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

Part 6:

**Laboratory measurements of impact sound
insulation of floors**

*Acoustique — Mesurage de l'isolation acoustique des immeubles et des
éléments de construction —*

*Partie 6: Mesurage en laboratoire de la transmission des bruits de choc par
les planchers*



Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 140-6 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This second edition cancels and replaces the first edition (ISO 140-6:1978), which has been technically revised.

ISO 140 consists of the following parts, under the general title *Acoustics — Measurement of sound insulation in buildings and of building elements*:

- *Part 1: Requirements of laboratory test facilities with suppressed flanking transmission*
- *Part 2: Determination, verification and application of precision data*
- *Part 3: Laboratory measurement of airborne sound insulation of building elements*
- *Part 4: Field measurements of airborne sound insulation between rooms*
- *Part 5: Field measurements of airborne sound insulation of façade elements and façades*
- *Part 6: Laboratory measurements of impact sound insulation of floors*

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- *Part 7: Field measurements of impact sound insulation of floors*
- *Part 8: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor*
- *Part 9: Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it*
- *Part 10: Laboratory measurement of airborne sound insulation of small building elements*

Annex A forms an integral part of this part of ISO 140. Annexes B to F are for information only.

Acoustics — Measurement of sound insulation in buildings and of building elements —

Part 6:

Laboratory measurements of impact sound insulation of floors

1 Scope

This part of ISO 140 specifies a laboratory method for measuring impact noise transmission through floors by using a standard tapping machine. The method is applicable to bare floors and also to floors with coverings.

The results obtained can be used to compare the impact sound insulation properties of floors and to classify floors according to their sound insulation capabilities.

NOTE 1 Field measurements of impact sound insulation of floors are dealt with in ISO 140-7.

NOTE 2 Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor are dealt with in ISO 140-8.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 140. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 140 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 140-1:1997, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 1: Requirements for laboratory test facilities with suppressed flanking transmission.*

ISO 140-2:1991, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 2: Determination, verification and application of precision data.*

ISO 354:1985, *Acoustics — Measurement of sound absorption in a reverberation room.*

ISO 717-2:1996, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 2: Impact sound insulation.*

IEC 60651:1979, *Sound level meters.*

IEC 60804:1985, *Integrating-averaging sound level meters.*

IEC 60942: 1988, *Sound calibrators.*

IEC 61260:1995, *Electroacoustics — Octave band filters and fractional — Octave band filters.*

3 Definitions

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

3.1 average sound pressure level in a room, L : Ten times the logarithm to the base 10 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; it is expressed in decibels.

If a continuously moving microphone is used, L is determined by

$$L = 10 \lg \frac{\frac{1}{T_m} \int_0^{T_m} p^2(t) dt}{p_0^2} \text{ dB} \quad \dots (1)$$

where

p is the sound pressure, in pascals;

p_0 is the reference sound pressure and is equal to 20 μPa ;

T_m is the integration time, in seconds.

If fixed microphone positions are used, L is determined by

$$L = 10 \lg \frac{p_1^2 + p_2^2 + \dots + p_n^2}{n \cdot p_0^2} \text{ dB} \quad \dots (2)$$

where $p_1, p_2, \dots, p_n$ are r.m.s. sound pressures at n different positions in the room. In practice, usually the sound pressure levels L_j are measured. In this case L is determined by

$$L = 10 \lg \left(\frac{1}{n} \sum_{j=1}^n 10^{L_j/10} \right) \text{ dB} \quad \dots (3)$$

where L_j are the sound pressure levels L_1 to L_n at n different positions in the room.

3.2 impact sound pressure level, L_i : Average sound pressure level in a one-third-octave band in the receiving room when the floor under test is excited by the standardized impact sound source; it is expressed in decibels.

3.3 normalized impact sound pressure level, L_n : Impact sound pressure level L_i increased by a correction term which is given in decibels, being ten times the logarithm to the base 10 of the ratio of the measured equivalent absorption area A of the receiving room to the reference absorption area A_0 ; it is expressed in decibels:

$$L_n = L_i + 10 \lg \frac{A}{A_0} \text{ dB} \quad \dots (4)$$

where $A_0 = 10 \text{ m}^2$.

4 Equipment

The equipment shall comply with the requirements of clause 6.

The standard tapping machine shall meet the requirements given in annex A.