INTERNATIONAL STANDARD

ISO 10848-2

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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

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

Partie 2: Application aux éléments légers lorsque la jonction a une faible influence

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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.

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 10848-2 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).

This first edition cancels and replaces EN 20140-9 and ISO 140-12.

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

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 measured quantities may 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.

This part of ISO 10848 is specifically referred to in ISO 10848-1:2006, 4.4, as being a supporting part of the frame document.

This part of ISO 10848 applies to light elements such as suspended ceilings, access floors, light uninterrupted façades or floating floors. The transmission from one room to another can be simultaneous through the test element and via the plenum, if any. With measurements according to this part of ISO 10848, the total sound transmission is measured, and it is not possible to separate the two kinds of transmission. The measured quantities $D_{n,f}$ and $L_{n,f}$ depend on the actual dimensions of the test specimen.

A light element is defined in ISO 10848-1:2006, Clause 3.

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

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 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*

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

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

3 Terms and definitions

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

3.1
normalized flanking level difference
$D_{n,f}$
difference in the space and time average 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:

$$D_{n,f} = L_1 - L_2 - 10 \lg \frac{A}{A_0} \text{ dB} \qquad (1)$$

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.

[ISO 10848-1:2006]

3.2
normalized flanking impact sound pressure level
$L_{n,f}$
space and time average 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:

$$L_{n,f} = L_2 + 10 \lg \frac{A}{A_0} \text{ dB} \qquad (2)$$

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.

[ISO 10848-1:2006]

3.3
plenum space
whole of the void below an access floor or above a suspended ceiling in both rooms in the test facility

4 Measuring equipment

The equipment shall fulfil the requirements given in ISO 10848-1:2006, Clause 5.

5 Test arrangement

5.1 Requirements for the laboratory

5.1.1 General

The general requirements for test specimens and test rooms given in ISO 10848-1:2006, Clause 6 shall be fulfilled. Further requirements for this part of ISO 10848 are stated in the following subclauses. Facilities for different kinds of test specimens are shown in Figures 1 to 4.

5.1.2 Construction of the test facility

The rooms shall be on the same level, except for the façade testing where the rooms may be placed one on top of the other.

For access floors and suspended ceilings, the ground plan of the test facility shall be rectangular. When the rooms are side by side, a vibration break shall be provided between the two rooms in order to ensure that structure-borne transmissions through the test facility are negligible (see Figure 1).

When a plenum is used, the reverberation time of each room might be affected by sound transmission back from the other test room. In such cases, a suitable impervious plenum barrier shall be installed between the edge of the dividing wall and the bottom wall of the plenum during the reverberation time measurements.

5.1.3 Dimensions of the test facility

The width of the test facility shall be 4,5 m ± 0,5 m and the internal height of the source and receiving rooms shall be at least 2,3 m.

The volume V of each room shall be at least 50 m^3. It is recommended that the dividing wall be positioned such that the volumes of source and receiving room differ by at least 10 % when the test element is in position.

The minimum depth in both rooms shall be 3,5 m.

5.1.4 Dividing wall

The dividing wall divides the test facility into source and receiving room. The dividing wall shall be mounted in such a way that it is not loading the element. The gap between the dividing wall and the element shall be sealed with a flexible material. The thickness of the wall shall be less than 200 mm or tapered to 200 mm (see for example Figure 1). The tapering between the widest part of the wall and the element shall be achieved by means of an angle not exceeding 45°. The construction of the dividing wall shall be such that $D_{n,f,max}$ is 10 dB higher than the $D_{n,f}$ of any element which is likely to be tested.

In cases where there is a plenum, for checking the airborne sound insulation of the facility, a suitable plenum barrier of construction similar to the dividing wall may be installed between the edge of the dividing wall and the wall of the test facility, without the element. In cases where there is no plenum, a suitable construction, for example a lining of the internal face of the test element, could be necessary to determine $D_{n,f,max}$.

5.1.5 Plenum height

For access floors, the height as measured from the surface of the access floor to the surface of the floor of the test facility shall be either 0,3 m or, if this is not possible, then the nearest possible value shall be used. Other heights may be tested if they are intended to be used in practice.

For suspended ceilings, the height as measured from the lower surface of the ceiling to the lower surface of the test facility ceiling shall be between 0,7 m and 0,8 m. Other heights may be tested if they are intended to be used in practice.

5.1.6 Plenum lining

One sidewall of the plenum and both endwalls of the plenum shall be lined with suitable sound-absorbing material. This material shall have such properties that when tested as a plane absorber in accordance with ISO 354, it has sound absorption coefficients not less than those shown in Table 1.

Table 1

Octave-band centre frequency, Hz	125	250	500	1 000	2 000	4 000
Sound absorption coefficient, α_s	0,65	0,80	0,80	0,80	0,80	0,80

For the other sidewalls and the floor, the sound absorption coefficient shall be less than 0,10 at all frequencies given in the table.

The thickness of the lining shall not exceed 150 mm.

In cases where there is no plenum, attention shall be given to avoiding an important outside airborne transmission path between the two parts of the test element – through the hall where the test facility is installed.

NOTE Typically, the ratio of the volume of the hall (in cubic metres) to its reverberation time (in seconds) should be larger than 500 m^3/s.

5.2 Installation of the test element

5.2.1 Installation of access floors

The area of a floor shall be equal to the area given by the length and width of the test facility.

