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

Part 8:

Laboratory measurements of the reduction of
transmitted impact noise by floor coverings on
a heavyweight standard floor

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

*Partie 8: Mesurages en laboratoire de la réduction de la transmission du
bruit de choc par les revêtements de sol sur un plancher lourd normalisé*

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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 140-8 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This second edition cancels and replaces the first edition (ISO 140-8:1978), 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 measurements 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 facade elements and facades*
- *Part 6: Laboratory measurements of impact sound insulation of floors*
- *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*
- *Part 12: Laboratory measurement of room-to-room airborne and impact sound insulation of an access floor*

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

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

Part 8:

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor

1 Scope

This part of ISO 140 specifies a method for measuring the acoustic properties of floor coverings from the view-point of reducing impact noise transmission. The purpose of this part of ISO 140 is to establish a method for determining the noise reducing value of a floor covering under standard test conditions. The test is limited to the specification of procedures for the physical measurement of sound originating from an artificial source (standard tapping machine) under laboratory conditions and is not directly related to the subjective significance of the results.

This part of ISO 140 is applicable to all floor coverings, whether single or multi-layered, as installed on a standard floor. In the case of multi-layered coverings, they may be factory-assembled or assembled at the test site. The test method applies only to laboratory measurements. It does not contain any provision that permits an assessment of the effectiveness of a floor covering *in situ*.

2 Normative reference(s)

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 140-6:— ¹⁾, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 6: Laboratory measurements of impact sound insulation of floors.*

ISO 140-7:— ²⁾, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 7: Field measurements of impact sound insulation of floors.*

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.*

1) To be published. (Revision of ISO 140-6:1978)

2) To be published. (Revision of ISO 140-7:1978)

IEC 651:1979, *Sound level meters*.

IEC 804:1985, *Integrating-averaging sound level meters*.

IEC 942:1988, *Sound calibrators*.

IEC 1260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*.

3 Definitions

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

3.1 average sound pressure level in a room, L : 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; it is expressed in decibels.

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

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

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

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

where $p_1, p_2, \dots, p_n$ are the 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

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

where L_j is the sound pressure level L_1 to L_n at n different positions in the room.

3.2 impact sound pressure level, L_1 : The 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.