

Acoustics - Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

**Acoustics - Measurement of room acoustic parameters - Part 2:
Reverberation time in ordinary rooms (ISO 3382-2:2008)**

Acoustique - Mesurage des paramètres acoustiques des
salles - Partie 2: Durée de réverbération des salles
ordinaires (ISO 3382-2:2008)

Akustik - Messung von Parametern der Raumakustik - Teil
2: Nachhallzeit in gewöhnlichen Räumen (ISO 3382-
2:2008)

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Foreword

This document (EN ISO 3382-2:2008) 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of an identical text or by endorsement, at the latest by December 2008, and conflicting national standards shall be withdrawn at the latest by December 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 3382-2:2008 has been approved by CEN as a EN ISO 3382-2:2008 without any modification.

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Introduction

This part of ISO 3382 specifies three levels of measurement accuracy: survey; engineering; and precision. The main difference concerns the number of measurement positions and thus the time required for the measurements. Annex A contains some additional information about the measurement uncertainty of the reverberation time. The introduction of the option of a survey measurement is intended to promote more frequent measurement of reverberation time in rooms where it is relevant. It is obvious that a very simple measurement is better than no measurement.

There are several reasons to measure reverberation time. First, the sound pressure level from noise sources, the intelligibility of speech, and the perception of privacy in a room are strongly dependent on reverberation time. Rooms may include domestic rooms, stairways, workshops, industrial plants, classrooms, offices, restaurants, exhibition centres, sports halls, and railway and airport terminals. Second, reverberation time is measured to determine the correction term for room absorption inherent in many acoustic measurements, such as sound insulation measurements according to ISO 140 (all parts) and sound power measurements according to ISO 3740.

In some countries, building codes specify the required reverberation times in classrooms and other categories of room. However, in the vast majority of rooms, it is left to the design team to specify and design for a reverberation time that is reasonable for the purpose of a room. This part of ISO 3382 is intended to contribute to the general understanding and acceptance of reverberation time for room quality and usability.

Two different evaluation ranges are defined in this part of ISO 3382, 20 dB and 30 dB. However, a preference has been given to the 20 dB evaluation range for several reasons:

- a) the subjective evaluation of reverberation is related to the early part of the decay;
- b) for the estimation of the steady-state sound level in a room from its reverberation time, it is appropriate to use the early part of the decay; and
- c) the signal-to-noise ratio is often a problem in field measurements, and it is often difficult or impossible to get a evaluation range of more than 20 dB. This requires a signal-to-noise level of at least 35 dB.

The traditional measuring technique is based on visual inspection of every single decay curve. With modern measuring equipment, the decay curves are normally not displayed and this may introduce a risk that abnormal decay curves are used for the determination of the reverberation time. For this reason, Annex B introduces two new measures that quantify the degree of non-linearity and the degree of curvature of the decay curve. These measures may be used to give warnings when the decay curve is not linear, and consequently the result should be marked as less reliable and not having a unique reverberation.

The use of rotating microphones during the measurement of decay curves has been considered by the working group, and this procedure is found to be without a clear physical meaning and thus it is only accepted for the interrupted noise method and only when the result is used for a correction term.

For other reverberation time measurements, ISO 3382-1 covers auditoria and performance spaces, and ISO 354 absorption coefficient measurements in a reverberation room. Neither ISO 3382-1 nor ISO 354 is suitable for measurements in rooms like those mentioned above. Thus, this part of ISO 3382 fills a gap among measurement standards for acoustic properties of buildings.

This part of ISO 3382 does not repeat the technical details of ISO 3382-1, but deals with the measurement of reverberation time, only, in any kind of room.

Acoustics — Measurement of room acoustic parameters —

Part 2: Reverberation time in ordinary rooms

1 Scope

This part of ISO 3382 specifies methods for the measurement of reverberation time in ordinary rooms. It describes the measurement procedure, the apparatus needed, the required number of measurement positions, and the method for evaluating the data and presenting the test report.

The measurement results can be used for correction of other acoustic measurements, e.g. sound pressure level from sound sources or measurements of sound insulation, and for comparison with requirements for reverberation time in rooms.

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 3382-1:—¹⁾, *Acoustics — Measurement of room acoustic parameters — Part 1: Performance rooms*

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

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

3 Terms and definitions

For the purposes 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

[ISO 354:2003, 3.1]

NOTE 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.

1) To be published. (Revision of ISO 3382:1997)