The floor components shall be representative of those used in practice in actual field installations. The floor shall be installed in accordance with the recommended practice of the manufacturer or with the recommended practice of an installation standard.

For an example, see Figure 1.

5.2.2 Installation of suspended ceilings

The detail of the joint between the ceiling and the top of the dividing wall is of critical importance and care shall be taken to simulate actual field conditions.

The area of a continuous ceiling shall be equal to the area given by the length and width of the test facility.

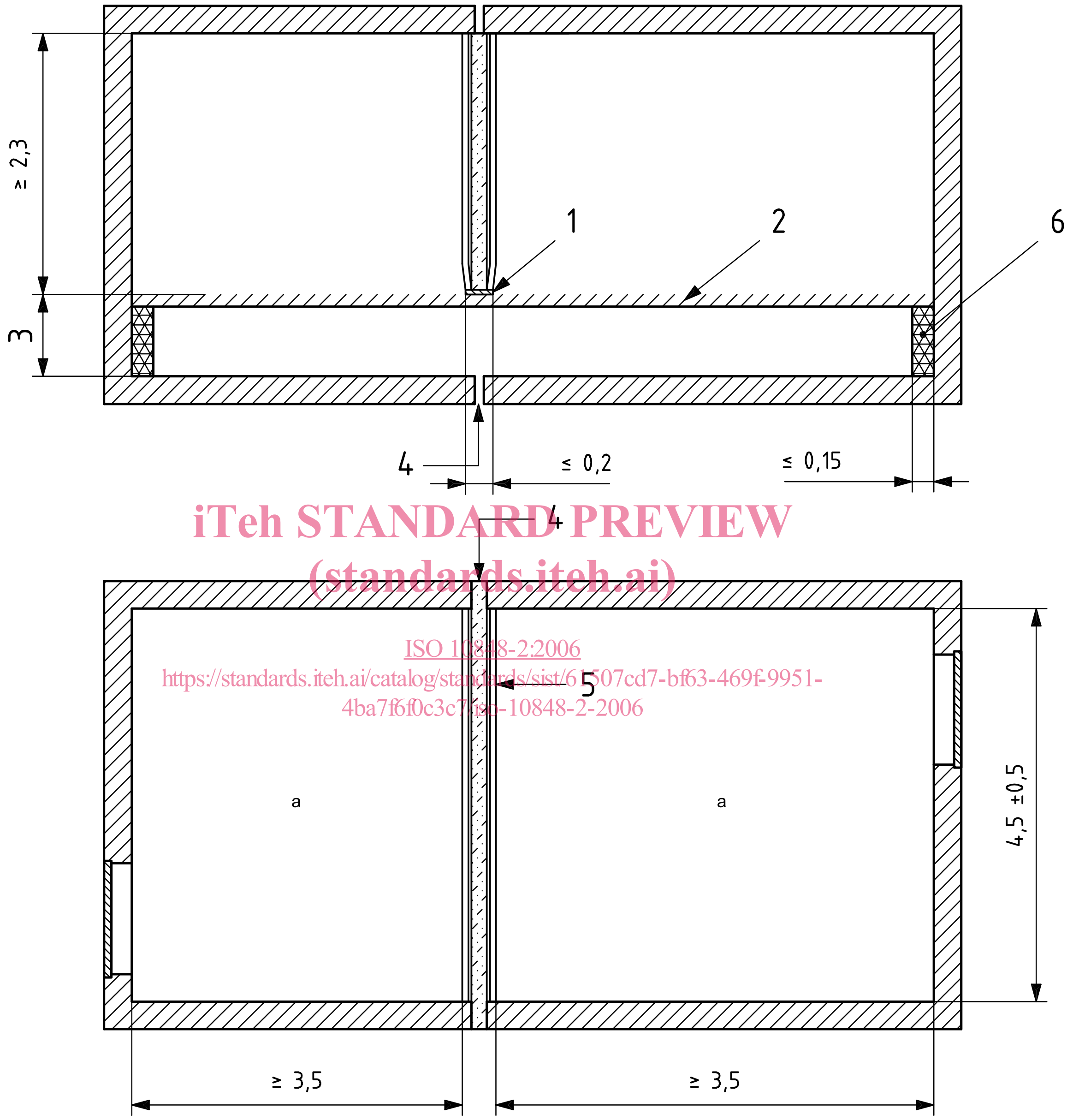
For a ceiling with a break at the dividing wall, it may be necessary to add additional capping to the top of the dividing wall to complete the junction. The area of a discontinuous ceiling shall then be equal to the area given by the length and width of the test facility less the area of the capping on the top of the dividing wall.

The ceiling components shall be representative of those used in practice in actual field installations. The ceiling shall be installed in accordance with the recommended practice of the manufacturer or with the recommended practice of an installation standard.

In cases where normal installation practices would result in the use of custom-fitted ceiling tile of width or length less than 100 mm adjacent to one of the end walls of the facility parallel to the dividing wall, a filler material with a higher transmission loss may be substituted for the custom fitted pieces of ceiling tile.

For an example, see Figure 2.

Dimensions in metres



Key

1 flexible material

2 access floor

3 access floor height = 0,3 m if possible

4 vibration break

5 dividing wall

6 absorbing material

a $V \geqslant 50$ m^3.

Figure 1 — Requirements for the dimensions of the laboratory and for the mounting of the access floor and the dividing wall