



Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door¹

This standard is issued under the fixed designation E1827; 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 These test methods describe two techniques for measuring air leakage rates through a building envelope in buildings that may be configured to a single zone. Both techniques use an orifice blower door to induce pressure differences across the building envelope and to measure those pressure differences and the resulting airflows. The measurements of pressure differences and airflows are used to determine airtightness and other leakage characteristics of the envelope.

1.2 These test methods allow testing under depressurization and pressurization.

1.3 These test methods are applicable to small indoor-outdoor temperature differentials and low wind pressure conditions; the uncertainty in the measured results increases with increasing wind speeds and temperature differentials.

1.4 These test methods do not measure air change rate under normal conditions of weather and building operation. To measure air change rate directly, use Test Methods E741.

1.5 The text of these test methods reference notes and footnotes that provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of the 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 hazard statements see Section 7.

2. Referenced Documents

2.1 ASTM Standards:²

E456 Terminology Relating to Quality and Statistics

¹ These test methods are under the jurisdiction of ASTM Committee E06 on Performance of Buildings and are the direct responsibility of Subcommittee E06.41 on Air Leakage and Ventilation Performance.

Current edition approved Sept. 1, 2011. Published October 2011. Originally approved in 1996. Last previous edition approved in 2007 as E1827 – 96 (2007). DOI: 10.1520/E1827-11.

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.

E631 Terminology of Building Constructions

E741 Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution

E779 Test Method for Determining Air Leakage Rate by Fan Pressurization

E1186 Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems

E1258 Test Method for Airflow Calibration of Fan Pressurization Devices

2.2 ISO International Standards:³

ISO 9972 Thermal Insulation—Determination of Building Airtightness—Fan Pressurization Method

2.3 Other Standards:³

ANSI/ASME PTC 19.1–1985 Part 1: Measurement Uncertainty, Instruments, and Apparatus

3. Terminology

3.1 Definitions:

3.1.1 For definitions of general terms related to building construction used in this test methods, refer to Terminology E631 and for general terms related to accuracy, bias, precision, and uncertainty refer to Terminology E456.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 ACH_{50} , n —the ratio of the air leakage rate at 50 Pa (0.2 in. H₂O), corrected for a standard air density, to the volume of the test zone (1/h).

3.2.2 *air leakage rate*, Q_{env} , n —the total volume of air passing through the test zone envelope per unit of time (m³/s, ft³/min).

3.2.3 *airtightness*, n —the degree to which a test zone envelope resists the flow of air.

NOTE 1— ACH_{50} , air leakage rate, and effective leakage area are examples of measures of building airtightness.

3.2.4 *blower door*, n —a fan pressurization device incorporating a controllable fan and instruments for airflow measurement and building pressure difference measurement that mounts securely in a door or other opening.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.