

INTERNATIONAL STANDARD

ISO
18233

First edition
2006-06-01

Acoustics — Application of new measurement methods in building and room acoustics

*Acoustique — Application de nouvelles méthodes de mesurage dans
l'acoustique des bâtiments et des salles*



Reference number
ISO 18233:2006(E)

© ISO 2006

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms definitions and abbreviated terms.....	1
3.1 Terms and definitions.....	1
3.2 Abbreviated terms.....	2
4 Designations.....	2
4.1 Maximum length sequence method (MLS).....	2
4.2 Swept-sine method (SS).....	2
5 Theory.....	2
5.1 General.....	2
5.2 Sound in a room.....	3
5.3 Sound transmission between two rooms.....	5
5.4 Using the frequency response function.....	6
6 Measurement of the impulse response.....	7
6.1 General.....	7
6.2 Excitation signal.....	7
6.3 Measurement of the response.....	9
7 Measurement of the frequency response function.....	14
8 Precision.....	14
9 Test report.....	15
Annex A (normative) Maximum length sequence method.....	16
Annex B (normative) Swept-sine method.....	20
Bibliography.....	26

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 18233 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This document is a preview generated by EVS

Introduction

Stochastic signal analysis methods for the measurement of sound transmission phenomena started to be developed around 1960, but lack of available computing power excluded the use of these methods outside the best equipped research laboratories.

The development of digitizing circuitry, powerful personal computers and the use of digital signal processing components in sound measuring equipment for field use, have made the application of measuring equipment based on extended digital signal analysis readily available. Dedicated instruments, as well as specialized software used on general computers, currently apply such methods and are already widely used.

The new methods bring a number of advantages compared to the well-established classical methods, such as suppression of background noise and extended measurement range. However, there is also risk of unreliable results if certain guidelines are not followed. The new methods may demonstrate larger sensitivity to time-variations and change in the environmental conditions than the classical methods.

This International Standard is developed to give requirements and guidelines for the use of new measurement methods in building and room acoustic measurements, but can also be used in the construction of measuring equipment for the implementation of the methods.

As even an experienced user of equipment based on classical methods may be unaware of the difficulties and limitations for some applications of the new methods, the user is encouraged to develop a deeper understanding of the theoretical bases for the new methods. Instrument manufacturers are also encouraged to give further guidelines for applications and to make it an objective to design instruments that give warnings when results are not reliable.

This International Standard gives guidelines and requirements for the application of new methods for the measurement of sound insulation in buildings and building elements and for the measurement of reverberation time and related quantities. Reference is made to the standards for the classical methods regarding what to measure, the number and the selection of measurement points, and the conditions for measurements.

This document is a preview generated by EVS

Acoustics — Application of new measurement methods in building and room acoustics

1 Scope

This International Standard gives guidelines and specifies requirements for the application of new methods for the measurement of the acoustic properties of buildings and building elements. Guidelines and requirements for selection of the excitation signal, signal processing and environmental control are given, together with requirements for linearity and time-invariance for the systems to be tested.

This International Standard is applicable to such measurements as airborne sound insulation between rooms and of façades, measurement of reverberation time and other acoustic parameters of rooms, measurement of sound absorption in a reverberation room, and measurement of vibration level differences and loss factor.

This International Standard specifies methods to be used as substitutes for measurement methods specified in standards covering classical methods, such as ISO 140 (all parts), ISO 3382 (all parts) and ISO 17497-1.

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.

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

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

3 Terms definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1

classical method

conventional method of measurement where the resulting sound pressure levels or decay rates are determined directly from the recorded responses to random noise or impulse signals

3.1.2

new method

measurement method in which various deterministic signals can be used to first obtain the impulse response of the system under test and from which the required sound pressure levels and decay rates can be obtained

NOTE The new methods may have additional, intentional features such as giving results under situations where no result is obtained by the classical method. The new methods may, for instance, be more immune to noise from other sources.