

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

Part 5: Field measurements of airborne sound insulation of facade elements and facades

The European Standard EN ISO 140-5:1998 has the status of a
British Standard

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National foreword

This British Standard is the English language version of EN ISO 140-5:1998. It is identical with ISO 140-5:1998. It supersedes BS 2750-5:1980 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee EH/1, Acoustics, to Subcommittee EH/1/6, Building acoustics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, page 2, the ISO title page, page ii, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Health and Environment Sector Board, was published under the authority of the Standards Board and comes into effect on 15 October 1998

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English version

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(ISO 140-5:1998)

Acoustique — Mesurage de l'isolation acoustique des immeubles et des éléments de construction — Partie 5: Mesurages in situ de la transmission des bruits aériens par les éléments de façade et les façades
(ISO 140-5:1998)

Akustik — Messung der Schalldämmung in Gebäuden und von Bauteilen — Teil 5: Messung der Luftschalldämmung von Fassadenelementen und Fassaden am Bau
(ISO 140-5:1998)

This European Standard was approved by CEN on 14 August 1998.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

The text of the International Standard ISO 140-5:1998 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 1999, and conflicting national standards shall be withdrawn at the latest by February 1999.

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

Endorsement notice

The text of the International Standard ISO 140-5:1998 was approved by CEN as a European Standard without any modification.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

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INTERNATIONAL STANDARD

**ISO
140-5**

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

Part 5:

**Field measurements of airborne sound
insulation of façade elements and façades**

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

*Partie 5: Mesurages in situ de la transmission des bruits aériens par les
éléments de façade et les façades*



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.

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.

International Standard ISO 140-5 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This second edition cancels and replaces the first edition (ISO 140-5:1978), which has been technically revised.

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 of laboratory test facilities with suppressed flanking transmission;*
- *Part 2: Determination, verification and application of precision data;*
- *Part 3: Laboratory measurement 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 measurement 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.*

Annex A and Annex B form an integral part of this part of ISO 140. Annex C to Annex F are for information only.

Descriptors: Acoustics, buildings, façades, airborne sound, acoustic insulation, tests, field tests, acoustic tests, acoustic measurements.

1 Scope

This part of ISO 140 specifies two series of methods (element methods and global methods) for measurement of the airborne sound insulation of façade elements and whole façades, respectively. The element methods aim to estimate the sound reduction index of a façade element, for example a window. The most accurate element method uses a loudspeaker as an artificial sound source. Other, less accurate, element methods use available traffic noise. The global methods, on the other hand, aim to estimate the outdoor/indoor sound level difference under actual traffic conditions. The most accurate global methods use the actual traffic as sound source. In addition, a loudspeaker may be used as an artificial sound source. An overview of the methods is given in Table 1.

The element loudspeaker method yields an apparent sound reduction index which, under certain circumstances [e.g. taking account of measurement precision (see 7.1)], can be compared with the sound reduction index measured in laboratories in accordance with ISO 140-3 or ISO 140-10. This method is the preferred method when the aim of the measurement is to evaluate the performance of a specified façade element in relation to its performance in the laboratory.

The element road traffic method will serve the same purposes as the element loudspeaker method. It is particularly useful when, for different practical reasons, the element loudspeaker method cannot be used. These two methods will often yield slightly different results. The road traffic method tends to result in lower values of the sound reduction index than the loudspeaker method. In Annex D this road traffic method is supplemented by the corresponding aircraft and railway traffic methods.

The global road traffic method yields the real reduction of a façade in a given place relative to a position 2 m in front of the façade. This method is the preferred method when the aim of the measurement is to evaluate the performance of a whole façade, including all flanking paths, in a specified position relative to nearby roads. The result cannot be compared with that of laboratory measurements.

The global loudspeaker method yields the sound reduction of a façade relative to a position 2 m in front of the façade. This method is particularly useful when, for different practical reasons, the real noise source cannot be used. The result cannot be compared with that of laboratory measurements.

Table 1 — Overview of the different measurement methods

No.	Method	Reference	Result	Field of application
	Element			
1	Element loudspeaker	Clause 5	R'_{45°	Preferred method to estimate the apparent sound reduction index of façade elements
2	Element road traffic	Clause 6	$R'_{tr,s}$	Alternative to method No.1 when road traffic noise of sufficient level is available
3	Element railway traffic	Annex D (informative)	$R'_{rt,s}$	Alternative to method No.1 when railway traffic noise of sufficient level is available
4	Element air traffic	Annex D (informative)	$R'_{at,s}$	Alternative to method No.1 when air traffic noise of sufficient level is available
	Global			
5	Global loudspeaker	Clause 5	$D_{Is,2m,nT}$ $D_{Is,2m,n}$	Alternative to methods Nos. 6, 7 and 8
6	Global road traffic	Clause 6	$D_{tr,2m,nT}$ $D_{tr,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to road traffic noise
7	Global railway traffic	Annex D (informative)	$D_{rt,2m,nT}$ $D_{rt,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to railway traffic noise
8	Global air traffic	Annex D (informative)	$D_{at,2m,nT}$ $D_{at,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to air traffic noise