SLOVENSKI STANDARD
SIST EN ISO 10848-1:2006

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Akustika - Laboratorijsko merjenje bočnega prenosa zvoka v zraku in udarnega zvoka med mejnimi prostori - 1. del: Okvirni dokument (ISO 10848-1:2006)

Acoustics - Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms - Part 1: Frame document (ISO 10848-1:2006)

Akustik - Messung der Flankenübertragung von Luftschall und Trittschall zwischen benachbarten Räumen in Prüfständen - Teil 1: Rahmendokument (ISO 10848-1:2006)

Acoustique - Mesurage en laboratoire des transmissions latérales du bruit aérien et des bruits de choc entre pieces adjacentes - Partie 1: Document cadre (ISO 10848-1:2006)

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This European Standard was approved by CEN on 16 March 2006.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

This document (EN ISO 10848-1:2006) has been prepared by Technical Committee CEN/TC 126 "Acoustic properties of building elements and of buildings", the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 43 "Acoustics".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

INTERNATIONAL STANDARD

ISO 10848-1

First edition
2006-04-01

Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms —

Part 1: Frame document

Acoustique — Mesurage en laboratoire des transmissions latérales du bruit aérien et des bruits de choc entre des pièces adjacentes —

Partie 1: Document cadre

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 10848-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 126, *Acoustic properties of building elements and of buildings*, in collaboration with Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 10848 consists of the following parts, under the general title *Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms*:

— *Part 1: Frame document*

— *Part 2: Application to light elements when the junction has a small influence*

— *Part 3: Application to light elements when the junction has a substantial influence*

The following part is under preparation:

— *Part 4: Application to all other cases*

Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms —

Part 1: Frame document

1 Scope

ISO 10848 specifies measurement methods to be performed in a laboratory test facility in order to characterize the flanking transmission of one or several building components. The performance of the building components is expressed either as an overall quantity for the combination of elements and junction (such as $D_{n,f}$ and/or $L_{n,f}$) or as the vibration reduction index K_{ij} of a junction.

This part of ISO 10848 contains definitions, general requirements for test specimens and test rooms, and measurement methods. Guidelines are given for the selection of the quantity to be measured depending on the junction and the types of building elements involved. Other parts of ISO 10848 specify the application for different types of junction and building elements.

The quantities characterizing the flanking transmission can be used to compare different products, or to express a requirement, or as input data for prediction methods, such as EN 12354-1 and EN 12354-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 140-3:1995, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements*

ISO 140-6:1998, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 6: Laboratory measurements of impact sound insulation of floors*

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

ISO 3382, *Acoustics — Measurement of the reverberation time of rooms with reference to other acoustical parameters*

ISO 7626-1, *Vibration and shock — Experimental determination of mechanical mobility — Part 1: Basic definitions and transducers*

ISO 10848-2:2006, *Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms — Part 2: Application to light elements when the junction has a small influence*

ISO 10848-3:2006, *Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms — Part 3: Application to light elements when the junction has a substantial influence*

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

IEC 60651, *Sound level meters*

IEC 60804, *Integrating-averaging sound level meters*

IEC 60942, *Sound calibrators*

3 Terms and definitions

For the purposes of this document, the following terms and 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 (walls, etc.) is of significant influence

NOTE 1 This quantity is expressed in decibels.

NOTE 2 If a continuously moving microphone is used, L is determined by

$$L = 10 \lg \frac{\frac{1}{T_m} \int_0^{T_m} p^2(t) \mathrm{d}t}{p_0^2} \text{ dB} \tag{1}$$

where

p is the sound pressure, in pascals;

p_0 is the reference sound pressure, in pascals; p_0 = 20 μPa;

T_m is the integration time, in seconds.

NOTE 3 If fixed microphone positions are used, L is determined by

$$L = 10 \lg \frac{p_1^2 + p_2^2 + ... + p_n^2}{n \cdot p_0^2} \text{ dB} \tag{2}$$

where p_1, p_2, ... p_n are r.m.s. (root mean square) sound pressures at n different positions in the room, in pascals.

