



Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors¹

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1. Scope

1.1 This practice establishes requirements for testing and rating acoustical performance of exterior windows and doors, regardless of their method or materials of manufacture.

1.1.1 Air leakage and operating force are integral elements of acoustical performance of exterior windows and doors; therefore this practice requires concurrent testing of air leakage and operating force in addition to acoustical tests.

1.2 This practice establishes the test methodology and specimen criteria and classification rating system for purposes of determining the acoustical performance levels of exterior windows and doors only, and not through openings between such assemblies and adjacent construction.

1.3 Excluded from the scope of this practice are roof windows, skylights, sloped glazing systems, or any interior window or door assembly.

1.4 The values stated in inch/pound units are to be regarded as standard. The values given in parentheses (SI units) are provided for information only.

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.*

2. Referenced Documents

2.1 ASTM Standards:

- C 634 Terminology Relating to Environmental Acoustics²
- E 90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions²
- E 283 Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen³
- E 413 Classification for Rating Sound Insulation²

¹ This practice is under the jurisdiction of ASTM Committee E-6 on Performance of Buildings and is the direct responsibility of Subcommittee E06.51 on Component Performance of Windows, Curtain Walls, and Doors.

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² *Annual Book of ASTM Standards*, Vol 04.06.

³ *Annual Book of ASTM Standards*, Vol 04.11.

E 631 Terminology of Building Constructions³

E 1017 Specification for Generic Performance Requirements for Exterior Residential Window Assemblies³

E 1332 Classification for Determination of Outdoor-Indoor Transmission Class²

2.2 Other Standards:

ANSI/BHMA A156.2 Bored and Preassembled Locks and Latches⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminologies C 634 and E 631, unless otherwise indicated.

4. Significance and Use

4.1 *Air Leakage Relative to Sound Transmission*—Certain frequencies are more susceptible to sound transmission through cavities or discontinuities in the test specimen; therefore, the air leakage of the test specimen is reported to allow the approving authority information relative to air tightness.

4.2 *Operating Force Relative to Sound Transmission*—The use of specific sealing components to achieve a given sound rating could affect operating force of the vertical or horizontal sliding sash or panels of the assembly; therefore, operating force is reported to allow the approving authority information relative to sash or panel operating forces.

5. Test Specimen

5.1 Assemblies to be tested in accordance with this practice shall be representative of those produced by the manufacturer or fabricator. Test specimens shall be sealed, painted or otherwise finished or prepared only as they would normally be prepared for actual installation and use. Test specimens shall be mounted for testing as specified by each applicable test method.

5.1.1 Test specimens shall not be modified with supplementary adhesives, sealants, tapes, or clamping devices not normally a part of the product.

⁴ Available from American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

5.2 Test specimen sizes:

5.2.1 *Window*—Specimen submitted for testing shall be no less than 20 ft² (1.86 m²) nor more than 24 ft² (2.23 m²) with neither dimension less than 42 in. (1067 mm).

5.2.2 Door:

5.2.2.1 *Single door*—Specimen submitted for testing shall be no less than 19 ft² (1.77 m²) nor more than 22 ft² (2.04 m²), with neither dimension being less than 36 in. (914 mm).

5.2.2.2 *Double doors*—Specimen submitted for testing shall be no less than 38 ft² (3.53 m²), nor more than 44 ft² (4.09 m²).

6. Test Methods

6.1 The sequence of testing shall be: operating force; followed by latching force, if applicable; followed by air leakage; and ending with sound transmission loss.

6.2 *Operating force*—Operating force test (horizontal or vertical operating windows and sliding glass door only). Perform test in accordance with Specification E 1017 section on operating force.

6.2.1 *Latching force*—Latching force test (swinging doors only). Perform in accordance with ANSI/BHMA 156.2. The procedure described is as follows:

6.2.1.1 *Swinging doors*—Apply a force measuring device perpendicular to the face of the door at a point 1.0 in. (25.4 mm) from the lock edge of the door and on the center line of the latch bolt. The door should be ajar with the latch bolt slightly separated from the lip of the strike plate. Close the door slowly with minimal force by pushing the force measuring instrument against the door until the latch bolt fully enters the strike plate opening. The maximum force that is required to close and fully latch the door shall be recorded. A minimum of five measurements is required, and the range as well as the average force or torque shall be recorded.

NOTE 1—A swinging door is defined as closed when the latch is fully secured in the strike plate and the door remains in the closed position.

6.3 *Air leakage test*—Perform in accordance with Test Method E 283, at 1.57 lbf/ft² (75 Pa).

6.4 *Sound transmission loss test*—Perform in accordance with Test Method E 90, modified as specified in Classification E 1332 and by Test Method E 90, modified as specified in Classification E 413.

7. Classification

7.1 Products shall be classified based on their acoustical performance capabilities as determined in accordance with Classification E 1332, and by Classification E 413.

8. Report

8.1 Report the following information:

8.1.1 Date of test and date of report.

8.1.2 Identification of the specimen (manufacturer, plant location, dimensions, type, model, materials, weight, and any other pertinent information).

8.1.3 Detailed drawings of the specimen showing dimensioned section profiles, sash or door dimensions and arrangement, framing location, panel arrangement, installation and spacing of anchorage, weatherstripping, locking arrangement, hardware, sealants, glazing details, and any other pertinent construction details. Any modifications made on the specimen to obtain the reported values shall be noted on the drawings.

8.1.4 Description of locking and operating mechanisms.

8.1.5 Description of glazed assembly (glass thickness, type and manufacturer, and method of glazing).

8.1.6 Type or types of weatherstrip and location on specimen.

8.1.7 Operating forces or latching force recorded in accordance with Section 6.2.

8.1.8 Air leakage measurements in accordance with Section 6.3.

8.1.9 Classification of the specimen in accordance with Section 7.1.

8.1.10 Transmission loss data in one-third octave bands 80-4000 Hz as measured in accordance with Section 6.4. Ambient room temperature and relative room humidity at time of test shall also be reported.

8.1.11 A statement that the test or tests were conducted in accordance with this practice, or a complete description of any deviations from this practice.

9. Keywords

9.1 acoustics; door; fenestration; OITC; practice; sound; STC; window

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