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**Acoustics — Laboratory
measurement of sound insulation of
building elements —**

**Part 3:
Measurement of impact sound
insulation**

AMENDMENT 1

*Acoustique — Mesurage en laboratoire de l'isolation acoustique des
éléments de construction —*

Partie 3: Mesurage de l'isolation au bruit de choc

AMENDEMENT 1



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

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Acoustics — Laboratory measurement of sound insulation of building elements —

Part 3: Measurement of impact sound insulation

AMENDMENT 1

Page v, Introduction

Delete the last sentence: "It is intended to update [...] ISO 10140 (all parts).".

Page 3, 5.2

Add the following paragraph as the third paragraph.

"Also other types of impact sources can be applied, as for example rainfall on roofs and roof elements. Such sources are defined in ISO 10140-5:2010, Annex H, while the specific application is treated in ISO 10140-1:2010, Annex K."

Page 4

Add the following new [subclause 5.4](#) and renumber the subsequent subclauses under Clause 5 accordingly.

5.4 Correction of airborne sound transmission

In case that the airborne sound transmission from the source to the receiving room cannot be neglected (this applies to situations where airborne and impact sound pressure level in the receiving room differ by less than 10 dB, for instance for long reverberation times in the source room or floors with good impact but poor airborne sound insulation) the measured impact sound shall be corrected. Make the correction in the following way:

- a) Measure the sound levels generated by the tapping machine in the source and the receiving room, L_{TS} and L_i .
- b) While running a loudspeaker in the source room, the resulting sound pressure levels in the source and receiving room, L_{LS} and L_{LR} , are measured. From the measured values, calculate the level difference $D = L_{LS} - L_{LR}$. To ensure constant measuring conditions, the loudspeaker shall already be in the source room during the measurement of impact sound. It shall be placed in an edge of the room in a height of 1,0 m and a distance of 1,0 m to the walls (the mentioned distances refer to the centre of the source). Further positions of the loudspeaker are not necessary. If the airborne sound reduction index R of the floor is known, D can be alternatively determined from $D = R - 10 \lg(S/A)$, where S is the floor area and A is the equivalent absorption area in the receiving room.
- c) Calculate the normalized impact sound pressure level, L_n , according to Formula (3). If necessary, both L_i and L_{LR} should be corrected for background noise according to ISO 10140-4:2010, 4.3.

$$L_n = 10 \lg \left(10^{L_i/10} - 10^{(L_{TS}-D)/10} \right) + 10 \lg \left(\frac{A}{A_0} \right) \quad (3)$$

where

A is the equivalent absorption area in the receiving room;

$A_0 = 10 \text{ m}^2$;

L_{TS} is the sound pressure level generated by the tapping machine in the source room;

L_i is the sound pressure level generated by the tapping machine in the receiving room.

The calculation is performed in one-third octave bands. If a correction for airborne sound is applied, this shall be mentioned in the test report. For the case that the condition $L_i - (L_{TS} - D) \geq 10 \text{ dB}$ is valid in all one-third octave bands a correction of airborne sound is not necessary. For $L_i - (L_{TS} - D) \leq 3 \text{ dB}$ sound transmission is dominated by airborne sound and impact sound insulation cannot be measured correctly.

Page 9, A.4

Add the following new subclause A.4.5.

A.4.5 Standardized maximum impact sound pressure level $L_{i,Fmax,V,T}$

The room-averaged maximum impact sound pressure level, $L_{i,Fmax}$, in the octave or one-third octave frequency band that is measured in the receiving room below the floor depends on the volume of the receiving room and its reverberation time. Therefore, for comparison of laboratory measurements with results from other laboratories or actual buildings, the result should be corrected to give $L'_{i,Fmax,V,T}$ using Formula (A.3):

$$L'_{i,Fmax,V,T} = L_{i,Fmax} + 10 \lg \frac{V}{V_0} - 10 \lg \left[\frac{1 - C_0^{-1}}{1 - C^{-1}} \left(\frac{C^{(1-C)^{-1}} - C^{-(1-C^{-1})^{-1}}}{C_0^{(1-C_0)^{-1}} - C_0^{-(1-C_0^{-1})^{-1}}} \right) \right] \quad (A.3)$$

where

$$C_0 = \frac{T_0}{1,7275} \quad (A.4)$$

$$C = \frac{T}{1,7275} \quad (A.5)$$

where

T is the reverberation time for the octave or one-third octave frequency band in the receiving room;

T_0 is the reference reverberation time; for dwellings, $T_0 = 0,5 \text{ s}$;

V is the receiving room volume, in cubic metres;

V_0 is the reference receiving room volume, for dwellings, $V_0 = 50 \text{ m}^3$;

The standardized maximum impact sound pressure level, $L_{i,Fmax,V,T}$, should be calculated using Formula (A.3) for the octave or one-third octave frequency bands specified in A.4.3.2.