NOTE 4 In practice usually the sound pressure levels L_i are measured. In this case L is determined by

$$L = 10 \lg \frac{1}{n} \sum_{i=1}^{n} 10^{L_i/10} \text{ dB} \tag{3}$$

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

3.2
normalized flanking level difference
$D_{n,f}$
difference in the space and time averaged sound pressure level produced in two rooms by one or more sound sources in one of them, when the transmission only occurs through a specified flanking path

NOTE $D_{n,f}$ is normalized to an equivalent sound absorption area (A_0) in the receiving room and is expressed in decibels:

$$D_{n,f} = L_1 - L_2 - 10 \lg \frac{A}{A_0} \text{ dB} \quad (4)$$

where

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

L_2 is the average sound pressure level in the receiving room, in decibels;

A is the equivalent sound absorption area in the receiving room, in square metres;

A_0 is the reference equivalent sound absorption area, in square metres; A_0 = 10 m^2.

3.3
normalized flanking impact sound pressure level
$L_{n,f}$
space and time averaged sound pressure level in the receiving room produced by a standard tapping machine operating at different positions on a tested floor in the source room, when the transmission only occurs through a specified flanking path

NOTE $L_{n,f}$ is normalized to an equivalent sound absorption area (A_0) in the receiving room and is expressed in decibels

$$L_{n,f} = L_2 + 10 \lg \frac{A}{A_0} \text{ dB} \quad (5)$$

where

L_2 is the average sound pressure level in the receiving room, in decibels;

A is the equivalent sound absorption area in the receiving room, in square metres;

A_0 is the reference equivalent sound absorption area, in square metres; A_0 = 10 m^2.

3.4
average velocity level
L_v
ten times the common logarithm of the ratio of the time and space averaged mean squared normal velocity of an element to the squared reference velocity v_0 ($v_0 = 1 \times 10^{-9}$ m/s)

$$L_v = 10 \lg \frac{\frac{1}{T_m} \int_0^{T_m} v^2(t) \mathrm{d}t}{v_0^2} \text{ dB} \quad (6)$$

NOTE 1 It should be stressed that the reference velocity preferred in ISO 1683 is 1×10^{-9} m/s, although a common reference value in some countries is still $v_0 = 5 \times 10^{-8}$ m/s.

NOTE 2 Instead of the average velocity level, the average acceleration level L_a can be measured. The reference acceleration preferred in ISO 1683 is 1×10^{-6} m/s^2.

NOTE 3 If airborne or stationary structure-borne excitation is used, the spatial averaging is calculated with

$$L_v = 10 \ \lg \frac{v_1^2 + v_2^2 + \cdots + v_n^2}{n \cdot v_0^2} \ \text{dB} \tag{7}$$

where v_1, v_2, v_n are r.m.s. (root mean square) velocities at n different positions on the element, in metres per second.

NOTE 4 For transient structure-borne excitation, use Equations (9) and (10).

3.5
structural reverberation time
T_s
time that would be required for the velocity or acceleration level in a structure to decrease by 60 dB after the structure-borne sound source has stopped

NOTE 1 The quantity is expressed in seconds.

NOTE 2 The definition of T_s with a decrease by 60 dB of the velocity or acceleration level in a structure can be fulfilled by linear extrapolation of shorter evaluation ranges.

3.6
velocity level difference
$D_{v,ij}$
difference between the average velocity level of an element i and that of an element j, when only the element i is excited (airborne or structure-borne)

$$D_{v,ij} = L_{v,i} - L_{v,j} \tag{8}$$

NOTE 1 If a transient structure-borne excitation is used, then the normal velocity should be measured simultaneously on both elements and the velocity level difference determined by:

$$D_{v,ij} = \frac{1}{M \ N} \sum_{m=1}^{M} \sum_{n=1}^{N} (D_{v,ij})_{mn} \ \text{dB} \tag{9}$$

where

M is the number of excitation points on element i;

N is the number of transducer positions on each element for each excitation point;

$(D_{v,ij})_{mn}$ is the velocity level difference as given by Equation (10) for one excitation point and one pair of transducer positions only, in decibels:

$$(D_{v,ij})_{mn} = 10 \ \lg \frac{\int_0^{T_m} v_i^2(t) \ dt}{\int_0^{T_m} v_j^2(t) \ dt} \ \text{dB} \tag{10}$$

and

v_i, v_j are the normal velocities at points on elements i and j respectively, in metres per second;

T_m is the integration time, in seconds.

NOTE 2 For practical purposes, Equation (8) is preferable to Equation (9).

