



Standard Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method)¹

This standard is issued under the fixed designation C 1570; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The air permeability of tile roofing systems is a critical factor in determining the wind resistance of tile roofing as applied to a roof. This Standard describes a procedure for measuring the air permeability of clay and concrete tile and slate roof systems when applied to a small section of roof deck in accordance with the manufacturer's instructions.

1.2 This test procedure measures the air permeability of a laid array of unsealed clay or concrete roof tiles or slates. The tiles or slates shall have a thickness between $\frac{1}{8}$ -in. (3-mm) and 2-in. (51-mm).

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 43 Terminology of Structural Clay Products²

C 67 Test Methods for Sampling and Testing Brick and Structural Clay Tile²

C 140 Test Methods of Sampling and Testing Concrete Masonry Units²

C 1167 Specification for Clay Roof Tiles²

C 1492 Specification for Concrete Roof Tiles²

2.2 SBCCI Standard:

SBCCI SSDT 11, SBCCI Test Standard for Determining Wind Resistance of Concrete or Clay Roof Tiles³

NOTE 1—This standard is based on the International Code Council's ICC/SBCCI SSDT 11 and work derived from the tile industry's testing programs completed in the Redland Wind Tunnel in the UK.

2.3 ASCE Standard:

ASCE 7, Minimum Design Loads for Buildings and Other Structures⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method refer to Terminology C 43, and Specifications C 1167 and C 1492.

4. Principle of the Test Method

4.1 Air pressure is applied to the underside of an air permeable assembly of a specified type of roofing elements. The difference in air pressure across the assembly and the volume air flow rate are measured and used to determine the air permeability of the assembly.

5. Significance and Use

5.1 The air permeability of roofing systems constructed from discrete elements, as is the case for clay and concrete tile and slate roof systems, is a critical factor in determining the wind resistance of the roof system. The ability of the roof system to relieve wind-induced uplift pressures as a result of the overall air permeability of the roof assembly relates to the resistance of the roof system to damage induced by wind.

5.2 Natural wind conditions differ with respect to intensity, duration, and turbulence; these conditions are beyond the means of this test method to simulate.

6. Apparatus

6.1 A plenum chamber is a rectangular box with a depth of not less than 1.64 ft (500 mm) or one-third of the least lateral dimension, whichever is the greater. The plenum chamber shall be made airtight except for an open upper face to receive a mounting board or cover panel, a tapping for a pressure difference gage (relative to atmospheric pressure) and a connection to an air delivery pipe. The tapping shall be positioned to avoid direct alignment with the air delivery pipe. The shape and area of the mounting surface shall be capable of accepting

¹ This test method is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.06 on Roofing Tile.

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² Annual Book of ASTM Standards, Vol 04.05.

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⁴ Available from The American Society of Civil Engineers (ASCE), 1801 Alexander Bell Dr., Reston, VA 20191.