

DRAFT INTERNATIONAL STANDARD

ISO/DIS 10140-4

ISO/TC 43/SC 2
Voting begins on:
2015-12-03

Secretariat: DIN
Voting terminates on:
2016-03-03

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 mesure*

ICS: 91.120.20

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/1928f407-290f-43fb-9922-87160284e88d/iso-fdis-10140-4>

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.



Reference number
ISO/DIS 10140-4:2015(E)

© ISO 2015

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/1928f407-290f-43fb-9922-87160284e88d/iso-fdis-10140-4>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	iv
Introduction.....	v
1 Scope.....	1
2 Normative references	1
3 Terms and definitions.....	1
4 Measurement procedures and requirements	2
4.1 Frequency range	2
4.2 Correction for background noise level.....	4
4.3 Measurement of airborne sound insulation	4
4.4 Measurement of impact sound insulation	5
4.5 Measurement of reverberation time and evaluation of the equivalent sound absorption area	6
4.6 Measurement of structural reverberation time	7
4.7 Measurement of radiated sound power by surface velocity of elements.....	7
5 Sound insulation measurements.....	8
5.1 General.....	8
5.2 General procedure for the determination of airborne sound insulation.....	8
5.3 General procedure for the determination of impact sound insulation of floors	9
Annex A (mandatory) Additional procedures for measurements at low frequencies.....	10
A.1 General.....	10
A.2 Minimum distances.....	10
A.3 Sampling of the sound field.....	10
A.4 Loudspeaker positions	11
A.5 Averaging time	12
A.6 Reverberation time.....	12
A.7 Diffusion of the field	12
Bibliography	13

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 10140-4 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This second edition of ISO 10140-4 cancels and replaces ISO 10140-4:2010, which has been technically revised.

ISO 10140 consists of the following parts, under the general title *Acoustics — Laboratory measurement of sound insulation of building elements*:

- *Part 1: Application rules for specific products*
- *Part 2: Measurement of airborne sound insulation*
- *Part 3: Measurement of impact sound insulation*
- *Part 4: Measurement procedures and requirements*
- *Part 5: Requirements for test facilities and equipment*

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 preparation, mounting, 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 part of ISO 10140 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 part of ISO 10140 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 created 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. It is intended for ISO 10140 (all parts) to present a well-written and arranged format for laboratory measurements.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/1928f407-290f-43fb-9922-87160284e88d/iso-fdis-10140-4>

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"> — 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 complete 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"> — 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 complete 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"> — Definitions of main quantities to measured — General mounting and boundary conditions — General measurement procedure — Data processing — Test report (general points)
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"> — 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).	<p>Test facilities, design criteria:</p> <ul style="list-style-type: none"> — volumes, dimensions; — flanking transmission; — laboratory loss factor; — maximum achievable sound reduction index; — reverberation time; — influence of lack of diffusivity in the laboratory. <p>Test openings:</p> <ul style="list-style-type: none"> — standard openings for walls and floors; — other openings (windows, doors, small technical elements); — filler walls in general. <p>Requirements for equipment:</p> <ul style="list-style-type: none"> — loudspeakers, number, positions; — tapping machine and other impact sources; — measurement equipment. <p>Reference constructions:</p>

		— basic elements for airborne and impact insulation improvement; — corresponding reference performance curves.
--	--	---

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/1928f407-290f-43fb-9922-87160284e88d/iso-fdis-10140-4>

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/1928f407-290f-43fb-9922-87160284e88d/iso-fdis-10140-4>

Acoustics — Laboratory measurement of sound insulation of building elements — Part 4: Measurement procedures and requirements

1 Scope

This part of ISO 10140 specifies the basic measurement procedures for airborne and impact sound insulation in laboratory test facilities.

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

ISO 10140-1:2010, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 1: Application rules for specific products*

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

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

ISO 10140-5:2010, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment*

ISO 10848-1:2006, *Acoustics — Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms — Part 1: Frame document*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

energy average sound pressure level in a room

L

ten times the common logarithm of the ratio of the space and time average of the squared sound pressure to the square of the reference sound pressure, the space average being taken over the entire room with the exception of those parts where the direct radiation of a sound source or the near field of the boundaries (walls, etc.) is of significant influence

Note 1 to entry: *L* is expressed in decibels.

3.2 reverberation time

T

time required for the sound pressure level in a room to decrease by 60 dB after the sound source has stopped

Note 1 to entry: The reverberation time is expressed in seconds.

Note 2 to entry: The range evaluated is defined by the times at which the decay curve first reaches 5 dB and 25 dB, respectively, below the initial level.

3.3 structural reverberation time

T_s

time required for the acceleration level in a structure to decrease by 60 dB after the structure-borne sound source has stopped

Note 1 to entry: The structural reverberation time is expressed in seconds.

Note 2 to entry: T_s is calculated using linear extrapolation of much shorter evaluation ranges than 60 dB, preferably 15 dB or 20 dB.

3.4 background noise level

measured sound pressure level in the receiving room from all sources other than the loudspeaker or tapping machine in the source room.

3.5 continuously moving microphone

microphone that, with respect to a fixed point,

- a) moves with approximately constant speed in a circle, or
- b) sweeps to and fro along the arc of a circle, which is as large as possible, but is not be less than 270°, over a fixed time period

4 Measurement procedures and requirements

4.1 Frequency range

All quantities shall be measured using one-third octave band filters having at least the following centre frequencies, in hertz:

100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1 000, 1 250, 1 600, 2 000, 2 500, 3 150, 4 000, 5 000

If additional information in the low-frequency range is required, use one-third octave band filters with the following centre frequencies, in hertz:

50, 63, 80

For measurements including low frequencies (i.e. starting at third octave band 50 Hz), additional criteria from Annex A shall be used. In case of differences between standard measurements (starting at third octave band 100 Hz) and those following Annex A additional criteria, the measurements performed using Annex A