

Indian Standard

RATING OF SOUND INSULATION IN BUILDINGS AND OF BUILDING ELEMENTS



PART 1 AIRBORNE SOUND INSULATION IN BUILDINGS AND OF INTERIOR BUILDING ELEMENTS

(ISO Title : Acoustics — Rating of Sound Insulation in Buildings
and of Building Elements — Part 1 : Airborne Sound Insulation in
Buildings and of Interior Building Elements)

National Foreword

This Indian Standard, which is identical with ISO 717/1-1982 ' Acoustics — Rating of sound insulation in buildings and of building elements — Part 1 : Airborne sound insulation in buildings and of interior building elements ', issued by the International Organization for Standardization (ISO), was adopted by the Indian Standards Institution on the recommendation of Acoustics Sectional Committee and approved by the Electronics and Telecommunication Division Council.

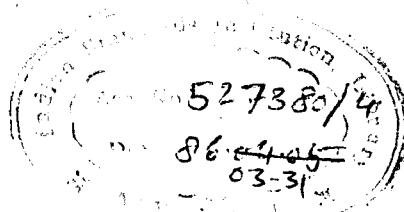
Cross Reference

In this Indian Standard, the following International Standards are referred to. Read in their respective places the following :

<i>International Standard</i>	<i>Corresponding Indian Standard</i>
ISO 140 Acoustics — Measurement of sound insulation in buildings and of building elements :	IS : 9901 Measurement of sound insulation in buildings and of building elements :
Part 3 Laboratory measurements of airborne sound insulation of building elements	Part 3 Laboratory measurements of airborne sound insulation of building elements (Technically equivalent)
Part 4 Field measurements of airborne sound insulation between rooms	Part 4 Field measurements of airborne sound insulation between rooms (Technically equivalent)

In the adopted standard certain terminology and conventions are not identical with those used in Indian Standards, attention is especially drawn to the following :

Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.



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0 Introduction

Methods of measurement of airborne sound insulation in buildings and of interior building elements have been standardized in ISO 140/3 and ISO 140/4. These methods give values for airborne sound insulation which are frequency dependent.

The purpose of this part of ISO 717 is to standardize a method whereby the frequency dependent values of airborne sound insulation can be converted into a single number characterizing the acoustical performance.

1 Scope and field of application

This part of ISO 717

- defines single-number quantities for the airborne sound insulation in buildings and of interior building elements such as walls, floors, doors, and
- gives rules for determining these quantities from the results of measurements carried out in one-third octave bands according to ISO 140/3 and ISO 140/4.

The single-number quantities according to this part of ISO 717 are intended for rating the airborne sound insulation and for simplifying the formulation of acoustical requirements in building codes. The required numerical values of the single-number quantities can be specified according to varying needs.

2 References

ISO 140, *Acoustics — Measurement of sound insulation in buildings and of building elements*

Part 3 : Laboratory measurements of airborne sound insulation of building elements.

Part 4 : Field measurements of airborne sound insulation between rooms.

3 Definitions

3.1 single-number quantity for airborne sound insulation rating : The value, in decibels, of the reference curve at 500 Hz after shifting it according to the method laid down in this part of ISO 717.

Terms and symbols for the single-number quantity used depend on the type of measurement. They are listed in table 1 for airborne sound insulation properties of building elements and in table 2 for airborne sound insulation between rooms in buildings.

NOTE — In order to distinguish clearly between values with and without flanking transmission, primed symbols (for example R') are used to denote values obtained with flanking transmission.

3.2 margin : The shifting of the reference curve, necessary in order to satisfy the deviation requirement laid down in this part of ISO 717. The margin is expressed in decibels and is positive when the reference curve has to be shifted in the favourable direction and negative if it has to be shifted in the unfavourable direction.

The airborne sound insulation margin is denoted by M_a or M'_a .

NOTE — The following relations exist between the single-number quantities listed in table 1 and the margins :

$$M_a = R_w - 52 \text{ dB}$$

or

$$M'_a = R'_w - 52 \text{ dB}$$

4 Procedure for evaluating single-number quantities

4.1 General

The values obtained according to ISO 140/3 and ISO 140/4 are compared with reference values (see 4.2) at the frequencies of measurement within the range of 100 to 3 150 Hz.

