



Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems¹

This standard is issued under the fixed designation E1680; 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 This test method covers the determination of the resistance of exterior metal roof panel systems to air infiltration resulting from either positive or negative air pressure differences. The test method described is for tests with constant temperature and humidity across the specimen. This test method is a specialized adaption of Test Method E283.

1.2 This test method is applicable to any roof area. This test method is intended to measure only the air leakage associated with the field of the roof, including the panel side laps and structural connections; it does not include leakage at the openings or perimeter or any other details.

1.3 The proper use of this test method requires knowledge of the principles of air flow and pressure measurements.

1.4 The text of this test method references notes and footnotes excluding tables and figures, which provide explanatory material. These notes and footnotes shall not be considered to be requirements of the test method.

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *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.* For specific precautionary statements, see Section 7.

2. Referenced Documents

2.1 ASTM Standards:²

¹ This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.57 on Performance of Metal Roof Systems.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E283 Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

E631 Terminology of Building Constructions

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1592 Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

E1646 Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference

2.2 Other Standards:

AAMA 501 Methods of Test for Metal Curtain Walls³

3. Terminology

3.1 *Definitions*—For definitions of general terms relating to building construction used in this test method, see Terminology E631.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *air leakage (Q)*—the volume of air flowing per unit of time through the assembled specimen under a test pressure difference, expressed in cubic feet per minute (cubic metres per second).

3.2.2 *extraneous air leakage (Q_L)*—the difference between the metered air flow (Q_m) and air leakage (Q); the leakage of the remainder of the test chamber.

3.2.3 *metered air flow (Q_m)*—the volume of air flowing per unit of time through the air flow metering system, expressed in cubic feet per minute (cubic metres per second).

3.2.4 *rate of air leakage*—the air leakage per unit of specimen area (A), expressed in cubic feet per minute per square foot (cubic metres per second per square metre).

³ Available from American Architectural Manufacturers Association (AAMA), 1827 Walden Office Square, Suite 550, Schaumburg, IL 60173-4268, <http://www.aamanet.org>.