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Standard Specification for Sound Sources Used for Testing Open Office Components and Systems[1]

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1. Scope

1.1 This specification states the requirements for sound sources used for measuring the speech privacy between open offices or for measuring the laboratory performance of acoustical components (see Test Methods E 1111 and E 1130).

1.2 The sound source shall be a loudspeaker located in an enclosure driven with an appropriate test signal.

1.3 This specification describes the sound source and method of qualifying it using a special qualification signal. Test signals required by open office test methods may differ.

2. Referenced Documents

2.1 *ASTM Standards:*

C 384 Test Method for Impedance and Absorption of Acoustical Materials by the Impedance Tube Method[2]

C 634 Terminology Relating to Environmental Acoustics[2]

E 1050 Test Method for Impedance and Absorption of Acoustical Materials Using a Tube, Two Microphones, and a Digital Frequency Analysis System[2]

E 1111 Test Method for Measuring the Interzone Attenuation of Ceiling Systems[2]

E 1130 Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index[2]

2.2 *ANSI Standards:*

S1.4 Specification for Sound Level Meters[3]

S1.6 Preferred Frequencies and Band Numbers for Acoustical Measurements[3]

S1.11 Specification for Octave, Half-Octave and One-Third Octave-Band Filter Sets[3]

3. Terminology

3.1 *Definitions:*

3.1.1 The acoustical terminology used in this specification is consistent with Terminology C 634.

3.2 *Descriptions of Terms Specific to This Standard:*

3.2.1 *qualification signal*—a test signal of broadband noise or bands of white or pink noise as defined in Terminology C 634.

3.2.2 *source point*—the point at which the loudspeaker axis intersects the front plane of the loudspeaker (see Fig. 1).

4. Sound Source Specifications

4.1 *Sound Source Description*[4]—The sound source shall be a loudspeaker enclosed in a box that has a maximum dimension of 0.30 m (1 ft) on a side, to reduce spurious sound reflections.

4.2 *Directivity*—With the source driven with the qualification signal, the maximum and minimum sound pressure levels within any one-third octave band, measured at a distance of 1.0 m (39 in.) from the source point, at any angle up to and including 25° in any direction from the loudspeaker axis, shall differ by 2 dB or less.

NOTE 1—At angles beyond 25° from the loudspeaker axis, the source shall produce lower levels than within the 50° included angle.

NOTE 2—The directivity requirement may be met by using more than one loudspeaker, each one used separately to cover a different portion of the test frequency range.

5. Source Qualification

5.1 *Test Environment*—The measurements shall be carried out in a free sound field. The preferred test environment is an anechoic room with surfaces that have a minimum normal incidence sound absorption coefficient of 0.990 at all frequencies above 175 Hz as measured in accordance with Test Methods C 384 or E 1050. Alternatively, an outdoor environment may be used if it is shown that sound reflections do not influence the data.

5.2 *Test Instruments*:

5.2.1 The measurement microphone, amplifier, and level meter used to measure sound pressure levels shall satisfy the requirements of ANSI S1.4 for Type 1 or better sound level meters except that weighting networks are not required.

[1] This specification is under the jurisdiction of ASTM Committee E33 on Environmental Acoustics and is the direct responsibility of Subcommittee E33.02 on Open Plan Spaces.

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

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

[4] A sound source available from Acculab, 3201 Ridgewood Dr., Columbus, OH 43220, (or its equivalent) has been found suitable for this purpose.

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