



Acoustics — Measurement of sound absorption in a reverberation room

The European Standard EN ISO 354:2003 has the status of a
British Standard

ICS 91.120.20

National foreword

This British Standard is the official English language version of EN ISO 354:2003. It is identical with ISO 354:2003. It supersedes BS EN 20354:1993 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee EH/1, Acoustics, to Subcommittee EH/1/6, Building acoustics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to v, a blank page, pages 1 to 21, the Annex ZA page, an inside back cover and a back cover.

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English version

Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)

Acoustique - Mesurage de l'absorption acoustique en salle réverbérante (ISO 354:2003)

Akustik - Messung der Schallabsorption in Hallräumen (ISO 354:2003)

This European Standard was approved by CEN on 23 April 2003.

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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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN ISO 354:2003) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 126 "Acoustic properties of building products 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This document supersedes EN ISO 354:1993.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 354:2003 has been approved by CEN as EN ISO 354:2003 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

INTERNATIONAL STANDARD

ISO
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Second edition
2003-05-15

Acoustics — Measurement of sound absorption in a reverberation room

*Acoustique — Mesurage de l'absorption acoustique en salle
réverbérante*



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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.

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

This second edition cancels and replaces the first edition (ISO 354:1985), which has been technically revised, as follows:

- an integrated impulse response method has been introduced;
- the requirement to measure at least 36 decays has been added;
- mounting conditions according to ISO 354:1985:Amd.1:1997 and mounting conditions Type B and Type J have been introduced.

Introduction

When a sound source operates in an enclosed space, the level to which reverberant sound builds up, and the subsequent decay of reverberant sound when the source is stopped, are governed by the sound-absorbing characteristics of the boundary surfaces, the air filling the space, and objects within the space. In general, the fraction of the incident sound power absorbed at a surface depends upon the angle of incidence. In order to relate the reverberation time of an auditorium, office, workshop, etc., to the noise reduction that would be effected by an absorbing treatment, knowledge of the sound-absorbing characteristics of the surfaces, usually in the form of a suitable average over all angles of incidence, is required. Since the distribution of sound waves in typical enclosures includes a wide and largely unpredictable range of angles, a uniform distribution is taken as the basic condition for the purposes of standardization. If, in addition, the sound intensity is independent of the location within the space, the sound distribution is called a diffuse sound field, and the sounds reaching a room surface are said to be at random incidence.

The sound field in a properly designed reverberation room closely approximates a diffuse field. Hence, sound absorption measured in a reverberation room closely approximates the sound absorption that would be measured under the basic conditions assumed for standardization.

The purpose of this International Standard is to promote uniformity in the methods and conditions of measurement of sound absorption in reverberation rooms.

Acoustics — Measurement of sound absorption in a reverberation room

1 Scope

This International Standard specifies a method of measuring the sound absorption coefficient of acoustical materials used as wall or ceiling treatments, or the equivalent sound absorption area of objects, such as furniture, persons or space absorbers, in a reverberation room. It is not intended to be used for measuring the absorption characteristics of weakly damped resonators.

The results obtained can be used for comparison purposes and for design calculation with respect to room acoustics and noise control.

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 266, *Acoustics — Preferred frequencies*

ISO 9613-1, *Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere*

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

3 Terms and definitions

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

3.1

decay curve

graphical representation of the decay of the sound pressure level in a room as a function of time after the sound source has stopped

3.2

reverberation time

T

time, in seconds, that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped

NOTE 1 The definition of T with a decrease by 60 dB of the sound pressure level can be fulfilled by linear extrapolation of shorter evaluation ranges.

NOTE 2 This definition is based on the assumptions that, in the ideal case, there is a linear relationship between the sound pressure level and time, and that the background noise level is sufficiently low.