Australian/New Zealand Standard™

Acoustics— Measurements of sound insulation in buildings and of building elements— Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it

[Modified and including the full text of ISO 140-9:1985]

Standards Australia

STANDARDS NEW ZEALAND
Paerewa Aotearoa

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Acoustics Consulting Interests, New Zealand
Association of Australian Acoustical Consultants
Australian Acoustical Society
Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Defence Force Academy
Australian Hearing
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Australian/New Zealand Standard™

Acoustics— Measurements of sound insulation in buildings and of building elements— Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV/4, Acoustics, Architectural, to supersede AS 2499—1981, *Acoustics—Method for laboratory measurement of airborne sound attenuation of ceilings (two-room method*).

The objective of this Standard is to provide a laboratory method for measuring the airborne sound insulation of a suspended ceiling with a plenum of defined height mounted above an acoustical barrier which separates two rooms of a specified test facility. The essential features of the test facility are specified in the Standard.

This Standard has been adopted with national modifications and has been reproduced from ISO 140-9:1985, *Acoustics—Measurements of sound insulation in buildings and of building elements*, Part 9: *Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it*.

Appendix ZZ lists the variations between this Standard and ISO 140-9. For the purpose of this Standard the ISO text is amended, supplemented or replaced as set out in Appendix ZZ. These changes are indicated by a rule in the margin against each clause affected.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text ‘this part of ISO 140’ should read ‘this Australian/New Zealand Standard’.

(c) A full point should be substituted for a comma when referring to a decimal marker.

(d) In Clause 9f the cross-reference in parentheses should read ‘see 5.2’.

References to International Standards should be replaced by references to equivalent Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian, New Zealand or Australian/New Zealand Standard*	
ISO		AS	
140	Acoustics—Measurement of sound insulation in buildings and of building elements	—	
140-2	Part 2: Statement of precision requirements		
354	Acoustics—Measurement of sound absorption in a reverberation room	1045	Acoustics—Measurement of sound absorption in a reverberation room
		AS/NZS	
717	Acoustics—Rating of sound insulation in buildings and of building elements	1276	Acoustics—Rating of sound insulation in buildings and of building elements
717-1	Part 1: Airborne sound insulation	1276.1	Part 1: Airborne sound insulation
IEC			
225	Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations	4476	Acoustics—Octave-band and fractional-octave-band filters

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of the Standard.

CONTENTS

Page

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Acoustics—Measurements of sound insulation in buildings and of building elements—Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it

1 Scope and field of application

This part of ISO 140 specifies a laboratory method of measuring the airborne sound insulation of a suspended ceiling with a plenum of defined height mounted above an acoustical barrier which separates two rooms of a specified test facility.

This method utilizes a laboratory space so arranged that it simulates a pair of horizontally adjacent, typical offices or rooms sharing a common suspended ceiling system, plenum space and a dividing wall. The dividing wall extends to the underside of the ceiling system which at the junction is either continuous or discontinuous.

The quantity being measured is the airborne sound insulation between two rooms of a specified test facility when the sound transmitted by paths other than the suspended ceiling and common plenum space is negligible. This quantity is called the suspended ceiling normalized level difference.

The method may be extended to include the study of composite ceiling systems comprising the ceiling material and other components such as luminaires and ventilating systems.

The method may also be extended to the study of the additional sound insulation that may be achieved by auxiliary systems, such as material used either as plenum barriers or as backing for all of, or part of, the ceiling.

2 References

ISO 140/2, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 2 : Statement of precision requirements.*

ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room.*

ISO 717/1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1 : Airborne sound insulation in buildings and of interior building elements.*

IEC Publication 225, *Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations.*

3 Definitions

For the purpose of this part of ISO 140, the following definitions apply.

3.1 average sound pressure level in a room : Ten times the common logarithm of the ratio of the space and time average of the sound pressure squared to the square of the reference sound pressure, the space average being taken over the entire room with the exception of those parts where the direct radiation of a sound source or the near field of the boundaries (wall, etc.) is of significant influence. This quantity is denoted by L and is expressed in decibels.

$$L = 10 \lg \frac{p_1^2 + p_2^2 + \ldots + p_n^2}{n p_0^2} \qquad \ldots (1)$$

where

$p_1, p_2, \ldots, p_n$ are the r.m.s. sound pressures at n different positions in the room;

$p_0 = 20$ μPa is the reference sound pressure.

3.2 level difference : The difference in the space and time average sound pressure levels produced in two rooms by a sound source in one of the rooms. This quantity is denoted by D and is expressed in decibels.

$$D = L_1 - L_2 \qquad \ldots (2)$$

where

L_1 is the average sound pressure level in the source room;

L_2 is the average sound pressure level in the receiving room.