



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 air handler fan.

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

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

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

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

E 631 Terminology of Building Constructions

E 741 Test Method for Determining Air Change in a Single

Zone by Means of a Tracer Gas Dilution

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

E 1258 Test Method for Airflow Calibration of Fan Pressurization Devices

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.

3.1.1 *air handler fan*—the air moving fan for the distribution system located in the air-handling unit.

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

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

3.1.4 *conditioned space*—the portion of a building whose air temperature or humidity is intentionally controlled for human occupancy.

4. Summary of Test Methods

4.1 Two alternative measurement and analysis procedures are specified. The first of these techniques, Test Method A, is based upon changes in flow through distribution system leaks at fixed envelope pressure differences due to air handler operation. The envelope pressure differences are generated by a separate air moving fan, both pressurization and depressurization measurements are performed. The second technique, Test Method B, is based upon pressurizing the distribution system at the same time as the house in order to isolate the leaks that are outside the building envelope. Measured system operating pressures are then used to estimate leakage under operating conditions. Test Method B is shown schematically in Fig. 1.

4.2 These test methods also include specifications for the auxiliary measurements to interpret the air leakage measurements. These include measurement of the pressures that drive

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.

Current edition approved Dec. 1, 2003. Published January 2004. Originally approved in 1993. Last previous edition approved in 1994 as E 1554 – 94.

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.

³ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990.

