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ILNAS-EN 16205:2013+A1:2018

Laboratory measurement of walking noise on floors

Mesurage en laboratoire du bruit des pas sur les planchers

Messung von Gehschall auf Fußböden im Prüfstand

03/2018

National Foreword

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EUROPEAN STANDARD
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This European Standard was approved by CEN on 1 May 2013 and includes Amendment 1 approved by CEN on 12 February 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16205:2013+A1:2018) 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.

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of an identical text or by endorsement, at the latest by September 2018, and conflicting national standards shall be withdrawn at the latest by September 2018.

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

This document includes Amendment 1 approved by CEN on 2018-02-12.

This document supersedes EN 16205:2013.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

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Introduction

This document sets up a laboratory measurement method to determine noise radiated from a floor covering on a standard concrete floor when excited by a standard tapping machine. The noise is measured in the room where the floor covering and the excitation are located. There is no restriction concerning the type of floor covering unless that the required small pads of the flooring could not be assembled. Using the standard tapping machine according to EN ISO 10140 means that a more general excitation compared to walking alone is regarded – in the same way as it is accepted for impact sound improvement measurements of floor coverings. The results are expressed in terms of the normalised A-weighted average sound pressure level in the walking room. The results provide information about the noise radiated. A more sophisticated psychoacoustic evaluation did not seem to be appropriate in view of the fact that this measurement stands for a large range of sources with different acoustical behaviour (even if only different types of walking were regarded). A subjective classification of the quality of the floor coverings is not intended.

1 Scope

This European Standard specifies a laboratory measurement method to determine noise radiated from a floor covering on a standard concrete floor when excited by a standard tapping machine.

2 Normative references

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

EN ISO 10140-1, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 1: Application rules for specific products (ISO 10140-1)*

EN ISO 10140-2, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 2: Measurement of airborne sound insulation (ISO 10140-2)*

EN ISO 10140-3, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 3: Measurement of impact sound insulation (ISO 10140-3)*

EN ISO 10140-4:2010, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 4: Measurement procedures and requirements (ISO 10140-4:2010)*

EN ISO 10140-5, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment (ISO 10140-5)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 10140 and the following apply.

3.1
sufficiently large specimen
specimen whose radiated sound power does not increase any longer with size, or which covers the total area of the floor

Note 1 to entry: In case of uncertainty the testing laboratory will decide, which size is sufficient.

3.2
pads
pieces of the flooring under test, which are as large as the hitting areas of the tapping machine hammers

Note 1 to entry: Quadratic pads should be the smallest possible including the whole hitting area.

3.3
walking sound pressure level (in third-octave band *i*)
$L_{n,\mathrm{walk},i}$
normalised impact sound pressure level in the upper (walking) room with a standardised contribution of the concrete bare floor underneath the floor covering under test

Note 1 to entry: It is calculated according to Formula (1):

$$L_{n,\mathrm{walk},i} = \begin{cases} L_{i,\mathrm{ref,b}} + L_{i,\mathrm{Fl,c}} - L_{i,\mathrm{Fl,b}} & \text{if } L_{i,\mathrm{with}} < \left(L_{i,\mathrm{pads}} + 10 \cdot \log\left(\dfrac{T_{i,\mathrm{upper,with}}}{T_{i,\mathrm{upper,pads}}} \right) \right) \\ 10 \log_{10} \left(\dfrac{0{,}16 \cdot V_{\mathrm{upper}}}{A_0} \left(\dfrac{10^{\frac{L_{i,\mathrm{with}}}{10}}}{T_{i,\mathrm{upper,with}}} - \dfrac{10^{\frac{L_{i,\mathrm{pads}}}{10}}}{T_{i,\mathrm{upper,pads}}} \right) + 10^{\frac{L_{i,\mathrm{ref,b}} + L_{i,\mathrm{Fl,c}} - L_{i,\mathrm{Fl,b}}}{10}} \right) & \text{else} \end{cases} \quad (1)$$

where

$L_{i,\mathrm{with}}$	is the impact sound pressure level measured in the upper room, when a sufficiently large specimen is lying on the test floor;
$L_{i,\mathrm{pads}}$	is the impact sound pressure level measured in the upper room, when only pads of the flooring material are lying on the test floor below the tapping machine hammers;
$L_{i,\mathrm{Fl,b}}$	is the impact sound pressure level measured in the lower room, when the tapping machine acts on the bare floor in the upper room;
$L_{i,\mathrm{Fl,c}}$	is the impact sound pressure level measured in the lower room, when the tapping machine acts on the sufficiently large specimen in the upper room;
$L_{i,\mathrm{ref,b}}$	is the reference values for the bare floor as given in Annex B;
V_{upper}	is the volume of the upper room, in cubic metres;
$T_{i,\mathrm{upper,with}}$	is the reverberation time in the upper room with sufficiently large floor covering installed, in seconds;
$T_{i,\mathrm{upper,pads}}$	is the reverberation time in the upper room with pads installed, in seconds;
A_0	10 m².

This definition presumes, that the reverberation time in the lower room does not change between the measurements of $L_{i,\mathrm{Fl,c}}$ and $L_{i,\mathrm{Fl,b}}$.

Note 2 to entry: This can be achieved by leaving the lower room unchanged.

3.4
A-weighted walking sound pressure level

$L_{n,\mathrm{walk,A}}$

A-weighted sound pressure level, calculated from $L_{n,\mathrm{walk},i}$ according to Formula (2) with C_i according to EN 61672-1:

$$L_{n,\mathrm{walk,A}} = 10 \cdot \lg \sum_{i=1}^{21} 10^{\left(L_{n,\mathrm{walk},i} + C_i\right)/10} \quad (2)$$