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Acoustics — Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms —

Part 3: Application to Type B elements when the junction has a substantial influence

Acoustique — Mesurage en laboratoire et sur le terrain des transmissions latérales du bruit aérien, des bruits de choc et du bruit d'équipement technique de bâtiment entre des pièces —

Partie 3: Application aux éléments de Type B lorsque la jonction a une influence importante

Reference number
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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 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This second edition cancels and replaces the first edition (ISO 10848-3:2006), which has been technically revised with the following changes:

a) extension to field measurements;

b) extension to building service equipment with the introduction of the normalized flanking equipment sound pressure level;

c) normalized direction-averaged vibration level difference for junctions between lightweight elements has been introduced.

A list of all the parts in the ISO 10848 series can be found on the ISO website.

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Acoustics — Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms —

Part 3: Application to Type B elements when the junction has a substantial influence

1 Scope

ISO 10848 (all parts) specifies measurement methods to characterize the flanking transmission of one or several building components.

This document specifies laboratory and field measurements of buildings for Type B elements (defined in ISO 10848-1) when the junction has a substantial influence.

Laboratory measurements are used to quantify the performance of the junction with suppressed flanking transmission from the laboratory structure. Field measurements are used to characterize the *in situ* performance and it is not usually possible to suppress unwanted flanking transmission sufficiently; hence, the results can only be considered representative of the performance of that junction when installed in that particular building structure.

This document is referred to in ISO 10848-1:2017, 4.5 as being a supporting part to the frame document and applies to Type B elements that are structurally connected as defined in ISO 10848-1.

The measured quantities can be used to compare different products, or to express a requirement, or as input data for prediction methods, such as ISO 12354-1 and ISO 12354-2.

The relevant quantity to be measured is selected according to ISO 10848-1:2017, 4.5. The performance of the building components is expressed either as an overall quantity for the combination of elements and junction (such as $D_{n,f,ij}$ and/or $L_{n,f,ij}$ and/or $L_{ne0,f,ij}$) or as the normalized direction-average velocity level difference $\overline{D_{v,ij,n}}$ of a junction. $D_{n,f,ij}$, $L_{n,f,ij}$, $L_{ne0,f,ij}$ and $\overline{D_{v,ij,n}}$ depend on the actual dimensions of the elements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 10848-1:2017, *Acoustics — Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms — Part 1: Frame document*

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

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3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
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 and the result is normalized to an equivalent sound absorption area in the receiving room according to

$$D_{n,f} = L_1 - L_2 - 10 \lg \frac{A}{A_0}$$

where

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

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

A is the equivalent sound absorption area in the receiving room, in m^2;

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

Note 1 to entry: This quantity is expressed in decibels.

Note 2 to entry: For clarity, the term $D_{n,f}$ is used when only one flanking path determines the sound transmission (such as with suspended ceilings) and the term $D_{n,f,ij}$ is used when only one specified transmission path *ij* out of several paths is considered (such as with structure-borne sound transmission on junctions of three or four connected elements).

3.2
normalized flanking impact sound pressure level
$L_{n,f}$
space and time averaged sound pressure level in the receiving room produced by a tapping machine operating at different positions on a tested element (floor) in the source room, when the transmission only occurs through a specified flanking path and the result is normalized to an equivalent sound absorption area, in the receiving room according to

$$L_{n,f} = L_2 + 10 \lg \frac{A}{A_0}$$

where

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

A is the equivalent sound absorption area in the receiving room, in m^2;

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

Note 1 to entry: This quantity is expressed in decibels.

Note 2 to entry: For clarity, the term $L_{n,f}$ is used when only one flanking path determines the sound transmission (such as with access floors) and the term $L_{n,f,ij}$ is used when only one specified transmission path *ij* out of several paths is considered (such as with structure-borne sound transmission on junctions of three or four connected elements).

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3.3
normalized flanking equipment sound pressure level
$L_{\mathrm{ne0,f}}$
space and time averaged sound pressure level in the receiving room produced by a structure-borne sound source injecting a unit power (1 W) at different positions on a tested element in the source room, when the transmission only occurs through a specified flanking path and the result is normalized to an equivalent sound absorption area in the receiving room and is expressed in decibels according to

$$L_{\mathrm{ne0,f}} = L_{2\mathrm{e}} + 10\lg\frac{A}{A_0}$$

where

$L_{2\mathrm{e}}$ is the average sound pressure level in the receiving room with a structure-borne sound source injecting 1 W into the tested element, in dB;

A is the equivalent sound absorption area in the receiving room, in m^2;

A_0 is the reference equivalent sound absorption area, in m^2; $A_0 = 10\ \mathrm{m}^2$.

Note 1 to entry: This quantity is expressed in decibels.

Note 2 to entry: For clarity, the term $L_{\mathrm{ne0,f}}$ is used when only one flanking path determines the sound transmission (such as with equipment installed on access floors or light façades) and the term $L_{\mathrm{ne0,f},ij}$ is used when only one specified transmission path ij out of several paths is considered (such as with structure-borne sound transmission on junctions of three or four connected elements).

3.4
normalized direction-average vibration level difference
$\overline{D_{\mathrm{v},ij,\mathrm{n}}}$
difference in velocity level between elements i and j, averaged over the excitation from i and excitation from j, and normalized to the junction length and the measurement areas on both elements according to

$$\overline{D_{\mathrm{v},ij,\mathrm{n}}} = \overline{D_{\mathrm{v},ij}} + 10\lg\left(\frac{l_{ij}\,l_0}{\sqrt{S_{\mathrm{m},i}\,S_{\mathrm{m},j}}}\right)$$

where

l_0 is the reference length, in m; $l_0 = 1$ m;

$S_{\mathrm{m},i}$ is the area of element i over which the velocity is measured, in m^2;

$S_{\mathrm{m},j}$ is the area of element j over which the velocity is measured, in m^2.

Note 1 to entry: This quantity is expressed in decibels.

4 Instrumentation

The equipment shall fulfil the requirements of ISO 10848-1:2017, Clause 5.

5 Test arrangement

5.1 Requirements for the laboratory

The general requirements for the test facility shall be fulfilled according to ISO 10848-1:2017, 6.1.

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