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Acoustics - Field measurement of sound insulation in buildings and of building elements - Part 3: Faade sound insulation (ISO 16283-3:2016)

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This standard includes the English version of the European Standard.

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English Version

## Acoustics - Field measurement of sound insulation in buildings and of building elements - Part 3: Façade sound insulation (ISO 16283-3:2016)

Acoustique - Mesurage in situ de l'isolement acoustique des bâtiments et des éléments de construction - Partie 3: Isolement aux bruits de façades (ISO 16283-3:2016)

Akustik - Messung der Schalldämmung in Gebäuden und von Bauteilen am Bau - Teil 3: Fassadenschalldämmung (ISO 16283-3:2016)

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## European foreword

This document (EN ISO 16283-3:2016) has been prepared by Technical Committee ISO/TC 43 “Acoustics” in collaboration with Technical Committee CEN/TC 126 “Acoustic properties of building elements 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of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.

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### Endorsement notice

The text of ISO 16283-3:2016 has been approved by CEN as EN ISO 16283-3:2016 without any modification.

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**Acoustics — Field measurement of  
sound insulation in buildings and of  
building elements —**

**Part 3:  
Façade sound insulation**

*Acoustique — Mesurage in situ de l'isolement acoustique  
des bâtiments et des éléments de construction —  
Partie 3: Isolement aux bruits de façades*





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This first edition cancels and replaces ISO 140-5:1998 and ISO 140-14:2004, which have been technically revised.

ISO 16283 consists of the following parts, under the general title *Acoustics — Field measurement of sound insulation in buildings and of building elements*:

- *Part 1: Airborne sound insulation*
- *Part 2: Impact sound insulation*
- *Part 3: Façade sound insulation*

## **Introduction**

ISO 16283 (all parts) describes procedures for field measurements of sound insulation in buildings. Airborne, impact, and façade sound insulation are described in ISO 16283-1, ISO 16283-2, and in this part of ISO 16283, respectively.

Field sound insulation measurements that were described previously in ISO 140-4, ISO 140-5, and ISO 140-7 were (a) primarily intended for measurements where the sound field could be considered to be diffuse and (b) not explicit as to whether operators could be present in the rooms during the measurement. ISO 16283 differs from ISO 140-4, ISO 140-5, and ISO 140-7 in that (a) it applies to rooms in which the sound field can or cannot approximate to a diffuse field, (b) it clarifies how operators can measure the sound field using a hand-held microphone or sound level metre, and (c) it includes additional guidance that was previously contained in ISO 140-14.

NOTE Survey test methods for field measurements of façade sound insulation are dealt with in ISO 10052.

# Acoustics — Field measurement of sound insulation in buildings and of building elements —

## Part 3: Façade sound insulation

### 1 Scope

This part of ISO 16283 specifies procedures to determine the airborne sound insulation of façade elements (element methods) and whole façades (global methods) using sound pressure measurements. These procedures are intended for room volumes in the range from 10 m<sup>3</sup> to 250 m<sup>3</sup> in the frequency range from 50 Hz to 5 000 Hz.

The test results can be used to quantify, assess, and compare the airborne sound insulation in unfurnished or furnished rooms where the sound field can or cannot approximate to a diffuse field. The measured airborne sound insulation is frequency-dependent and can be converted into a single number quantity to characterize the acoustic performance using the rating procedures in ISO 717-1.

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. A loudspeaker can be used as an artificial sound source when there is insufficient level from traffic noise inside the room. An overview of the methods is given in [Table 1](#).

The element loudspeaker method yields an apparent sound reduction index which, under certain circumstances, can be compared with the sound reduction index measured in laboratories in accordance with ISO 10140. 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 that is 2 m in front of the façade. This method is particularly useful when, for practical reasons, the real source cannot be used; however, the result cannot be compared with that of laboratory measurements.

Table 1 — Overview of the different measurement methods

No.	Method Element	Reference in this part of ISO 16283	Result	Field of application
1	Element loudspeaker	<a href="#">9.5</a>	$R'_{45^\circ}$	Preferred method to estimate the apparent sound reduction index of façade elements
2	Element road traffic	<a href="#">10.3</a>	$R'_{tr,s}$	Alternative to method No.1 when road traffic as a sound source provides a sufficient level
3	Element railway traffic	<a href="#">Annex E</a>	$R'_{rt,s}$	Alternative to method No.1 when railway traffic as a sound source provides a sufficient level
4	Element aircraft traffic	<a href="#">Annex E</a>	$R'_{at,s}$	Alternative to method No.1 when aircraft traffic as a sound source provides a sufficient level
	<b>Global</b>			
5	Global loudspeaker	<a href="#">9.6</a>	$D_{ls,2m,nT}$ $D_{ls,2m,n}$	Alternative to methods Nos. 6, 7, and 8
6	Global road traffic	<a href="#">10.4</a>	$D_{tr,2m,nT}$ $D_{tr,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to road traffic as a sound source
7	Global railway traffic	<a href="#">Annex E</a>	$D_{rt,2m,nT}$ $D_{rt,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to railway traffic as a sound source
8	Global aircraft traffic	<a href="#">Annex E</a>	$D_{at,2m,nT}$ $D_{at,2m,n}$	Preferred method to estimate the global sound insulation of a façade exposed to aircraft traffic as a sound source

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*

ISO 3382-2, *Acoustics — Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms*

ISO 12999-1, *Acoustics — Determination and application of measurement uncertainties in building acoustics — Part 1: Sound insulation*

ISO 15712-3, *Building acoustics — Estimation of acoustic performance of buildings from the performance of elements — Part 3: Airborne sound insulation against outdoor sound*

ISO 18233, *Acoustics — Application of new measurement methods in building and room acoustics*

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61183, *Electroacoustics — Random-incidence and diffuse-field calibration of sound level meters*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

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