



BSI Standards Publication

# Acoustics — Laboratory measurement of sound insulation of building elements

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Part 1: Application rules for specific products

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## National foreword

This British Standard is the UK implementation of EN ISO 10140-1:2021. It is identical to ISO 10140-1:2021. It supersedes BS EN ISO 10140-1:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/1/6, Building acoustics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

## Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1:2021)

Acoustique - Mesurage en laboratoire de  
l'isolation acoustique des éléments de  
construction - Partie 1: Règles d'application  
pour produits particuliers (ISO 10140-1:2021)

Akustik - Messung der Schalldämmung von  
Bauteilen im Prüfstand - Teil 1: Anwendungsregeln  
für bestimmte Produkte (ISO 10140-1:2021)

This European Standard was approved by CEN on 1 May 2021.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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## European foreword

This document (EN ISO 10140-1:2021) 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of an identical text or by endorsement, at the latest by November 2021, and conflicting national standards shall be withdrawn at the latest by November 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 10140-1:2016.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 10140-1:2021 has been approved by CEN as EN ISO 10140-1:2021 without any modification.

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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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 126, *Acoustic properties of building elements and of buildings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 10140-1:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

- all references in the text have been updated;
- in [Clause 2](#), the normative references have been updated;
- [D.4.2.1](#) regarding reference IGUs has been edited;
- former Clause G.6, "Additional information", has been removed;
- [H.6.2.2](#) has been edited;
- in [Annex K](#), rooflights have been added.

A list of all parts in the ISO 10140 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

ISO 10140 (all parts) concerns laboratory measurement of the sound insulation of building elements (see [Table 1](#)).

This document specifies the application rules for specific elements and products, including specific requirements for the preparation and mounting of the test elements, and for the operating and test conditions. ISO 10140-2 and ISO 10140-3 contain the general procedures for airborne and impact sound insulation measurements, respectively, and refer to ISO 10140-4 and ISO 10140-5 where appropriate. For elements and products without a specific application rule described in this document, it is possible to apply ISO 10140-2 and ISO 10140-3. ISO 10140-4 contains basic measurement techniques and processes. ISO 10140-5 contains the requirements for test facilities and equipment. For the structure of ISO 10140 (all parts), see [Table 1](#).

ISO 10140 (all parts) was developed to improve the layout for laboratory measurements, ensure consistency and simplify future changes and additions regarding mounting conditions of test elements in laboratory and field measurements. ISO 10140 (all parts) aims at presenting a well-written and arranged format for laboratory measurements.

This document is planned to be updated with application rules for other products.

**Table 1 — Structure and contents of ISO 10140 (all parts)**

Relevant part of ISO 10140	Main purpose, contents and use	Detailed content
ISO 10140-1	It indicates the appropriate test procedure for elements and products. For certain types of element/product, it can contain additional and more specific instructions about quantities and test element size and about preparation, mounting and operating conditions. Where no specific details are included, the general guidelines are according to ISO 10140-2 and ISO 10140-3.	Appropriate references to ISO 10140-2 and ISO 10140-3 and product-related, specific and additional instructions on: <ul style="list-style-type: none"> <li>— specific quantities measured;</li> <li>— size of test element;</li> <li>— boundary and mounting conditions;</li> <li>— conditioning, testing and operating conditions;</li> <li>— additional specifics for test report.</li> </ul>
ISO 10140-2	It gives a procedure for airborne sound insulation measurements according to ISO 10140-4 and ISO 10140-5. For products without specific application rules, it is sufficiently complete and general for the execution of measurements. However, for products with specific application rules, measurements are carried out according to ISO 10140-1, if available.	<ul style="list-style-type: none"> <li>— Definitions of main quantities measured</li> <li>— General mounting and boundary conditions</li> <li>— General measurement procedure</li> <li>— Data processing</li> <li>— Test report (general points)</li> </ul>
ISO 10140-3	It gives a procedure for impact sound insulation measurements according to ISO 10140-4 and ISO 10140-5. For products without specific application rules, it is sufficiently complete and general for the execution of measurements. However, for products with specific application rules, measurements are carried out according to ISO 10140-1, if available.	<ul style="list-style-type: none"> <li>— Definitions of main quantities measured</li> <li>— General mounting and boundary conditions</li> <li>— General measurement procedure</li> <li>— Data processing</li> <li>— Test report (general points)</li> </ul>

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Relevant part of ISO 10140	Main purpose, contents and use	Detailed content
ISO 10140-4	It gives all the basic measurement techniques and processes for measurement according to ISO 10140-2 and ISO 10140-3, or facility qualifications according to ISO 10140-5. Much of the content is implemented in software.	<ul style="list-style-type: none"> <li>— Definitions</li> <li>— Frequency range</li> <li>— Microphone positions</li> <li>— SPL measurements</li> <li>— Averaging, space and time</li> <li>— Correction for background noise</li> <li>— Reverberation time measurements</li> <li>— Loss factor measurements</li> <li>— Low-frequency measurements</li> <li>— Radiated sound power by velocity measurement</li> </ul>
ISO 10140-5	It specifies all information needed to design, construct and qualify the laboratory facility, its additional accessories and measurement equipment (hardware).	<p>Test facilities, design criteria:</p> <ul style="list-style-type: none"> <li>— volumes, dimensions;</li> <li>— flanking transmission;</li> <li>— laboratory loss factor;</li> <li>— maximum achievable sound reduction index;</li> <li>— reverberation time;</li> <li>— influence of lack of diffusivity in the laboratory.</li> </ul> <p>Test openings:</p> <ul style="list-style-type: none"> <li>— standard openings for walls and floors;</li> <li>— other openings (windows, doors, small technical elements);</li> <li>— filler walls in general.</li> </ul> <p>Requirements for equipment:</p> <ul style="list-style-type: none"> <li>— loudspeakers, number, positions;</li> <li>— tapping machine and other impact sources;</li> <li>— measurement equipment.</li> </ul> <p>Reference constructions:</p> <ul style="list-style-type: none"> <li>— basic elements for airborne and impact insulation improvement;</li> <li>— corresponding reference performance curves.</li> </ul>

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# Acoustics — Laboratory measurement of sound insulation of building elements —

## Part 1: Application rules for specific products

### 1 Scope

This document specifies test requirements for the laboratory measurement of the sound insulation of building elements and products, including detailed requirements for the preparation and mounting of the test elements, and for the operating and test conditions. It also specifies the applicable quantities, and provides additional test information for reporting.

The general procedures for airborne and impact sound insulation measurements are given in ISO 10140-2 and ISO 10140-3, respectively.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*

ISO 10140-2:2021, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 2: Measurement of airborne sound insulation*

ISO 10140-3:2021, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 3: Measurement of impact sound insulation*

ISO 10140-4, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 4: Measurement procedures and requirements*

ISO 10140-5:2021, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment*

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

ISO 16940, *Glass in building — Glazing and airborne sound insulation — Measurement of the mechanical impedance of laminated glass*

EN 572-1, *Glass in building — Basic soda lime silicate glass products — Part 1: Definitions and general physical and mechanical properties*

EN 572-2, *Glass in building — Basic soda lime silicate glass products — Part 2: Float glass*

### 3 Terms and definitions

No terms and definitions are listed in this document.