The comparison is carried out according to 4.3.

4.2 Reference values

The set of reference values used for comparison with measurement results is specified in table 3 and shown in the figure.

4.3 Method of comparison

To evaluate the results of a measurement of R , R' , D or D_{nT} in one-third octave bands (preferably given to one decimal place), the reference curve is shifted in steps of 1 dB towards the measured curve until the mean unfavourable deviation, calculated by dividing the sum of the unfavourable deviations by the total number (i.e. 16) of measurement frequencies, is as large as possible but not more than 2,0 dB. An unfavourable deviation at a particular frequency occurs when the result of measurements is less than the reference value. Only the unfavourable deviations are taken into account

The value, in decibels, of the reference curve at 500 Hz, after shifting it according to this procedure, is R_w , R'_w , D_w or $D_{nT, w}$ respectively.

In addition, the maximum unfavourable deviation at any frequency shall be recorded, if it exceeds 8,0 dB

5 Statement of results

The appropriate single-number quantity and/or the corresponding margin shall be given with reference to this part of ISO 717. Also, the maximum unfavourable deviation shall be reported, if it exceeds 8,0 dB.

The results of measurements shall also be given in the form of a diagram as specified in ISO 140/3 and ISO 140/4, and shall include the shifted reference curve exemplified in the figure.

Table 1 — Single-number quantities of airborne sound insulation properties of interior building elements

Single-number quantity	Symbol	Derived from one-third octave band values			
		name	symbol	defined in ISO 140	
				part	formula
Weighted sound reduction index	R_w	sound reduction index	R	3	(3)
Weighted apparent sound reduction index *	R'_w	apparent sound reduction index	R'	3	(5)
				4	(6)

* Formerly known as "airborne sound insulation index, I_a ".

Table 2 — Single-number quantities of airborne sound insulation between rooms in buildings

Single-number quantity	Symbol	Derived from one-third octave band values			
		name	symbol	defined in ISO 140	
				part	formula
Weighted level difference	D_w	level difference	D	4	(2)
Weighted standardized level difference	$D_{nT, w}$	standardized level difference	D_{nT}	4	(3)

Table 3 — Reference values for airborne sound

Frequency	Reference value
Hz	dB
100	33
125	36
160	39
200	42
250	45
315	48
400	51
500	52
630	53
800	54
1 000	55
1 250	56
1 600	56
2 000	56
2 500	56
3 150	56

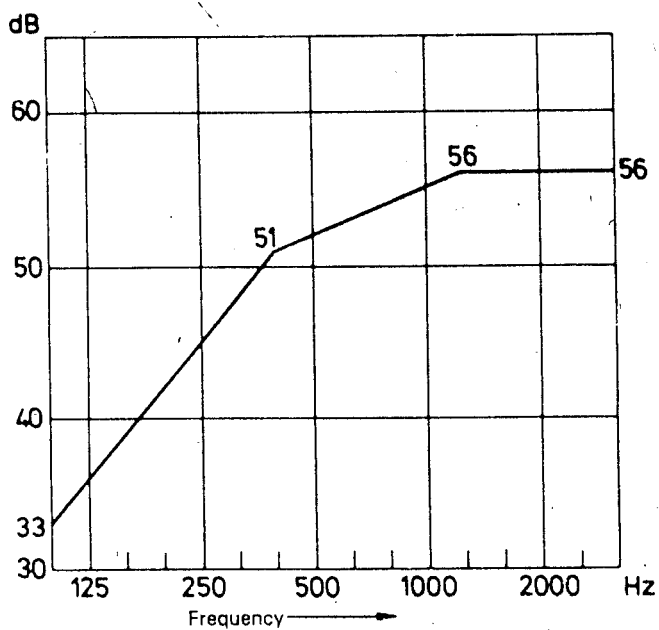


Figure — Curve of reference values for airborne sound