2.2.4. Leaking valleys / hips / ridges that can be repaired.
3. Roof Slope Use as defined in Part 7, General Roofing Specification (07 30 00)
 - 3.1. A concrete tile roof can be used on the following roof slopes:
 - 3.1.1. High Slope, within manufacturer's maximum slope limits.
4. Repair or replacement of roof, not to contradict Part 6, General Roofing Specification (07 30 00)
 - 4.1. If a roof does not meet condition(s) for repair / restore / ~~rejuvenation~~ then roof replacement is the only required and allowed action.
 - 4.2. Failed underlayment constitutes a failed concrete tile roofing system.
5. Demolition requirements
 - 5.1. All items as found in Part 10, General Roofing Specification (07 30 00).
 - 5.2. No special demolition requirements for concrete tile roofing systems.
6. Concrete Tile Roofing
 - 6.1. Materials shall meet the following standards and specifications:

6.1.1. Concrete tiles shall meet:

6.1.1.1. ASTM C1492 – Standard Specification for Concrete Roof Tiles.

6.1.1.2. ASTM C1568 – Standard Test Method for Wind-Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method).

6.1.1.3. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

6.1.1.4. ASTM E108 – Standard Test Methods for Fire Tests of Roof Coverings.

6.1.1.5. Concrete tile roofing shall have at least the following characteristics: ASTM Class A fire rating, ASTM wind resistance of 90 MPH minimum and meet the IECC solar reflectance index (SRI) for the roof pitch and material.

6.1.1.6. Concrete tile shall be nailed.

6.1.2. Underlayment shall meet:

6.1.2.1. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing, Type II

6.1.2.2. ASTM D4869 – Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing, Type IV

6.1.2.3. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

6.1.2.4. Concrete tile underlayment shall be at least, as determined by the Professional Registrant and manufacturer's specifications and recommendations:

6.1.2.4.1. Single layer of ASTM D226 Type II, single layer of ASTM D4869 Type IV, or

6.1.2.4.2. Self-adhered underlayment meeting ASTM D1970.

6.1.2.4.2.1. This underlayment shall be used in specific areas, not as an entire underlayment and have a minimum vapor

permeance of 15. All bituminous membranes shall be of High Temperature type.

- 6.2. All fasteners shall be copper or stainless steel and compatible with all other metal materials used on the roof, galvanized fasteners shall be prohibited.
- 6.3. Wood battens shall be used on all installations.
- 6.4. All fascia / barge boards to be protected from the environment in a manner by drip edge metal flashing that will provide a minimum 20-year performance and shall be sealed to prevent moisture penetration into any enclosed space at the eaves and soffits.
- 6.5. The edges of all concrete tile roofs shall have a metal drip that extends under the tiles not less than three (3) inches, at least two (2) inches in height, with a minimum 45° toe to prevent water from running down the face of the fascia / barge board.
- 6.6. Gutters/ rain diverters / snow (ice) guards shall be provided to prevent water / snow / ice from falling on people as they enter the building and shall not let anything falling into any walking surface below the roof line.
 - 6.6.1. Gutters shall be installed below the level of the roofing to allow water to flow directly into the gutter and shall be sized in conformance to the code.
 - 6.6.2. Downspouts shall be sized in accordance to the code.
- 6.7. All enclosed attic spaces below concrete tile roofs shall be vented to a net free area of a minimum of $\frac{1}{150}$ th of the space ventilated, unless a code compliant cross-ventilation system is provided.
- 6.8. All valleys shall be a metal flashing underlayment of a minimum 24" width centered on the valley.
- 6.9. All roof penetrations shall have weather sealing boots, integral curbs, saddles, etc. to ensure that water is not trapped anywhere on the concrete tile roof or allowed to penetrate below the roof into the building.
- 6.10. Crickets at curbs, and other locations, wider than 24" shall be sheet metal. Curb heights shall be at least 8" above roof surface and at least 6" above the high point of the adjacent cricket.

7. Closeout Documents

7.1. All items as found in Part 16, General Roofing Specification (07 30 00).

8. Preventative Maintenance Criteria

8.1. All items as found in Part 17, General Roofing Specification (07 30 00).

9. Budgeting cost ranges

9.1. This part shall apply only to SFB budgeting and economic projections and analysis. Not to be used for anything else.

9.2. Installation costs

9.2.1. Installation of specified clay tile system will be \$5.50 per square foot.

9.2.2. If a synthetic underlayment is required the cost would be \$5.00 per square foot.

9.2.3. Demolition costs would be \$1.50 per square foot.

9.2.3.1. In rural areas disposal costs may be higher and required an adjustment to the overall demolition costs.

9.3. Life cycle costing estimate for a concrete tile roof is \$1.50 per square foot per year.

10. Expected End of Life (EOL) for system

10.1. The minimum expectant life for a concrete tile roof is 20 years.

Note: This type of Roofing System is usually going to be installed only on the Historic Buildings due to the aesthetics and thus, this document can only be used as a reference document for the Design Phase for the Lightweight Concrete Tile. Changes need to be discussed with SFB Staff on a project-by-project basis.