



Designation: E 1554 – 94

An American National Standard

Standard Test Methods for Determining External Air Leakage of Air Distribution Systems by Fan Pressurization¹

This standard is issued under the fixed designation E 1554; 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 cover two techniques for measuring the air leakage of the sections of air distribution systems that pass outside the conditioned space in low-rise residential and small low-rise commercial buildings. Both techniques use air flow and pressure measurements to determine the leakage characteristics, and include separate measurements of the supply-side and the return-side distribution system leakage.

1.2 These test methods also specify the auxiliary measurements needed to characterize the magnitude of the distribution system air leakage during normal operation (a measurement of pressure differentials across duct leaks during normal distribution-system operation), and to normalize the distribution system's air leakage by the total recirculating air flow induced by the distribution-system fan.

1.3 The air-leakage measurement portion of these test methods is applicable to small temperature differentials and low wind pressures; the uncertainty in the measured results increase with increasing wind speeds and temperature differentials.

1.4 The proper use of these test methods requires a knowledge of the principles of air flow and pressure measurements.

1.5 These test methods are intended to produce a measure of the air tightness between an air distribution system and its surroundings exterior to the conditioned space of a building.

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.7 *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:

E 631 Terminology of Building Constructions²

E 741 Test Methods for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution²

E 779 Test Method for Determining Air Leakage Rate by Fan Pressurization²

E 1258 Test Method for Airflow Calibration of Fan Pressurization Devices²

2.2 ASME Standard:

MFC-3M Measurement of Fluid Flow in Pipes Using Orifice Nozzle and Venturi³

3. Terminology

3.1 *Definitions*—Refer to Terminology E 631 for definitions of other terms used in these test methods.

3.2 *air-handling unit*—the distribution-system fan and portion of the distribution system that is integral to the furnace, air-conditioner, or heat-pump.

3.3 *air-leakage rate*—the volume of air movement per unit time across the building envelope or the exterior envelope of the air distribution system.

3.3.1 *Discussion*—This movement includes flow through joints, cracks, and porous surfaces, or combinations thereof. The driving forces for such air leakage in service can be mechanical pressurization and depressurization, natural wind pressures, and air temperature differentials between the building interior and the outdoors.

3.4 *building envelope*—the boundary or barrier separating the interior volume of a building from the outside environment.

3.5 *building pressure difference*—the pressure difference across the building envelope, expressed in pascals (inches of water, pounds-force per square foot, or inches of mercury).

¹ These test methods are under the jurisdiction of ASTM Committee E-6 on Performance of Buildings and are the direct responsibility of Subcommittee E06.41 on Air Leakage and Ventilation.

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² *Annual Book of ASTM Standards*, Vol 04.11.

³ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.