INTERNATIONAL STANDARD

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AMENDMENT 1
2006-08-15

Acoustics — Rating of sound insulation in buildings and of building elements —

Part 2: Impact sound insulation

AMENDMENT 1

Acoustique — Évaluation de l'isolement acoustique des immeubles et des éléments de construction —

Partie 2: Protection contre le bruit de choc

AMENDEMENT 1

Reference number
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Foreword

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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.

Amendment 1 to ISO 717-2:1996 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 ISO 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).

Introduction

The existing texts on rounding of data in ISO 717-1 and ISO 717-2 are not very precise and lead to different interpretations, especially when implemented numerically in computer software.

This amendment to ISO 717-2:1996 defines a procedure for evaluating the weighted reduction in impact sound pressure level by floor coverings on lightweight floors, gives more precise instructions, and makes other minor changes in the following parts of the document:

— updating the normative references;

— modification of the first paragraph of 4.3.1, Measurements in one-third-octave bands, and the addition of a new footnote 1;

— modification of the first paragraph of 4.3.2, Calculation of spectrum adaptation terms, and the addition of a reference to the new footnote 1;

— addition, after the existing Clause 5, of a new Clause 6 describing procedure for evaluating the weighted reduction in impact sound pressure level by floor coverings on lightweight floors;

— modification of Annex A;

— modification of Annex B;

— modification of Annex C;

— deletion of the heading “Annex D,” leaving the title Bibliography" and the references.

Acoustics — Rating of sound insulation in buildings and of building elements —

Part 2:
Impact sound insulation

AMENDMENT 1

Page 1, Scope:

Add the following text to the Scope as numbered item d) after the existing numbered item c):

d) defines a procedure for evaluating the weighted reduction in impact sound pressure level by floor coverings on lightweight floors.

Page 1, Clause 2:

Add the following text to the Scope as numbered item d) after the existing numbered item c):

Replace "ISO 140-6:—[1)]" with "ISO 140-6:1998". Delete footnote 1.

Replace "ISO 140-7:—[2)]" with "ISO 140-7:1998". Delete footnote 2.

Replace "ISO 140-8:—[3)]" with "ISO 140-8:1998". Delete footnote 3.

Add ISO 140-11:2005.

ISO 140-11:2005, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 11: Laboratory measurements of the reduction of transmitted impact sound by floor coverings on lightweight reference floors*

Page 3, 4.3.1:

Replace the first sentence with the following:

To evaluate the results of a measurement of L_n, L'_n or L'_{nT} in one-third-octave bands, the measurement data shall be given to one decimal place[1)]. Shift the reference curve in increments of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible but not more than 32,0 dB.

Insert new footnote 1 as follows:

1) The different parts of ISO 140 state that the results shall be reported "to one decimal place". However, if the octave or one-third-octave values have been reported with more than one decimal digit, the values shall be reduced to one decimal place before use in the calculation of the single number rating. This is done by taking the value in tenths of dB closest to the reported values: $XX{,}XYZZZ\ldots$ is rounded to $XX{,}X$ if Y is less than 5 and to $XX{,}X + 0{,}1$ if Y is equal to or greater than 5. Software developers should ensure that this reduction applies to the true input values and not only to the displayed precision (as shown on the screen or printed on paper). Generally this can be implemented by the following sequence of instructions: multiply the (positive) number $XX{,}XYZZZ\ldots$ by 10 and add 0,5, take the integer part and then divide the result by 10. For further details see ISO 31-0:1992.

Page 3, 4.3.2:

Replace the first sentence with the following:

To evaluate the results of a measurement of L'_n or L'_{nT} in octave bands, the measurement data shall be given to one decimal place[1)]. Shift the reference curve in increments of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible but not more than 10,0 dB.

Page 5:

Add the following as a new Clause 6 after the existing Clause 5:

6 Procedure for evaluating the weighted reduction in impact sound pressure level by floor coverings on lightweight floors

6.1 General

The reduction of impact sound pressure level (improvement of impact sound insulation), $\Delta L_{t,1}$, $\Delta L_{t,2}$, $\Delta L_{t,3}$, of floor coverings when tested on one of the three lightweight reference floors as described in ISO 140-11 is independent of the normalized impact sound pressure level of the bare reference floor $L_{n,t1,0}$, $L_{n,t2,0}$ and $L_{n,t3,0}$, respectively.

However, the weighted, normalized impact sound pressure levels of a lightweight floor with and without a floor covering depend on $L_{n,t,0}$ of the bare floor on which the floor covering is used. In order to obtain values for $\Delta L_{t,,w}$, which are comparable between laboratories and especially which can be used to calculate the normalized impact sound pressure level of lightweight floors with the floor covering, it is necessary to relate the measured values of $\Delta L_{t,1}$, $\Delta L_{t,2}$ and $\Delta L_{t,3}$ to the respective reference curves for the lightweight floors in ISO 140-11.

6.2 Reference curves for the reference lightweight floors used to calculate $\Delta L_{t,w}$

In ISO 140-11, there are three different reference lightweight floors and, therefore, it is necessary to define different types of reference curves for the calculation of $\Delta L_{t,w}$. The reference curves are defined by the relevant values for $L_{n,t,r,0}$. Table 5 contains the reference curves for $L_{n,t,r,0}$ along with the weighted, normalized impact sound pressure levels for the different reference floors.

