

**Akustika. Võrdlusnull  
audiomeetriaseadmete kalibreerimiseks.  
Osa 2: Ekvivalentse võrdluskuuldeläve  
helirõhu tasemed puhastoonide ja  
ühendatavate kuularite jaoks**

Acoustics - Reference zero for the calibration of  
audiometric equipment - Part 2: Reference  
equivalent threshold sound pressure levels for pure  
tones and insert earphones

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 389-2:1999 sisaldab Euroopa standardi EN ISO 389-2:1996 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 12.12.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 389-2:1999 consists of the English text of the European standard EN ISO 389-2:1996.</p> <p>This document is endorsed on 12.12.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>Standard määrab kindlaks ekvivalentse võrdluskudeläve helirõhu tasemed (RETSPL) puhastooni audiomeetrite kalibreerimiseks lisaks neile, mida on käsitletud standardis ISO 389.</p>	<p><b>Scope:</b></p>
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**ICS** 13.140

**Võtmesõnad:** akustika, audiomeetria, audiomeetrid, kalibreerimine, kuudelävi, võrdlusandmed

ICS 13.140; 17.140.50

Descriptors: Acoustics, audiometers, reference zero.

**English version**

Acoustics

**Reference zero for the calibration  
of audiometric equipment**

**Part 2: Reference equivalent threshold sound pressure levels  
for pure tones and insert earphones  
(ISO 389-2:1994)**

Acoustique – Zéro normal de référence pour  
l'étalonnage d'équipements audio-  
métriques – Partie 2: Niveaux de référence  
équivalents de pression acoustique  
liminaire pour les écouteurs à son purs et à  
insertion (ISO 389-2:1994)

Akustik – Standard-Bezugspegel für die  
Kalibrierung audiometrischer Geräte –  
Teil 2: Äquivalente Bezugs-Schwellen-  
schalldruckpegel für reine Töne und  
Einsteckhörer (ISO 389-2:1994)

This European Standard was approved by CEN on 1996-07-10 and is identical to the ISO Standard as referred to.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Foreword

International Standard

ISO 389-2:1994 Acoustics – Reference zero for the calibration of audiometric equipment – Reference equivalent threshold sound pressure levels for pure tones and insert earphones,

which was prepared by ISO/TC 43 'Acoustics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 211 'Acoustics' as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by February 1996 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

## Endorsement notice

The text of the International Standard ISO 389-2:1994 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

## Introduction

Each part of International Standard ISO 389 specifies a specific reference zero for the calibration of audiometric equipment. ISO 389:1991 (to be re-issued as ISO 389-1) contains values of reference equivalent threshold sound pressure levels (RETSPL) for pure tones and two specified patterns of supra-aural earphones used in conjunction with an acoustic coupler conforming to IEC 303, and for other supra-aural earphones of specified patterns in conjunction with an artificial ear conforming to IEC 318. ISO 389-4 specifies reference levels for narrow-band masking noise based on these RETSPL data.

In some audiological applications it may, however, be desirable to use insert earphones to deliver either the test signal or the masking noise, e.g. to reduce the occlusion effect or interaural effects. RETSPL data for these kinds of earphone are specified in this part of ISO 389. It is based on an assessment of technical data provided by laboratories in different countries representing the most reliable data available at the time.

It is recognized that small differences may occur between results of hearing threshold level measurements obtained by audiometric equipment using different patterns of earphone, i.e. supra-aural or insert earphones.

## 1 Scope

This part of ISO 389 specifies reference equivalent threshold sound pressure levels (RETSPL) for the calibration of pure-tone audiometers supplementary to those specified in ISO 389:1991<sup>1)</sup>. Values given in this part of ISO 389 are applicable to insert earphones of a pattern specified in clause 4.

NOTE 1 For information, a note on the derivation of the reference values and the origin of the data input is given in annex A, and a bibliography is given in annex B.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 389. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 389 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 389:1991, *Acoustics — Standard reference zero for the calibration of pure-tone air conduction audiometers*.<sup>1)</sup>

IEC 126:1973, *IEC reference coupler for the measurement of hearing aids using earphones coupled to the ear by means of ear inserts*.

IEC 711:1981, *Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts*.

## 3 Definitions

For the purposes of this part of ISO 389, the definitions given in ISO 389:1991 together with the following definitions apply.

**3.1 ear insert:** Device used to provide the acoustic coupling between an earphone and the ear canal.

NOTE 2 This may be, for example, an earmould or a similar device with or without a connecting tube.

**3.2 insert earphone:** Small earphone coupled to the ear canal by means of an ear insert, or attached to a connecting element which is inserted into the ear canal. The ear insert may be a part of the insert earphone.

**3.3 ear simulator:** Device for measuring the output sound pressure of an earphone under well-defined loading conditions in a specified frequency range. It consists essentially of a principal cavity, acoustic load networks and a calibrated microphone. The location of the microphone is chosen so that the sound pressure at the microphone corresponds approximately to the sound pressure existing at the human eardrum.

1) To be re-issued as ISO 389-1.