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Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Facade Elements[1]

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INTRODUCTION

The sound transmission of a building facade or facade element as measured under field conditions is dependent not only on the physical characteristics of the facade, but also on the characteristics of the incident sound field used to make the measurement. This is also true for laboratory tests of panels using the two-room method described in Test Method E 90; however, the incident sound field in these controlled tests is made uniformly diffuse. The same is approximately true for field measurements of noise reduction and transmission loss by Test Method E 336. Such uniformity is not possible for facade measurements in the field where each situation is unique, resulting in incident sound fields that may range all the way from free field produced by a point source to quasi-diffuse produced by a line source.

At this time, there are insufficient data available to specify a single, standard measurement procedure suitable for all field situations. For this reason, this guide provides a number of alternative test procedures for the measurements of facade field level reduction and transmission loss.

1. Scope

1.1 This guide covers field procedures for measuring the sound level reduction or sound transmission loss of an installed building facade or facade element in specified frequency bands. These values may be used separately to predict interior levels or combined into a single number such as by Classification E 413 (with precautions) or Classification E 1332 to estimate the sound insulating properties of the test element, FOITC, in the field. The results are applicable to installations similar to that tested when exposed to an outdoor sound field similar to that used during the measurement.

1.1.1 The facade element may be the exterior wall of a room in the building, or a portion of that wall such as a door or window, when the remainder of that wall has substantially greater sound insulation than the portion under test.

1.2 To cope with the variety of outdoor test geometry that may be encountered, several testing techniques are presented. These techniques and their general applicability are summarized in Table 1 and Figs. 1-6.

1.3 This guide may be used to determine the outdoor-indoor level reduction (OILR), which is the difference in sound pressure between a specified outdoor sound field and the resulting sound pressure level in the room abutting the test facade or facade element. The outdoor sound field and its measurement must be thoroughly described. The resulting level reduction or transmission loss value will depend on the outdoor field geometry and the point at which it is measured or represented.

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

1.5 *This standard does not purport to address 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 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method[2]

C 634 Terminology Relating To Environmental Acoustics[2]

E 90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions[2]

E 336 Test Method for Measurement of Airborne Sound Insulation in Buildings[2]

E 413 Classification for Rating Sound Insulation[2]

E 1332 Classification for Determination of Outdoor-Indoor Transmission Class[2]

[1] This guide is under the jurisdiction of ASTM Committee E33 on Environmental Acoustics and is the direct responsibility of Subcommittee E33.03 on Transmission.

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

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