Table 5 — Normalized impact sound pressure level for the lightweight reference floors

Frequency Hz	$L_{n,t,r,0}$ **for floors of type Nos. 1 and 2 in ISO 140-11:2005** dB	$L_{n,t,r,0}$ **for floors of type No. 3 in ISO 140-11:2005** dB
100	78	69
125	78	72
160	78	75
200	78	78
250	78	78
315	78	78
400	76	78
500	74	78
630	72	78
800	69	76
1 000	66	74
1 250	63	72
1 600	60	69
2 000	57	66
2 500	54	63
3 150	51	60
Weighted normalized impact sound pressure level	72	75

Values of $\Delta L_{t,w}$ calculated with the reference floor for type No. 1 or 2 shall be designated as $\Delta L_{t,1,w}$ or $\Delta L_{t,2,w}$ respectively; values of $\Delta L_{t,w}$ calculated with the reference floor for type No. 3 shall be designated as $\Delta L_{t,3,w}$.

6.3 Calculation

The calculation shall be carried out as described in 5.3, substituting Table 5 for Table 4 and substituting ISO 140-11 for ISO 140-8.

6.4 Statement of results

The single number quantity $\Delta L_{t,1,w}$, $\Delta L_{t,2,w}$ or $\Delta L_{t,3,w}$ shall be given with reference to Clause 6 of ISO 717-2. The results of measurements shall be given in the form of a diagram as specified in ISO 140-11.

Page 6, Annex A, A.2.1:

Replace the first paragraph with the following:

The results of a measurement of L_n, L'_n or L'_{nT} in one-third-octave bands in the frequency range 100 Hz to 2 500 Hz or in octave bands in the frequency range 125 Hz to 2 000 Hz shall be given to one decimal place, then added up on an energetic basis[2)] $L_{n,sum}$, $L'_{n,sum}$ or $L'_{nT,sum}$ and rounded to an integer[3)]. The resulting spectrum adaptation term C_I is then calculated as an integer from one of the following equations:

Renumber the existing footnote 4 to footnote 2.

Add a new footnote 3 with the following text:

> $XX,YZZZ...$ is rounded to XX if Y is less than 5 and to $XX + 1$ if Y is greater than or equal to 5. For further details see ISO 31-0. Software implementers should be aware that calculation of the spectrum adaptation terms involves floating-point calculations that are never exact and may incur rounding errors. In some rare cases this may lead to a difference of + 1 dB or – 1 dB in the final result. In order to avoid rounding errors, it is strongly recommended to use the highest possible machine accuracy available for floating-point representation and mathematical operations.

Delete the sentence after the equations, including the existing footnote 5 and the associated text.

Page 7, Annex A, A.2.3:

Add the following text as A.2.3 after the existing A.2.2.

A.2.3 Spectrum adaptation term for the impact sound reduction of floor coverings on light weight floors

To gather experience with the unweighted impact sound level for light weight floors, a spectrum adaptation term for flat response for the impact sound reduction may also be calculated for the floor coverings on light weight floors. The spectrum adaptation term, $C_{I\Delta,t}$, is calculated from the following equation:

$$C_{I\Delta,t} = C_{I,t,r,0} - C_{I,t,r}$$

where

$C_{I,t,r}$ is the spectrum adaptation term for the reference floor with the floor covering under test;

$C_{I,t,r,0}$ is the spectrum adaptation term for the reference floor with $L_{n,t,r,0}$;

$C_{I,t,r,0}$ is 0 dB for the reference curve for floors of type Nos. 1 and 2;

$C_{I,t,r,0}$ is – 3 dB for the reference curve for floors of type No. 3.

Values of $C_{I\Delta,t}$ calculated with the reference floor for type Nos. 1 or 2 shall be designated as $C_{I\Delta,t1}$ or $C_{I\Delta,t2}$;

Values of $C_{I\Delta,t}$ calculated with the reference floor for type No. 3 shall be designated as $C_{I\Delta,t3}$.

Page 7, Clause B.1, NOTE 7, second line and first equation:

Replace "+ 10" by "+ 11" and in the last line of the equation, replace "C_I" by "$C_{I,0}$".

Page 10, Annex C:

Add the following note after list item b) and before Table C.1:

> NOTE In these examples the addition has been performed including 3 150 Hz, which is not in accordance with the text: maximum is 2 500 Hz.

Page 10, Table C.1:

Replace the last row of Table C.1 with the following (first and third columns of equations from the left have been modified as regards the rounding):

	$L_{n,sum}$ = 83,2613... = 83 dB C_I = 83 – 15 – 79... = – 11 dB	Sum 28,0 < 32,0 $L_{n,w}$ = 79 dB	$L_{n,sum}$ = 76.0525... = 76 dB C_I = 76 – 15 – 64 = – 3 dB	Sum 30,0 < 32,0 $L_{n,w}$ = 64 dB

Page 11, Table C.2:

Replace the last row of Table C.2 with the following (first column of equations from the left has been modified as regards the rounding):

	$L_{n,sum}$ = 75,7104... = 76 dB C_I = 76 – 15 – 63 = – 2 dB ΔL_{lin} = 78 – 11 – (63 – 2) = 6 dB	Sum 28,4 < 32,0 $L_{n,w,r}$ = 63 dB ΔL_w = 78 – 63 = 15 dB

Page 11, Table C.3:

Replace the last row of Table C.3 with the following (first column of equations from the left has been modified as regards the rounding):

	$L_{n,sum}$ = 68,59614... = 69 dB C_I = 69 – 15 – 54 = 0 dB	Sum 7,8 < 10,0 dB $L_{n,w}$ = 54 dB

Page 12, Annex D:

Delete the title **Annex D** (Informative), leaving the title "**Bibliography**" and the listed references.