

SLOVENSKI STANDARD

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SIST EN ISO 140-14:2005

SIST EN ISO 140-14:2005/AC:2009

SIST EN ISO 140-7:1999

Akustika - Terenska merjenja zvočne izolirnosti v stavbah in stavbnih elementov - 2. del: Izolirnost pred udarnim zvokom (ISO 16283-2:2015)

Acoustics - Field measurement of sound insulation in buildings and of building elements -
Part 2: Impact sound insulation (ISO 16283-2:2015)

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Akustik - Messung der Schalldämmung in Gebäuden und von Bauteilen am Bau - Teil 2:
Trittschalldämmung (ISO 16283-2:2015)

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Acoustique - Mesurage in situ de l'isolation acoustique des bâtiments et des éléments de
construction - Partie 2: Isolation des bruits d'impacts (ISO 16283-2:2015)

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Acoustics - Field measurement of sound insulation in buildings and of building elements - Part 2: Impact sound insulation (ISO 16283-2:2015)

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European foreword

This document (EN ISO 16283-2:2015) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 126 "Acoustic properties of building elements and of buildings" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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INTERNATIONAL
STANDARD

ISO
16283-2

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2015-11-15

**Acoustics — Field measurement of
sound insulation in buildings and of
building elements —**

**Part 2:
Impact sound insulation**

iTeh STANDARD PREVIEW
*Acoustique — Mesurage in situ de l'isolation acoustique des
bâtiments et des éléments de construction —
Partie 2: Isolation des bruits d'impacts*
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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This first edition of ISO 16283-2 cancels and replaces ISO 140-7:1998 and ISO 140-14:2004, which have been technically revised.

ISO 16283 consists of the following parts, under the general title *Acoustics — Field measurement of sound insulation in buildings and of building elements*:

- *Part 1: Airborne sound insulation*
- *Part 2: Impact sound insulation*
- *Part 3: Façade sound insulation*

ISO 16283-2:2015(E)**Introduction**

ISO 16283 (all parts) describes procedures for field measurements of sound insulation in buildings. Airborne, impact and façade sound insulation are described in ISO 16283-1, ISO 16283-2 and ISO 16283-3, respectively.

Field sound insulation measurements that were described previously in ISO 140-4, ISO 140-5, and ISO 140-7 were a) primarily intended for measurements where the sound field could be considered to be diffuse, and b) not explicit as to whether operators could be present in the rooms during the measurement. ISO 16283 (all parts) differs from ISO 140-4, ISO 140-5, and ISO 140-7 in that a) it applies to rooms in which the sound field might, or might not approximate to a diffuse field, b) it clarifies how operators can measure the sound field using a hand-held microphone or sound level meter and c) it includes additional guidance that was previously contained in ISO 140-14.

NOTE Survey test methods for field measurements of airborne and impact sound insulation are dealt with in ISO 10052.

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Acoustics — Field measurement of sound insulation in buildings and of building elements —

Part 2: Impact sound insulation

1 Scope

This part of ISO 16283 specifies procedures to determine the impact sound insulation using sound pressure measurements with an impact source operating on a floor or stairs in a building. These procedures are intended for room volumes in the range from 10 m³ to 250 m³ in the frequency range from 50 Hz to 5 000 Hz. The test results can be used to quantify, assess and compare the impact sound insulation in unfurnished or furnished rooms where the sound field might, or might not approximate to a diffuse field.

Two impact sources are described: the tapping machine and the rubber ball. These impact sources do not exactly replicate all possible types of real impacts on floors or stairs in buildings.

The tapping machine can be used to assess a variety of light, hard impacts such as footsteps from walkers wearing hard-heeled footwear or dropped objects. A single number quantity can be calculated using the rating procedures in ISO 717-2. This single number quantity links the measured impact sound insulation using the tapping machine to subjective assessment of general impacts in dwellings that occur on floors or stairs in a building. The tapping machine is also well-suited to the prediction of impact sound insulation using ISO 15712-2. These two aspects facilitate the specification of impact sound insulation in national building requirements using only measurements with the tapping machine as an impact source.

