SLOVENSKI STANDARD
SIST EN ISO 140-14:2005

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Akustika - Merjenje zvočne izolirnosti v stavbah in zvočne izolirnosti stavbnih elementov - 14. del: Smernice za posebne primere na terenu (ISO 140-14:2004)

Acoustics - Measurement of sound insulation in buildings and of building elements - Part 14: Guidelines for special situations in the field (ISO 140-14:2004)

Akustik - Messung der Schalldämmung in Gebäuden und von Bauteilen - Teil 14: Leitfäden für besondere bauliche Bedingungen (ISO 140-14:2004)

Acoustique - Mesurage de l'isolation acoustique des immeubles et des éléments de construction - Partie 14: Lignes directrices pour des situations particulieres in situ (ISO 140-14:2004)

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Acoustics - Measurement of sound insulation in buildings and of building elements - Part 14: Guidelines for special situations in the field (ISO 140-14:2004)

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This European Standard was approved by CEN on 22 July 2004.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 140-14:2004) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 126 "Acoustic properties of building products 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of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 140-14:2004 has been approved by CEN as EN ISO 140-14:2004 without any modifications.

INTERNATIONAL STANDARD

ISO 140-14

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

Part 14: Guidelines for special situations in the field

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

Partie 14: Lignes directrices pour des situations particulières in situ

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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 140-14 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

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* (Technical Report)

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

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

Part 14: Guidelines for special situations in the field

1 Scope

This part of ISO 140 concerns field measurements of airborne sound insulation and impact sound insulation, and is to be used as a supplement to ISO 140-4 and ISO 140-7. It contains guidelines on sound insulation measurements in special situations in the field not directly covered by ISO 140-4 and ISO 140-7.

NOTE The basic standards ISO 140-4 and ISO 140-7 specify the measurement procedure in detail under ideal conditions, but give only little information on how to establish a suitable measurement set-up in rooms differing from simple box-shaped rooms of normal living room size. When it comes to very large rooms, long and narrow rooms, staircases, coupled rooms, etc., no guidance is given in the basic standards, which is why the guidelines in this part of ISO 140 have been prepared. Use of the guidelines will contribute to improvement in the reproducibility of building acoustics field measurements and, furthermore, facilitate the performance of measurements by avoiding time-consuming considerations in actual measurement situations.

This part of ISO 140 is primarily applicable to measurements in rooms in dwellings, schools, hotels, etc., with volumes less than 250 m^3.

It is not mandatory to use these guidelines in connection with measurements according to ISO 140-4 and ISO 140-7 unless this is stated elsewhere.

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 140-4:1998, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 4: Field measurements of airborne sound insulation between rooms*

ISO 140-7:1998, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 7: Field measurements of impact sound insulation of floors*

3 Technical background

The guidelines in this part of ISO 140 are based on the results presented in ISO/TR 140-13. The guidelines consist of extracts from this Technical Report.

The guidelines have been prepared based on some theoretical considerations, a few experimental investigations, and on practical experience from performing a great number of field measurements.

The principle is that examples of suitable measurement set-ups are shown in diagrammatic sketches. Efforts have been made to present examples (some very realistic and some very unusual) which should permit selection of an example from which a suitable measurement set-up can be established in nearly all field situations. The possibility of creating a suitable measurement set-up inspired by the sketches but not fully identical to any of them is the main reason for presenting the guidelines as informative annexes.

The loudspeaker and microphone positions indicated in the sketches should only be considered as guidance to show how they should be arranged. All requirements given in ISO 140-4 concerning distances to room boundaries, displacement of the loudspeakers in relation to the planes parallel to room boundaries, etc., shall be fulfilled.

Not all the sketches are referred to in the text. Sketches not referred to should be regarded as additional examples.

Notice that in two situations the guidelines might be in conflict with the basic standards. These situations are explained as follows.

Situation 1: The method described in ISO 140-4 for measurement of airborne sound insulation presumes approximately diffuse sound fields in the source room as well as the receiving room. It is required that the microphone positions be evenly distributed within the entire volume of the rooms.

