Designation: E 779 – 03

Standard Test Method for Determining Air Leakage Rate by Fan Pressurization[1]

This standard is issued under the fixed designation E 779; 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 a standardized technique for measuring air-leakage rates through a building envelope under controlled pressurization and de-pressurization.

1.2 This test method is applicable to small temperature differentials and low-wind pressure conditions. For tests conducted in the field, it must be recognized that field conditions may be less than ideal. Nevertheless, strong winds and large indoor-outdoor temperature differentials should be avoided.

1.3 This test method is intended to produce a measure of air tightness of a building envelope. This test method does not measure air leakage rates under normal conditions of weather and building operation. To measure air-change rate directly, use the tracer gas dilution method (see Test Method E 741).

1.4 This test method is intended for the measurement of the airtightness of building envelopes of single-zone buildings. For the purpose of this test method, many multi-zone buildings can be treated as single-zone buildings by opening interior doors or by inducing equal pressures in adjacent zones.

1.5 *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 741 Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution.

E 1258 Test Method for Airflow Calibration of Fan Pressurization Devices

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *air-change rate*, *n*—air-leakage rate in volume units/h divided by the building space volume with identical volume units, normally expressed as air changes/h, ACT–.

3.1.2 *air-leakage graph*, *n*—the graph that shows the relationship of measured airflow rates to the corresponding measured pressure differences, usually plotted on a log-log scale.

3.1.3 *air-leakage rate*, *n*—the volume of air movement/unit time across the building envelope.

3.1.3.1 *Discussion*—This movement includes flow through joints, cracks, and porous surfaces, or a combination thereof. The driving force for such an air leakage, in service can be either mechanical pressurization and de-pressurization, natural wind pressures, or air temperature differentials between the building interior and the outdoors, or a combination thereof.

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

3.1.4.1 *Discussion*—For the purpose of this test method, the interior volume is the deliberately conditioned space within a building, generally not including attics, basements, and attached structures, for example, garages, unless such spaces are connected to the heating and air conditioning system, such as a crawl space plenum.

3.1.5 *single zone*, *n*—a space in which the pressure differences between any two places, differ by no more than 5 % of the inside to outside pressure difference.

3.1.5.1 *Discussion*—A multi-room space that is interconnected within itself with door-sized openings through any partitions or floors is likely to satisfy this criterion if the fan airflow rate is less than 3 m^3/s 6 × 10^3 ft^3/min).

3.1.6 *test pressure difference*, *n*—the measured pressure difference across the building envelope, expressed in Pascals (in. of water or pounds-force/ft^2 or in. of mercury).

3.2 *Symbols and Units*—See Table 1.

4. Summary of Test Method

4.1 This test method consists of mechanical pressurization or de-pressurization of a building and measurements of the resulting airflow rates at given indoor-outdoor static pressure differences. From the relationship between the airflow rates

[1] This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.41 on Air Leakage and Ventilation.

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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.

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