



Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method¹

This standard is issued under the fixed designation C 423; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the measurement of sound absorption in a reverberation room by measuring decay rate. Procedures for measuring the absorption of a room, the absorption of an object, such as an office screen, and the sound absorption coefficients of a specimen of sound absorptive material, such as acoustical ceiling tile, are described.

1.2 *Field Measurements*—Although this test method primarily covers laboratory measurements, the test method described in 4.1 can be used for making field measurements of the absorption of rooms (see also 5.5). A non-standard method to measure the absorption of rooms in the field is described in Appendix X2.

1.3 This test method includes information on laboratory accreditation (see Annex A1), asymmetrical screens (see Annex A2), and reverberation room qualification (see Annex A3).

1.4 *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 548 Practice for Generic Criteria for Use in Evaluation of Testing and Inspection Agencies³

E 795 Practices for Mounting Test Specimens During Sound Absorption Tests²

2.2 ANSI Standards:

S1.6 Preferred Frequencies, Frequency Levels, and Band Numbers for Acoustical Measurements⁴

S1.11 Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters⁴

S1.26 Method for the Calculation of the Absorption of Sound by the Atmosphere⁴

3. Terminology

3.1 Except as noted in 3.3, the terms and symbols used in this test method are defined in Terminology C 634. The following definition is not currently included in Terminology C 634:

3.1.1 *sound absorption average, SAA*—a single number rating, the average, rounded off to the nearest 0.01, of the sound absorption coefficients of a material for the twelve one-third octave bands from 200 through 2500 Hz, inclusive, measured according to this test method.

3.1.1.1 *Discussion*—The sound absorption coefficients shall be rounded off to the nearest 0.01 before averaging. If the unrounded average is an exact midpoint, round to the next higher multiple of 0.01. For example, report 0.625 as 0.63.

3.2 In previous versions of this test method a single number rating, called the noise reduction coefficient (NRC), was defined as follows:

“Round the average of the sound absorption coefficients for 250, 500, 1000, and 2000 Hz to the nearest multiple of 0.05. If the unrounded average is an exact midpoint, round to the next higher multiple of 0.05. For example, 0.625 and 0.675 would be reported as 0.65 and 0.70, respectively.”

The noise reduction coefficient shall be reported in order to provide comparison with values reported in the past see 12.1.3).

3.3 *Definition of Term Specific to This Standard*—The following term has the meaning noted for this test method only:

3.3.1 *output interval, Δt , [T], s*—of a real-time analyzer, the time between successive outputs; this time is not necessarily the same as the integration time.

4. Summary of Test Method

4.1 Measurement of the Sound Absorption of a Room:

4.1.1 A band of random noise is used as a test signal and turned on long enough (about the time for 20 dB decay in the test band with the smallest decay rate) for the sound pressure level to reach a steady state. When the signal is turned off, the

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² Annual Book of ASTM Standards, Vol 04.06.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.