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Australian Standard®

METHODS FOR FIELD MEASUREMENT OF THE REDUCTION OF AIRBORNE SOUND TRANSMISSION IN BUILDINGS

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Acoustical Society

Confederation of Australian Industry

CSIRO, Division of Building Research

Environment Protection Authority, Victoria

Experimental Building Station

Institution of Engineers, Australia

Public Works Department, Western Australia

Royal Australian Institute of Architects

Royal Melbourne Institute of Technology

Universities

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PREFACE

This standard was prepared by the Association's Committee on Architectural Acoustics as one of a series dealing with the evaluation of the sound attenuating properties of building elements. It is intended to enable measurement of the performance of partitions and assemblies of building elements installed in buildings.

The measurement of the sound attenuation of building partitions, unlike the measurement of most of the physical properties of the construction or of the materials, is of necessity made indirectly by determining the sound pressure levels in the spaces on either side. As a result, the measurements can be affected to a significant extent by the nature of these spaces. Hence measurements suitable for general application are more difficult to make in the field, where a great variety of room shapes, sizes and surface conditions are encountered, than they are in the laboratory where the conditions are standardized.

The purpose of this standard is to categorize, as far as possible, the multiplicity of situations that exist in the field into five broad types, and to specify an appropriate measurement procedure for each. Even so, there are likely to be substantial differences between data obtained from similar structures tested in the laboratory and in buildings. In the laboratory, the measurements are restricted to conditions where there are random sound fields on both sides of the partition because of the adoption of appropriate dimensions for the test chambers and of suitable sound absorption coefficients for the surfaces. Also, the specimens for test are generally of an adequate size and area, and special constructions are incorporated to reduce flanking transmission, which, in any case, may be measured and evaluated once for use in all subsequent tests.

In the field, the effect of the environment must be assessed for each measurement that is attempted. The presence of flanking transmission or some other condition may even make a valid determination of sound transmission loss impracticable. In these circumstances, the other procedure of measurement of noise reduction given in this standard may be found adequate and in some cases may even provide more useful information.

The sound transmission loss is mainly required to determine whether the performance of a particular partition type is in accordance with expectations, and whether the particular one under consideration has been faithfully constructed and installed. This may not necessarily be the information that is really wanted in the field, where often it is only the noise reduction between rooms or spaces that is actually required.

The simpler procedure of measuring noise reduction, as well as avoiding the need to identify and eliminate flanking transmission, also avoids the necessity to measure sound absorption in the receiving room. The procedure warrants increased use in specifications and for checking the performance of buildings.

Even where construction weaknesses and flanking transmission are successfully eliminated and conformity with one of the field test situations described in this standard for measurement of transmission loss is achieved, there may still be, for the same construction, discrepancies between the transmission loss measured in the field and that measured in the laboratory. Furthermore, with the differences that exist between buildings, each field transmission loss applies only to a particular field condition and is not necessarily the unique value which is applicable to a certain building element, irrespective of where it is installed. Hence any attempt to adjust field results to conform to the results obtained from laboratory measurements or the measurements in other field situations may have little meaning.

Where a significant number of field transmission loss measurements have been made in accordance with the procedures prescribed in this standard, the range of field transmission losses to be expected from a partition type in different building situations will begin to appear. It may then become possible for a partition to be characterized by two ratings: one that expresses the sound attenuation that it can provide as established by laboratory measurement, and the other that indicates the likely range of its performance when installed in the field.

This standard may require reference to the following documents:

AS 1045	Method of Measurement of Absorption Coefficients in a Reverberation Room
AS 1259	Sound Level Meters
AS 1276	Methods for the Determination of Sound Transmission Class and Noise Isolation Class of Building Partitions
AS 1633	Glossary of Acoustic Terms
AS Z41	Octave, Half Octave and One-third Octave Band Pass Filters Intended for the Analysis of Sound and Vibrations
SAA MP44	Guide for the Use of Sound Measuring Equipment Part 1— Portable Sound Level Meters
ASTM E 90	Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 336	Test Method for Measurement of Airborne Sound Insulation in Buildings

A related standard is AS [illegible] Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

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SECTION 1. SCOPE, APPLICATION AND DEFINITIONS

1.1 SCOPE. This standard sets out the methods for the field measurement of the reduction in the transmission of airborne sound between the spaces in a building separated by a partition (see Note).

The procedures are intended for the measurement of—

(a) field transmission loss (*FTL*); and

(b) noise reduction (NR_f).

NOTE: The term 'partition' includes in its meaning walls of all kinds, floor-ceiling assemblies, doors, and other space-dividing elements that may be permanent, openable or movable.

1.2 APPLICATION.

1.2 Field Transmission Loss (*FTL*). The requirements and procedures set out in this standard for the measurement of field transmission loss (*FTL*) are—

(a) to establish whether a partition's performance complies with a specification for its field transmission loss;

(b) to establish the field transmission loss of a particular partition for a subsequent specification; and

(c) to relate a partition's field transmission loss to its laboratory transmission loss.

NOTE: In this regard, it must be recognized that, for a particular partition, there are likely to be differences between the transmission losses measured in the field and those measured in the laboratory that are caused by differences in the acoustic environment and not necessarily by differences in construction.

1.2.2 Noise Reduction (NR_f). The requirements and procedures set out in this standard for the measurement of the noise reduction (NR_f) between two rooms apply when the airborne sound transmission loss of a partition is not in question but when the sound attenuation between the rooms is required including such effects as may be caused by furnishings and flanking transmission.