The rubber ball can be used to assess heavy, soft impacts such as from walkers in bare feet or children jumping, as well as quantifying absolute values that can be related to human disturbance in terms of a Fast time-weighted maximum sound pressure level. At present, calculation procedures for a single number quantity do not currently exist in an ISO Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 3382-2, *Acoustics — Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms*

ISO 12999-1, *Acoustics — Determination and application of measurement uncertainties in building acoustics — Part 1: Sound insulation*

ISO 18233, *Acoustics — Application of new measurement methods in building and room acoustics*

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61183, *Electroacoustics — Random-incidence and diffuse-field calibration of sound level meters*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

ISO 16283-2:2015(E)IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications***3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply

3.1 energy-average impact sound pressure level in a room

L_i
ten times the common logarithm of the ratio of the space and time average of the squared sound pressure to the square of the reference sound pressure where the impact source is the tapping machine and the space average is taken over the central zone of the room where nearfield radiation from the room boundaries has negligible influence

Note 1 to entry: L_i is expressed in decibels.**3.2 corner impact sound pressure level in a room**

$L_{i,Corner}$
ten times the common logarithm of the ratio of the highest time average squared sound pressure from the set of corner measurements to the square of the reference sound pressure for the low-frequency range (50 Hz, 63 Hz, and 80 Hz one-third octave bands) where the impact source is the tapping machine

Note 1 to entry: $L_{i,Corner}$ is expressed in decibels.**3.3 low-frequency energy-average impact sound pressure level in a room**

$L_{i,LF}$
ten times the common logarithm of the ratio of the space and time average of the squared sound pressure to the square of the reference sound pressure in the low-frequency range (50 Hz, 63 Hz, and 80 Hz one-third octave bands) where the impact source is the tapping machine and the space average is a weighted average that is calculated using the room corners where the sound pressure levels are highest and the central zone of the room where nearfield radiation from the room boundaries has negligible influence

Note 1 to entry: $L_{i,LF}$ is expressed in decibels.Note 2 to entry: $L_{i,LF}$ is an estimate of the energy-average sound pressure level for the entire room volume.**3.4 energy-average maximum impact sound pressure level in a room**

$L_{i,Fmax}$
ten times the common logarithm of the ratio of the space average of the squared maximum sound pressure with Fast time weighting to the square of the reference sound pressure where the impact source is the rubber ball and the space average is taken over the central zone of the room where nearfield radiation from the room boundaries has negligible influence

Note 1 to entry: $L_{i,Fmax}$ is expressed in decibels.**3.5 reverberation time**

T
time required for the sound pressure level in a room to decrease by 60 dB after the sound source has stopped

Note 1 to entry: T is expressed in seconds.**3.6 background noise level**

measured sound pressure level in the receiving room from all sources except the impact source

3.7**fixed microphone**

microphone that is fixed in space by using a device such as a tripod so that it is stationary

3.8**mechanized continuously moving microphone**

microphone that is mechanically moved with approximately constant angular speed in a circle, or is mechanically swept along a circular path where the angle of rotation about a fixed axis is between 270° and 360°

3.9**manually scanned microphone**

microphone attached to a hand-held sound level meter or an extension rod that is moved by a human operator along a prescribed path

3.10**manually held microphone**

microphone attached to a hand-held sound level meter or a rod that is hand-held at a fixed position by a human operator at a distance at least an arm's length from the trunk of the operator's body

3.11**partition**

total surface of the floor or stair which is excited by the impact source

Note 1 to entry: For two rooms which are staggered vertically or horizontally, the total surface of the separating partition is not visible from both sides of the partition; hence it is necessary to define the partition as the total surface.

3.12**common partition**

part of the floor or stair that is common to both the room in which the impact source is used and the receiving room

3.13**standardized impact sound pressure level**

L'_{nT}

impact sound pressure level, L_i , reduced by a correction term which is given in decibels, being ten times the common logarithm of the ratio of the measured reverberation time, T , to the reference reverberation time, T_0 , which is calculated using Formula (1) when the impact source is the tapping machine:

$$L'_{nT} = L_i - 10 \lg \frac{T}{T_0} \quad (1)$$

where

T is the reverberation time in the receiving room;

T_0 is the reference reverberation time; for dwellings, $T_0 = 0,5$ s.

Note 1 to entry: L'_{nT} is expressed in decibels.

Note 2 to entry: The impact sound pressure level is referenced to a reverberation time of 0,5 s because in dwellings with furniture the reverberation time has been found to be reasonably independent of volume and frequency and to be approximately equal to 0,5 s.

Note 3 to entry: L'_{nT} provides a straightforward link to the subjective impression of impact sound insulation.