

CLAY AND CONCRETE ROOF TILE MATERIALS AND APPLICATION: 2019 CBC**Disciplines:** Structural
Fire & Life Safety**History:** Revised 02/08/20 under 2019 CBC
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Division of the State Architect (DSA) documents referenced within this publication are available on the [DSA Publications](#) webpage.

PURPOSE: This Interpretation of Regulations (IR) clarifies the acceptance and test requirements for all tile roof covering materials and anchorage systems, including mechanical and foam adhesive attachment systems, on construction projects under DSA’s jurisdiction. This IR also specifies installation, testing and inspection requirements for these systems.

BACKGROUND: Applicable requirements for roof tile materials and installation are located in California Building Code (CBC) Sections 1507.3, 1507.7.8, 1510.7.2.1 and 1513; and ASTMs C1167 and C1492:

For newer materials and installation methods not included in the above CBC requirements, the provisions of this IR apply.

1. MATERIAL QUALIFICATIONS–TILE:

1.1 Qualification by Listing: Roof tile may be qualified and accepted if the roof tile has a DSA recognized listing or evaluation report that indicates compliance with ICC AC180, *Acceptance Criteria for Clay and Concrete Roof Tiles*. See Section 6 below for DSA recognized listings or evaluation reports.

1.2 Qualification by Project Specific Testing: Provide test documentation for each project to show compliance with:

- ASTM C1167 for clay tiles, or
- ASTM C1492 for concrete tiles.

2. MECHANICALLY ATTACHED SYSTEMS: Roof tile systems utilizing mechanical devices or fasteners for attachment shall comply with one of the following requirements:

- CBC Sections 1507.3 and 1513, or
- *IR 15-1: Attachment of Clay or Concrete “S” Roof Tile*, for clay or concrete S-tiles.

2.1 Alternate Systems: Mechanical attachment systems that are not prescribed by CBC may be accepted if they have a DSA recognized listing or evaluation report for the entire system or for each component of the system. See Section 6 below for DSA recognized listings or evaluation reports.

The listing or evaluation report shall indicate compliance with the following criteria:

- Tiles – see Section 1.1 above.
- Underlayments – ICC-ES AC188, *Acceptance Criteria for Roof Underlayment*, or in areas described in Section 4.1 below, ICC-ES AC48, *Acceptance Criteria for Roof Underlayments for Use in Severe Climate Conditions*.
- Installation – see Section 4 below.
- Inspection – see Section 5 below.

2.2 Fasteners: Shall be copper, brass or stainless steel per CBC Sections 1507.3.6 and 1513.

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3. ROOF SYSTEM WITH ADHESIVE ATTACHMENT: Roof systems that utilize foam adhesive for attachment may be accepted under the alternate materials and methods provisions of Title 24, Part 1 (California Administrative Code), Section 4-304. Such systems shall have a DSA recognized listing or evaluation report that indicates compliance with ICC-ES AC152, *Acceptance Criteria for Adhesive Attachment of Concrete or Clay Tiles*. See Section 6 below for DSA recognized listings or evaluation reports.

The listing or evaluation report shall indicate compliance with the following criteria:

- Underlayments – ICC-ES AC48, *Acceptance Criteria for Roof Underlayments for Use in Severe Climate Conditions*
- Installation – see Section 4 below.
- Inspection – see Section 5 below.

4. INSTALLATION FOR LISTED ROOF SYSTEMS: The roof structure must be able to support the anticipated vertical and lateral loads of the tiles as required by CBC. Only qualified or certified installers and applicators may install roof tiles. Installation of roof tiles shall meet all of the following requirements:

- *Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions*, which is also approved by ICC-ES as ESR-2015P.
- Installation provisions of the tile evaluation report.
- Tile and tile anchorage systems manufacturers' recommendations.

4.1 Cold Weather Regions: Cold weather regions are areas where ice damming may occur or where roof snow load is 150 psf or greater. In such areas installation must conform with the following:

- *The Standard Installation Guides for Concrete and Clay Roof Tile in Cold Weather Applications*, published by the National Tile Roofing Manufacturers Association, Inc. (NTRMA)/ Western States Roofing Contractors Association (WSRCA).
- ESR-2015P.
- Follow the instructions in the applicable evaluation reports.
- Manufacturer's recommendations.

If clay tiles are used in the cold weather regions, the designer shall specify Grade 1 clay tiles per ASTM C1167.

4.2 Wildland-Urban Interface Fire Area: Roof materials installed in wildland-urban interface fire areas (WUI) or locally designated fire hazard severity zones shall comply with CBC Chapter 7A. Roof coverings shall be constructed of ignition-resistant materials in accordance with CBC Section 704A that prevent the intrusion of flames and embers, and be installed per their listing and manufacturers installation instructions.

5. INSPECTION AND TESTING: The project inspector (PI) shall verify that the tile roof covering materials meet the requirements of Sections 1, 2 and 3 of this IR, and inspect the installation of the tile roof covering systems. The PI shall also verify that all installers and applicators are certified either by the manufacturer or the Roof Tile Institute, as required in the applicable evaluation report.

5.1 Pull Test for Adhesive Systems: In addition to the above requirements, for adhesive tile attachment systems a vertical upward pull force of 35 pounds shall be applied to the nose edge of randomly chosen tiles for a duration of five seconds. Test one tile per square of roofing area. If any tiles fail the pull test, test the four adjacent tiles.

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A simple method to perform the pull test is to slip an L-shaped hook under nose edge of the tile and attach the hook to a fish scale.

A pull test must be performed or witnessed by the PI at a minimum of one location.

6. RECOGNIZED LISTINGS: DSA recognized listings include the following:

- ICC-ES Evaluation Report (ESR).
- Miami-Dade County Notice of Acceptance (NOA).
- Other evaluation reports meeting the requirements and conditions of *IR-A5: Acceptance of Products, Materials and Evaluation Reports*.

7. REROOFING: Reroofing of an existing roof-covering system with a clay or concrete tile system shall comply with CBC Sections 1511 and 1513, and ESR 2015P (see Section 4 above). “Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered...” (CBC Section 1511.2). Substantial increase in roof load can be expected if the original roof-covering system was not a clay or concrete tile system.

REFERENCES:

- 2019 California Code of Regulations (CCR) Title 24
- Part 1 California Administrative Code (CAC) , Sections 4-305 and 4-333(b)
- Part 2: California Building Code (CBC), Sections 1507.3, 1507.7.8, 1510.7.2.1 and 1513

This IR is intended for use by the DSA staff and by design professionals to promote statewide consistency for review and approval of plans and specifications as well as construction oversight of projects within the jurisdiction of DSA, which includes State of California public schools (K–12), community colleges and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

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