SLOVENSKI PREDSTANDARD

oSIST prEN ISO 3382-2:2006

junij 2006

Akustika - Merjenje akustičnih parametrov v prostorih - 2. del: Odmevni čas v običajnih prostorih (ISO/DIS 3382 -2:2006)

Acoustics - Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms (ISO/DIS 3382-2:2006)

ICS 91.120.20

Referenčna številka
oSIST prEN ISO 3382-2:2006(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

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DRAFT
prEN ISO 3382-2

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ICS

Will supersede EN ISO 3382:2000

English Version

Acoustics - Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms (ISO/DIS 3382-2:2006)

Acoustique - Mesurage des paramètres acoustiques des salles - Partie 2: Durée de réverbération des salles ordinaires (ISO/DIS 3382-2:2006)

Akustik - Messung von Parametern der Raumakustik - Teil 2: Nachhallzeit in gewöhnlichen Räumen (ISO/DIS 3382-2:2006)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 126.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN 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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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN ISO 3382-2:2006) 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 document is currently submitted to the parallel Enquiry.

This document will supersede EN ISO 3382:2000.

Endorsement notice

The text of ISO 3382-2:2006 has been approved by CEN as prEN ISO 3382-2:2006 without any modifications.

DRAFT INTERNATIONAL STANDARD ISO/DIS 3382-2

ISO/TC **43**/SC **2** Secretariat: **DIN**

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Acoustics — Measurement of room acoustic parameters —

Part 2:
Reverberation time in ordinary rooms

Acoustique — Mesurage des paramètres acoustiques des salles —

Partie 2: Durée de réverbération des salles ordinaires

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ISO/CEN PARALLEL ENQUIRY

The CEN Secretary-General has advised the ISO Secretary-General that this ISO/DIS covers a subject of interest to European standardization. **In accordance with the ISO-lead mode of collaboration as defined in the Vienna Agreement, consultation on this ISO/DIS has the same effect for CEN members as would a CEN enquiry on a draft European Standard.** Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

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.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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

It has been agreed with the Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics* that this document should form a new Part 2 of ISO 3382. The existing International Standard ISO 3382:1997, *Acoustics – Measurement of the reverberation time of rooms with reference to other acoustical parameters* should be made Part 1. In this way it will be clear that the two standards are closely related but that they cover different applications. Part 1 contains the technical details of the measurement technique and the information for room acoustic measurements in performance spaces, including the measurement of other room acoustic parameters. Part 2 will not repeat the technical details of Part 1, but it deals with the measurement of reverberation time, only, in any kind of room.

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

— *Part 1: Performance rooms;*

— *Part 2: Reverberation time in ordinary rooms.*

The Annexes A, B and C are for information only.

Introduction

The reverberation time is important in many kinds of rooms and there are several purposes for measuring the reverberation time. The sound pressure level from noise sources, the intelligibility of speech and the privacy in a room are strongly dependent on the reverberation time. Examples of relevant rooms are living rooms, stairways, workshops, industrial halls, classrooms, offices, restaurants, exhibition areas, sports halls and railway and airport terminals. Another reason for measuring the reverberation time is for the correction term for room absorption inherent in many acoustic measurements. Examples of this are sound insulation measurements according to the ISO 140 series and sound power measurements according to the ISO 3740 series.

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 for the design team to specify and design for a reverberation time that is reasonable for the purpose of a room. It is the hope that the present standard may contribute to the general understanding and acceptance of the importance of reverberation time for the quality and usability of rooms.

The standard 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. By introducing the option of a survey measurement it is the hope that reverberation time will be measured more often in rooms where it is relevant. It seems obvious that even a very simple measurement is much better than no measurement.

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

- The subjective evaluation of reverberation is related to the early part of the decay.
- 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.
- 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 dismissed or marked as less reliable.

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 not accepted in this standard.

Two other standards for reverberation time measurement already exist: ISO 3382 for auditoriums and performance spaces and ISO 354 for absorption coefficient measurements in a reverberation room. Neither of these standards is suited for measurements in rooms like those mentioned above. Thus the present standard is assumed to fill a gap among the measuring standards for acoustic properties of buildings.

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

1 Scope

This International Standard specifies methods for the measurement of reverberation time in rooms. It specifies 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 may be used for correction of other acoustic measurements, e.g. sound pressure level from sound sources or measurements of sound insulation. The results may also be used for comparison with requirements for reverberation time in rooms. This standard is not applicable for concert halls and other performance spaces.

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 140 (all parts), *Acoustics — Measurement of sound insulation in buildings and of building elements*

ISO 10052, *Acoustics — Field measurements of airborne and impact sound insulation and of service equipment sound — Survey method*

ISO/FDIS 18233, *Acoustics – Application of new measurement methods in building acoustics*

ISO/CD 3382-1:2005, *Acoustics - Measurement of room acoustic parameters - Part 1: Performance spaces*

IEC 60268-1:1985, *Sound system equipment – Part 1: General*

IEC 61260, *Electro acoustics — Octave-band filters 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
decay of sound pressure level as a function of time at one point of the room after the source of sound has ceased

NOTE 1 This decay can be either measured 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 should only be used for survey purposes following the procedure for survey measurements.

