SLOVENSKI STANDARD
SIST EN ISO 140-16:2006

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Akustika - Merjenje zvočne izolirnosti v stavbah in zvočne izolirnosti gradbenih elementov - 16. del: Laboratorijsko merjenje indeksa zvočne izolativnosti, izboljšanega z oblaganjem (ISO 140-16:2006)

Acoustics - Measurement of sound insulation in buildings and of building elements - Part 16: Laboratory measurement of the sound reduction index improvement by additional lining (ISO 140-16:2006)

Akustik - Messung der Schalldämmung in Gebäuden und von Bauteilen - Teil 16: Messung der Verbesserung des Schalldämm-Maßes durch zusätzliche Vorsatzschalen im Prüfstand (ISO 140-16:2006)

Acoustique - Mesurage de l'isolation acoustique des immeubles et des éléments de construction - Partie 16: Mesurage en laboratoire de l'amélioration de l'indice de réduction acoustique par un revetement complémentaire (ISO 140-16:2006)

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91.120.20	Akustika v stavbah. Zvočna izolacija	Acoustics in building. Sound insulation

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English Version

Acoustics - Measurement of sound insulation in buildings and of building elements - Part 16: Laboratory measurement of the sound reduction index improvement by additional lining (ISO 140-16:2006)

Acoustique - Mesurage de l'isolation acoustique des immeubles et des éléments de construction - Partie 16: Mesurage en laboratoire de l'amélioration de l'indice de réduction acoustique par un revêtement complémentaire (ISO 140-16:2006)

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This European Standard was approved by CEN on 7 August 2006.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN ISO 140-16:2006) 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, in collaboration with Technical Committee ISO/TC 43 "Acoustics".

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 February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

INTERNATIONAL STANDARD

ISO 140-16

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

Part 16: Laboratory measurement of the sound reduction index improvement by additional lining

Acoustique — Mesurage de l'isolation acoustique des immeubles et des éléments de construction —

Partie 16: Mesurage en laboratoire de l'amélioration de l'indice de réduction acoustique par un revêtement complémentaire

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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 140-16 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 126, *Acoustic properties of building products 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).

ISO 140 consists of the following parts, under the general title *Acoustics — Measurement of sound insulation in buildings and of building elements*:

— *Part 1: Requirements for laboratory test facilities with suppressed flanking transmission*

— *Part 2: Determination, verification and application of precision data*

— *Part 3: Laboratory measurements of airborne sound insulation of building elements*

— *Part 4: Field measurements of airborne sound insulation between rooms*

— *Part 5: Field measurements of airborne sound insulation of façade elements and façades*

— *Part 6: Laboratory measurements of impact sound insulation of floors*

— *Part 7: Field measurements of impact sound insulation of floors*

— *Part 8: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor*

— *Part 9: Laboratory measurements of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it*

— *Part 10: Laboratory measurement of airborne sound insulation of small building elements*

— *Part 11: Laboratory measurements of the reduction of transmitted impact sound by floor coverings on lightweight reference floors*

— *Part 12: Laboratory measurement of room-to-room airborne and impact sound insulation of an access floor*

— *Part 13: Guidelines*

— *Part 14: Guidelines for special situations in the field*

— *Part 16: Laboratory measurement of the sound reduction index improvement by additional linings*

— *Part 18: Laboratory measurement of sound generated by rainfall on building elements*

Introduction

There is a strong need to separately characterize the sound reduction effect of walls or floors and acoustic linings. On the one hand, different industries are involved. On the other hand, the European calculation model for the acoustic performance of buildings from the performance of elements distinguishes the sound reduction index of a wall (or floor) and the improvement of the sound reduction index by an additional lining. The laboratory measurement of this sound reduction improvement is the subject of this part of ISO 140-16.

Characterizing a lining alone requires that its acoustic performance be independent from the basic structure to which it is fixed. This is fulfilled when the mass per unit area of the basic structure is much larger than the surface mass of the lining, when the coincidence frequency of the basic structure is below the measured frequency range and the structural coupling between the lining and the basic structure is small. If the actual situation differs from these conditions, the effect of the lining is, at least to some extent, dependent on the properties of the basic structure. The independent characterization of the acoustic performance of a lining thus requires very heavy massive elements, while a lot of practical applications involve various lightweight elements. As a practical compromise, different steps of testing are provided.

— In any case, the lining is applied to either a heavy massive wall of about 350 kg/m^2 with its coincidence frequency around 125 Hz or to the standard concrete floor according to ISO 140-8, depending on the use of the lining. The measured improvement by the lining is given as a frequency spectrum and as a single-number improvement value in accordance with Annexes A and B. Being based on mean basic element characteristics, the results are largely independent of the particular features of the test facility and the basic element used and thus characterize the lining in the most general way.

— If the performance of a lining on a generalized lightweight solid wall is of interest, a standard lightweight basic wall of about 70 kg/m^2 and coincidence frequency around 500 Hz are used. The results are given as a frequency spectrum and as a single-number improvement value according to Annexes A and B. The central position of the coincidence frequency can strongly influence the improvement by the lining. Therefore, the results are not likely to be transferable to other basic constructions. But by using the weighting procedure in Annexes A and B, the influences of the particular test facility and basic construction are minimized, thus making the results comparable between different laboratories.

— In order to specify the effect of linings in specific situations, other basic structures can be used in addition to those specified for the general characterization of the product. As no mean values of the properties of the basic element are available in this case, single-number results can only be given in terms of the direct difference between the weighted sound-reduction indices with and without lining (subsequently called “direct difference of the weighted sound reduction indices”). These improvement values include the particular features of the laboratory and the basic element, thus allowing a comparison of different linings under these particular conditions.

Flexible, lightweight basic elements and elements with thickness resonances within the measured frequency range are outside the scope of this part of ISO 140, as their influence is not predictable.

For standardization reasons and comparability, all measurements and evaluations are normatively done in third-octave bands. Additional octave-band results can optionally be deduced from the third-octave band results.

The sound-reduction improvement of a lining can be different for direct and flanking sound transmission, as well as for airborne and impact sound excitation. The method described in this part of ISO 140 yields the sound-reduction improvement for direct airborne sound transmission.

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

Part 16: Laboratory measurement of the sound reduction index improvement by additional lining

1 Scope

This part of ISO 140, as a complement to ISO 140-3, specifies the laboratory measurement of the improvement of the sound-reduction index of a wall or ceiling when covered by an additional acoustical lining. It also provides for individual non-standardized basic elements. This part of ISO 140 does not deal with the sound-reduction improvement by linings on flexible lightweight structures, such as timber-frame floors or double-leaf gypsum board walls.

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 140-1, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 1: Requirements for laboratory test facilities with suppressed flanking transmission*

ISO 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements*

ISO 140-8, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 8: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor*

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*

3 Terms, definitions and symbols

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

3.1
sound reduction index
R
ten times the logarithm to the base 10 of the ratio of the sound power, W_1, that is incident on the test specimen to the sound power, W_2, transmitted through the specimen, in a stated frequency band, as given in Equation (1):

$$R = 10 \lg \frac{W_1}{W_2} \text{ dB} \qquad (1)$$

