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Acoustics — Laboratory measurement of sound insulation of building elements —

Part 4: Measurement procedures and requirements

Acoustique — Mesurage en laboratoire de l'isolation acoustique des éléments de construction —

Partie 4: Exigences et modes opératoires de mesurage

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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).

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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 second edition cancels and replaces the first edition (ISO 10140-4:2010), 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;

— in Clause 3, the terms and definitions have been updated;

— in 4.8 first and last paragraph have been edited;

— in 5.3.3 the Note has been edited.

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.

Introduction

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

ISO 10140-1 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 this document and ISO 10140-5 where appropriate. For elements and products without a specific application rule described in ISO 10140-1, it is possible to apply ISO 10140-2 and ISO 10140-3. This document contains basic measurement techniques and processes. ISO 10140-5 contains 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.

ISO 10140-1 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: — specific quantities measured; — size of test element; — boundary and mounting conditions; — conditioning, testing and operating conditions; — additional specifics for test report.
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.	— Definitions of main quantities measured — General mounting and boundary conditions — General measurement procedure — Data processing — Test report (general points)
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.	— Definitions of main quantities measured — General mounting and boundary conditions — General measurement procedure — Data processing — Test report (general points)

Table 1 *(continued)*

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.	— Definitions — Frequency range — Microphone positions — SPL measurements — Averaging, space and time — Correction for background noise — Reverberation time measurements — Loss factor measurements — Low-frequency measurements — Radiated sound power by velocity measurement
ISO 10140-5	It specifies all information needed to design, construct and qualify the laboratory facility, its additional accessories and measurement equipment (hardware).	Test facilities, design criteria: — volumes, dimensions; — flanking transmission; — laboratory loss factor; — maximum achievable sound reduction index; — reverberation time; — influence of lack of diffusivity in the laboratory. Test openings: — standard openings for walls and floors; — other openings (windows, doors, small technical elements); — filler walls in general. Requirements for equipment: — loudspeakers, number, positions; — tapping machine and other impact sources; — measurement equipment. Reference constructions: — basic elements for airborne and impact insulation improvement; — corresponding reference performance curves.