
**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 m³.

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.