



Standard Test Method for Airflow Calibration of Fan Pressurization Devices¹

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1. Scope

1.1 This test method covers the airflow measurement calibration techniques for fan pressurization systems used for measuring air leakage rates through building envelopes.

1.2 This test method is applicable to systems used for air leakage measurement as described in Practice E 779.

1.3 This test method involves the installation of the fan pressurization system in a calibration chamber. Use of the fan pressurization system in an actual building may introduce additional errors in the airflow measurement due to operator influence, interference of internal partitions and furnishings, weather effects, and other factors.

1.4 The proper use of this test method requires a knowledge of the principles of airflow and pressure measurement.

1.5 This standard includes two basic procedures, a preferred procedure, based on ASHRAE Standard 51/AMCA Standard 210, and an optional procedure based on a nonstandard airflow measurement technique, commonly used by manufacturers of fan pressurization devices, but which has not been compared with standard airflow measurement techniques.

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.*

2. Referenced Documents

2.1 ASTM Standards:

E 631 Terminology of Building Constructions²

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

2.2 *American Society of Heating, Refrigerating, and Air-Conditioning Engineers Standard:*³

ASHRAE 51/AMCA 210 Laboratory Methods for Testing Fans for Rating

2.3 *American Society of Mechanical Engineers Standard:*⁴
ASME MFC-3M Standard Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi

3. Terminology

3.1 *Definitions*—For definitions used in this test method, see Terminology E 631.

3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *ambient conditions, n*—conditions in the space from which air is drawn into the calibration chamber and into which the chamber air is expelled.

3.2.2 *chamber, n*—an enclosure of rectangular or circular cross section to simulate the entrance and exit conditions that the fan is expected to encounter in service.

3.2.3 *fan air density, n*—density of air at the fan inlet expressed in kilograms per cubic metre.

3.2.4 *fan airflow rate, n*—volumetric airflow rate at the fan air density expressed in cubic metres per second.

3.2.5 *fan outlet area, n*—gross inside area measured in the plane of the fan outlet opening expressed in square metres.

3.2.6 *fan pressure difference, n*—the static pressure difference between two stations expressed in pascals, measured using the static pressure taps described in Fig. 1. One station is located within the chamber between the fan and the nearest flow conditioners. The other station is outside the chamber.

3.2.7 *fan pressurization system, n*—a device for measuring the air leakage rate of a building envelope under controlled pressurization or depressurization of the building interior. The system includes controllable air-moving equipment, an airflow rate measuring system, and a device for measuring the pressure difference across the building envelope. Such a system is often referred to as a blower door.

3.2.8 *fan signal, n*—an output from a fan pressurization system (other than fan speed) that is related to fan airflow rate by the system calibration, such as the static pressure difference across a constriction that is integral to the system.

3.2.9 *fan speed, n*—speed of rotation of the fan impeller expressed in inverse seconds.

¹ This test method is under the jurisdiction of ASTM Committee E06 on Performance of Building Constructions and is the direct responsibility of Subcommittee E06.41 on Infiltration Performances.

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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.

³ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990.