If, for example, the source room is a very long, narrow corridor with absorbing ceiling and a carpet on the floor, a considerable sound pressure level decay of 10 dB to 20 dB can occur from one end of the room to the other. In principle, measurement cannot be performed according to ISO 140-4 because the sound field is not diffuse, and because averaging the sound pressure level in a room with a considerable sound pressure level decay has no meaning.

However, often a measurement is needed. In this situation, this part of ISO 140 suggests that the sound source be placed at a certain maximum distance from the partition common to the source room and the receiving room, i.e. a “virtual” and limited source room volume is defined in the part of the corridor closest to the common partition according to these guidelines.

Situation 2: For measurement of impact sound insulation in situations with a large floor area in the source room, a discrepancy can be observed between results obtained according to this part of ISO 140 and the basic standard. According to this part of ISO 140, the tapping machine should not be placed too far away from the receiving room. This will in some situations lead to a higher sound pressure level in the receiving room than obtained according to ISO 140-7, where it is stated that the tapping machine positions shall be distributed over the total floor area in the source room.

4 Test report

ISO 140-4 and ISO 140-7 specify what information shall be included in the test report. If the guidelines in this part of ISO 140 have been used, this should be mentioned under the item “Brief description of details of procedure and equipment” in ISO 140-4:1998, Clause 9, item i), and in ISO 140-7:1998, Clause 8, item h). A short description of the applied measurement procedure should be given. Any deviation from the requirements in ISO 140-4 or ISO 140-7 should be reported.

5 Annexes

This part of ISO 140 has two different application areas: airborne sound insulation and impact sound insulation. In order to facilitate practical application, the guidelines are laid down in separate annexes, with examples of suitable measurement arrangements in the form of diagrammatic sketches, and also graphical explanations and tabulated figures. The informative annexes are the following:

— Annex A: Airborne sound insulation

— Annex B: Impact sound insulation

— Annex C: Diagrammatic sketches

— Annex D: Combinations of tapping machine positions and microphone positions

— Annex E: Explanation of terms.

Annex A
(informative)

Airborne sound insulation

A.1 General

This annex is a supplement to ISO 140-4.

That part of the separating partition common to both the source and receiving rooms is named the "common partition". The total surface of the separating partition is named the "partition" for both horizontal and vertical measurements. (See Annex E for an explanation of these terms.)

A.2 Principles

A.2.1 Frequency range of measurement

The sound reduction index should be measured using one-third-octave band filters in a frequency range of at least 100 Hz to 3 150 Hz.

These guidelines have been prepared for use in the frequency range 100 Hz to 3 150 Hz. However, the basic principles of the guidelines may also be used for measurements in the frequency range 50 Hz to 80 Hz according to ISO 140-4:1998, Annex D, and in the frequency range 4 000 Hz to 5 000 Hz.

These guidelines are applicable to measurements in one-third-octave bands as well as in octave bands.

A.2.2 Room conditions

The room volumes should not exceed 250 m^3. However, the guidelines may also be useful for measurements between rooms not fulfilling this limitation.

For horizontal measurements carried out in one direction only, the largest room is usually chosen to be the source room. However, if one of the rooms is regular with a well-defined volume while the other has a complicated geometry, the well-defined room should be used as the receiving room, even if it is the larger of the two rooms.

NOTE According to ISO 140-4, alternatively two measurements can be carried out in opposite directions and finally be averaged. However, measurements in two directions are quite time-consuming because two complete measurement set-ups are needed and the reverberation time has to be measured twice.

For vertical measurements, the lower room should preferably be used as the source room. The upper room may be the source room provided that an omnidirectional loudspeaker is used, situated at a sufficient distance above the floor to prevent incidence of direct sound. Preferably, the stand carrying the loudspeaker should be placed on soft material to prevent structure-borne sound entering into the floor.

When calculating the sound reduction index, the volume of the receiving room and the area of the common partition are needed. The volumes of objects in the receiving room with closed non-absorbing surfaces, such as wardrobes, cabinets and installation shafts, are subtracted from the total volume of the receiving room. The area of the common partition will not be reduced if fixed cabinets, wardrobes, etc., are covering a part of the common partition.

