

**Acoustics - Reference zero for the
calibration of audiometric equipment - Part
4: Reference levels for narrow-band
masking noise**

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audiometric equipment - Part 4: Reference levels for
narrow-band masking noise

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 389-4:1999 sisaldab Euroopa standardi EN ISO 389-4:1998 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 389-4:1999 consists of the English text of the European standard EN ISO 389-4:1998.
Käesolev dokument on jõustatud 12.12.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.	This document is endorsed on 12.12.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

Käsitlusala: This standard specifies reference levels for narrow-band masking noise presented by air conduction from an earphone in pure-tone audiometry.	Scope: This standard specifies reference levels for narrow-band masking noise presented by air conduction from an earphone in pure-tone audiometry.
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ICS 13.140

Võtmesõnad: acoustics, air conduction, audiometers, audiometry, auditory threshold, calibration, reference data

English version

Acoustics

Reference zero for the calibration of audiometric equipment

Part 4: Reference levels for narrow-band masking noise

(ISO 389-4 : 1994)

Acoustique – Zéro de référence pour l'étalonnage d'équipements audiométriques – Partie 4: Niveaux de référence pour bruit de masque en bande étroite (ISO 389-4 : 1994)

Akustik – Standard-Bezugspegel für die Kalibrierung audiometrischer Geräte – Teil 4: Bezugspegel für schmalbandige Verdeckungsgeräusche (ISO 389-4 : 1994)

This European Standard was approved by CEN on 1998-12-04.

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.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the 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 389-4 : 1994 Acoustics – Reference zero for the calibration of audiometric equipment – Part 4: Reference levels for narrow-band masking noise,

which was prepared by ISO/TC 43 'Acoustics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 211 'Acoustics', the Secretariat of which is held by DS, 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 June 1999 at the latest.

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

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

Endorsement notice

The text of the International Standard ISO 389-4 : 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

ISO 389:1991 (to be re-issued as ISO 389-1) and ISO 389-2 specify the reference zero for the calibration of pure-tone air-conduction audiometers. ISO 389-3 specifies the corresponding data for pure-tone bone-conduction audiometers.

For clinical diagnostic and other audiometric purposes, it is often necessary to prevent the test signal being heard through the ear not being tested. This masking is usually achieved by the presentation of a narrow band of noise, the centre frequency of which coincides with the frequency of the pure-tone signal, and which is delivered by means of the ordinary supra-aural or insert earphones of the audiometer.

IEC 645-1 specifies that masking levels for narrow-band noise be calibrated in terms of effective masking level and that the noise bandwidth be between one-third and one-half of an octave.

The noise level required to just mask a pure tone of a given hearing level has been calculated from known psychoacoustical data for ipsilateral masking, i.e. when the tone to be masked and the masking noise are presented through the same earphone to the same ear.

In most audiometric applications the masking noise is, however, applied by means of an earphone on the ear not being tested. The exact level of the tone reaching that ear from the transducer on the test side is influenced by skull attenuation and by the presence of the occlusion effect from the masker earphone. These phenomena have to be considered with regard to masking levels used in the audiometric procedure.

1 Scope

This part of ISO 389 specifies reference levels for narrow-band masking noise presented by air conduction from an earphone in pure-tone audiometry. The data are given in terms of levels to be added to the reference equivalent threshold sound pressure levels for the corresponding pure-tone frequencies as specified in ISO 389:1991 or ISO 389-2, respectively, when the masking earphone is placed on the appropriate acoustic coupler, ear simulator or artificial ear.

Data are given for noise bandwidths of one-third and one-half octaves.

NOTE 1 Some notes on the derivation of the reference levels are given in annex A.

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.

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

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

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

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

IEC 303:1970, *IEC provisional reference coupler for the calibration of earphones used in audiometry*.

IEC 318:1970, *An IEC artificial ear, of the wideband type, for the calibration of earphones used in audiometry*.

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 and ISO 389-2 and the following definitions apply.

3.1 bone conduction: Transmission of sound to the inner ear primarily by means of mechanical vibration of the cranial bones.