SLOVENSKI PREDSTANDARD

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september 2004

Acoustics - Measurement of sound insulation in buildings and of building elements - Part 16: Laboratory measurement of sound reduction index improvement by additional lining

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English version

Acoustics - Measurement of sound insulation in buildings and of building elements - Part 16: Laboratory measurement of 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

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 126.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (prEN ISO 140-16:2004) has been prepared by Technical Committee CEN/TC 126 "Acoustic properties of building products and of buildings", the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 43 "Acoustics".

This document is currently submitted to the parallel Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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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 —

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ISO/CEN PARALLEL ENQUIRY

This draft International Standard is a draft standard developed within the European Committee for Standardization (CEN) and processed under the CEN-lead mode of collaboration as defined in the Vienna Agreement. The document has been transmitted by CEN to ISO for circulation for ISO member body voting in parallel with CEN enquiry. Comments received from ISO member bodies, including those from non-CEN members, will be considered by the appropriate CEN technical body. Should this DIS be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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Foreword

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This document is currently submitted to the parallel Enquiry.

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 solid 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: Measurement of impact sound improvement of light-weight floors;*

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

— *Part 13: Guidelines;*

— *Part 14: Additional requirements and guidelines for sound insulation measurements according to ISO 140-4 and ISO 140-7 - Special situations in the field,*

— *Part 16: Laboratory measurement of the sound reduction improvement by acoustical linings;*

— *Part 17: Evaluation of the total loss factor;*

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

Introduction

There is a strong need to separately characterise 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 standard.

Characterising a lining alone requires that its acoustic performance is 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 characterisation of the acoustic performance of a lining thus requires very heavy massive elements, while a lot of practical applications will involve various lightweight elements. As a practical compromise, different steps of testing are provided:

- In any case, the lining is to be applied to either a heavy massive wall of about 350 kg/m² with its coincidence frequency around 125 Hz or to the standard concrete floor according to EN 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 according 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 characterise 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/m² and coincidence around 500 Hz has to be used. The results are to be given as a frequency spectrum and as a single number improvement value according Annexes A and B. The central position of the coincidence frequency may strongly influence the improvement by the lining. Therefore the results are not likely to be transferable to other basic constructions. But 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 characterisation of the product. As no mean 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 standard as their influence is not predictable.

For standardisation 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 may be different for direct and flanking sound transmission as well as for airborne and impact sound excitation. The method described in this standard yields the sound reduction improvement for direct airborne sound transmission.