

Akustika. Võrdlusnull audiomeetriaseadmete kalibreerimiseks. Osa 9: Eelistatud katsetingimused kuulmise piirväärtuste määramiseks

Acoustics - Reference zero for the calibration of audiometric equipment - Part 9: Preferred test conditions for the determination of reference hearing threshold levels

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 389-9:2009 sisaldab Euroopa standardi EN ISO 389-9:2009 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.11.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.05.2009.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 389-9:2009 consists of the English text of the European standard EN ISO 389-9:2009.

This standard is ratified with the order of Estonian Centre for Standardisation dated 30.11.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 15.05.2009.

The standard is available from Estonian standardisation organisation.

ICS 13.140

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

ICS 13.140

English Version

Acoustics - Reference zero for the calibration of audiometric equipment - Part 9: Preferred test conditions for the determination of reference hearing threshold levels (ISO 389-9:2009)

Acoustique - Zéro de référence pour l'étalonnage d'équipements audiométriques - Partie 9: Conditions d'essai préconisées pour la détermination des niveaux liminaires d'audition de référence (ISO 389-9:2009)

Akustik - Standard-Bezugspegel für die Kalibrierung audiometrischer Geräte - Teil 9: Vorzugs-Messbedingungen zur Bestimmung von Bezugs-Hörschwellenpegeln (ISO 389-9:2009)

This European Standard was approved by CEN on 30 April 2009.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

This document (EN ISO 389-9:2009) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 211 "Acoustics", the secretariat of which is held by DS.

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 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

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.

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

Endorsement notice

The text of ISO 389-9:2009 has been approved by CEN as a EN ISO 389-9:2009 without any modification.

Introduction

ISO/TC 43, *Acoustics*, is responsible for the production of International Standards specifying human hearing thresholds for use in the calibration of audiometric equipment. The Committee bases its work on data from independent laboratories throughout the world. Unfortunately, problems have existed in the past in trying to relate the data from experiments carried out by different laboratories in different parts of the world, all of which have had the same objective, but which lacked a common set of criteria for subject selection, methods of test and reporting of data, etc.

ISO/TC 43 has developed this part of ISO 389 in order to collate the data that is being, or will be, produced in the future, and to encourage other laboratories to participate in these activities. The test conditions are aimed at providing guidance to researchers to ensure that the collation of future work is made easier, which in turn ought to lead to a more rapid production of relevant standards.

Acoustics — Reference zero for the calibration of audiometric equipment —

Part 9: Preferred test conditions for the determination of reference hearing threshold levels

1 Scope

This part of ISO 389 specifies test conditions for determining the hearing thresholds of subjects for the purpose of establishing standardized values for reference hearing threshold levels.

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 amendments) applies.

ISO 389-1:1998, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 1: Reference equivalent threshold sound pressure levels for pure tones and supra-aural earphones*¹⁾

ISO 389-2, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 2: Reference equivalent threshold sound pressure levels for pure tones and insert earphones*¹⁾

ISO 389-3, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 3: Reference equivalent threshold force levels for pure tones and bone vibrators*

ISO 389-6, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 6: Reference threshold of hearing for test signals of short duration*

ISO 389-7, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions*

ISO 389-8, *Acoustics — Reference zero for the calibration of audiometric equipment — Part 8: Reference equivalent threshold sound pressure levels for pure tones and circumaural earphones*

ISO 8253-1:—²⁾, *Acoustics — Audiometric test methods — Part 1: Basic pure-tone air and bone conduction threshold audiometry*

ISO 8253-2:—³⁾, *Acoustics — Audiometric test methods — Part 2: Sound field audiometry with pure tone and narrow-band test signals*

1) Under revision.

2) To be published. (Revision of ISO 8253-1:1989)

3) To be published. (Revision of ISO 8253-2:1992)

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

IEC 60318-1, *Electroacoustics — Simulators of human head and ear — Part 1: Ear simulator for the calibration of supra-aural and circumaural earphones*⁴⁾

IEC 60318-3, *Electroacoustics — Simulators of human head and ear — Part 3: Acoustic coupler for the calibration of supra-aural earphones used in audiometry*

IEC 60318-4, *Electroacoustics — Simulators of human head and ear — Part 4: Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts*⁵⁾

IEC 60318-5, *Electroacoustics — Simulators of human head and ear — Part 5: 2 cm³ coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts*

IEC 60318-6, *Electroacoustics — Simulators of human head and ear — Part 6: Mechanical coupler for the measurement of bone vibrators*

IEC 60645-1:2001, *Electroacoustics — Audiological equipment — Part 1: Pure-tone audiometers*

IEC 60645-3:2007, *Electroacoustics — Audiometric equipment — Part 3: Test signals of short duration*

IEC 60645-4, *Audiometers — Part 4: Equipment for extended high-frequency audiometry*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8253-1 and ISO 389-6 apply.

4 Test conditions

4.1 Test subjects

4.1.1 At least 25 subjects shall participate, both males and females, preferably represented in equal numbers.

4.1.2 The subjects shall be in the age range 18 years to 25 years inclusive.

4.1.3 The subjects shall be otologically normal, i.e. be in a normal state of health, be free from all signs or symptoms of ear disease and from obstructing wax in the ear canals, and have no history of undue exposure to noise, exposure to potentially ototoxic drugs or familial hearing loss. Minimum information to be collected is given in Annex A.

4.1.4 Tympanometry shall be performed at the beginning of each test session. Hearing threshold measurements shall be performed only if a middle ear pressure in the range ± 50 daPa has been obtained.

4.2 Maximum ambient noise levels

4.2.1 The acoustic environment in which the test subjects are located during testing shall fulfil the requirements given in ISO 8253-1:—, 11.1 and 11.2 for measurement of hearing levels down to -10 dB with a maximum uncertainty of $+2$ dB due to ambient noise. The requirements for 8 kHz shall also be applied to the one-third-octave bands from 10 kHz to 16 kHz.

4) To be published. (Revision of IEC 60318-1:1998 and IEC 60318-2:1998)

5) To be published. (Revision of IEC 60711:1981)