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NSAI Standards

Irish Standard
I.S. EN ISO 3382-1:2009

Acoustics - Measurement of room acoustic parameters - Part 1: Performance spaces (ISO 3382-1:2009)

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I.S. EN ISO 3382-1:2009

Incorporating amendments/corrigenda issued since publication:

This document replaces:	*This document is based on:*	*Published:*
I.S. EN ISO 3382:2000	EN ISO 3382-1:2009 EN ISO 3382:2000	15 June, 2009 2 June, 2000

This document was published under the authority of the NSAI and comes into effect on:
19 August, 2009

ICS number:
91.120.20

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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3382-1

June 2009

ICS 91.120.20

Supersedes EN ISO 3382:2000

English Version

Acoustics - Measurement of room acoustic parameters - Part 1: Performance spaces (ISO 3382-1:2009)

Acoustique - Mesurage des paramètres acoustiques des salles - Partie 1: Salles de spectacles (ISO 3382-1:2009)

Akustik - Messung von raumakustischen Parametern - Teil 1: Aufführungsplätze (ISO 3382-1:2009)

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Ref. No. EN ISO 3382-1:2009: E

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Foreword

This document (EN ISO 3382-1:2009) 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of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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INTERNATIONAL STANDARD

ISO 3382-1

First edition
2009-06-15

Acoustics — Measurement of room acoustic parameters —

Part 1: Performance spaces

Acoustique — Mesurage des paramètres acoustiques des salles —

Partie 1: Salles de spectacles

Reference number
ISO 3382-1:2009(E)

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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.

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ISO 3382-1 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This first edition of ISO 3382-1, together with ISO 3382-2 and ISO 3382-3, cancels and replaces ISO 3382:1997, of which it constitutes a technical revision. Annex A has been extended with information on JND (just noticeable difference), recommended frequency averaging and by the addition of a new parameter for LEV (listener envelopment). A new Annex C has been added with parameters for the acoustic conditions on the orchestra platform.

ISO 3382 consists of the following parts, under the general title *Acoustics — Measurement of room acoustic parameters*:

— *Part 1: Performance spaces*

— *Part 2: Reverberation time in ordinary rooms*

Open plan spaces are to form the subject of a future part 3.

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Introduction

The reverberation time of a room was once regarded as the predominant indicator of its acoustical properties. While reverberation time continues to be regarded as a significant parameter, there is reasonable agreement that other types of measurements, such as relative sound pressure levels, early/late energy ratios, lateral energy fractions, interaural cross-correlation functions and background noise levels, are needed for a more complete evaluation of the acoustical quality of rooms.

This part of ISO 3382 establishes a method for obtaining reverberation times from impulse responses and from interrupted noise. The annexes introduce the concepts and details of measurement procedures for some of the newer measures, but these do not constitute a part of the formal specifications of this part of ISO 3382. The intention is to make it possible to compare reverberation time measurements with higher certainty and to promote the use of and consensus in measurement of the newer measures.

Annex A presents measures based on squared impulse responses: a further measure of reverberation (early decay time) and measures of relative sound levels, early/late energy fractions and lateral energy fractions in auditoria. Within these categories, there is still work to be done in determining which measures are the most suitable to standardize upon; however, since they are all derivable from impulse responses, it is appropriate to introduce the impulse response as the basis for standard measurements. Annex B introduces binaural measurements and the head and torso simulators (dummy heads) required to make binaural measurements in auditoria. Annex C introduces the support measures that have been found useful for evaluating the acoustic conditions from the musicians' point of view.

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Acoustics — Measurement of room acoustic parameters —

Part 1:
Performance spaces

1 Scope

This part of ISO 3382 specifies methods for the measurement of reverberation time and other room acoustical parameters in performance spaces. It describes the measurement procedure, the apparatus needed, the coverage required, and the method of evaluating the data and presenting the test report. It is intended for the application of modern digital measuring techniques and for the evaluation of room acoustical parameters derived from impulse responses.

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 and definitions

For the purposes of this part of ISO 3382, 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

[ISO 354:2003, 3.1]

NOTE 1 It is possible to measure this decay either after the actual cut-off of a continuous sound source in the room or derived from the reverse-time integrated squared impulse response of the room (see Clause 5).

NOTE 2 The decay directly obtained after non-continuous excitation of a room (e.g. by recording a gunshot with a level recorder) is not recommended for accurate evaluation of the reverberation time. This method ought only be used for survey purposes. The decay of the impulse response in a room is in general not a simple exponential decay, and thus the slope is different from that of the integrated impulse response.

3.2
interrupted noise method
method of obtaining decay curves by direct recording of the decay of sound pressure level after exciting a room with broadband or band limited noise

[ISO 354:2003, 3.3]

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