Australian Standard®

Acoustics—Audiometric test methods

Part 1: Basic pure tone air and bone conduction threshold audiometry

This Australian Standard® was prepared by Committee AV-003, Acoustics Human Effects. It was approved on behalf of the Council of Standards Australia on 2 December 2008.
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The following are represented on Committee AV-003:

- Association of Accredited Certification Bodies
- Association of Australian Acoustical Consultants
- Association of Consulting Engineers Australia
- Audiological Society of Australia
- Australasian Faculty of Occupational & Environmental Medicine
- Australian Acoustical Society
- Australian Chamber of Commerce and Industry
- Australian Council of Trade Unions
- Australian Industry Group
- Australian Society of Otolaryngological Head and Neck Surgery
- Department of Defence, Australia
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- Victorian WorkCover Authority
- WorkCover New South Wales
- WorkSafe Division Department of Commerce Government of WA

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Acoustics—Audiometric test methods

Part 1: Basic pure tone air and bone conduction threshold audiometry

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV-003, Acoustics Human Effects. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

This Standard is identical with, and has been reproduced from ISO 8253-1:1989, *Acoustics—Audiometric test methods,* Part *1: Basic pure tone air and bone conduction threshold audiometry*.

The objective of this Standard is to specify the procedures and requirements for air conduction and bone conduction.

Committee AV-003 agreed that the following sentences should be added:

(a) Clause 5.1, paragraph 1—Guidance on recent exposure can be obtained from AS/NZS 1269.4, *Occupational noise management,* Part 4: *Auditory assessment.*

(b) Clause 12, paragraph 1—It is recommended that for Stages B and C, the calibration be recorded and any non-compliance noted.

In addition, the following should be noted:

(i) Delete the last sentence of Clause 4.1, as ISO Standards for calibration of insert and circum-aural earphones now exist (ISO 389-2 an ISO 389-8).

(ii) Delete the last sentence of Clause 6.2.3.2, Note 2, as an ISO Standard for calibration of insert earphones now exists (ISO 389-2).

(iii) In Clause 11.1 and Tables 2 and 4, slow time constant should be used as it is not specified if the measurement of L_{max} for ambient noise is with a ‘slow’ or ‘fast’ time constant. This will make quite a difference if impulse noises are present.

(iv) Since the publication of the source Standard, IEC Standards have been renumbered as the IEC 60XXX series. References to IEC 318, IEC 373, IEC 645, IEC 651, and IEC 804 should now read IEC 60318, IEC 60373, IEC 60645, IEC 60651 and IEC 60804 respectively.

(v) IEC 225 and IEC 303 have been revised and amalgamated as IEC 60318-3, *Electroacoustics—Simulators of human head and ear,* Part 3: *Acoustic coupler for the calibration of supra-aural earphones used in audiometry.* ISO 7566 has been superseded by 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.*

As this Standard is reproduced from an International Standard, the following applies:

(A) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(B) In the source text ‘this part of ISO 8253’ should read ‘this Australian Standard’.

(C) Substitute a full point for a comma as a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS ISO	
389	Acoustics—Standard reference zero for the calibration of pure tone air conduction audiometers (series)	389	Acoustics—Reference zero for the calibration of audiometric equipment (series)
IEC		AS IEC	
645	Audiometers	60645	Electroacoustics—Audiological equipment
		60645.1	Part 1: Pure-tone audiometers (IEC 60645-1:2001, MOD)
		60645.2	Part 2: Equipment for speech audiometry
		60645.3	Part 3: Auditory test signals of short duration for audiometric and neuro-otological purposes
		60645.4	Part 4: Equipment for extended high frequency audiometry
651	Sound level meters	61672	Electroacoustics—Sound level meters
804	Integrating-averaging sound level meters	61672.1	Part 1: Specifications
		61672.2	Part 2: Pattern evaluation tests
		AS/NZS	
225	Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibration	4476	Acoustics—Octave-band and fractional-octave-band filters

Only international references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

INTRODUCTION

This International Standard lays down requirements and procedures for carrying out basic audiometric tests in which pure tones are presented to the test subject using earphones or bone vibrators. Electrophysiological test methods are not included. Procedures for air conduction threshold audiometry for hearing conservation purposes are given in ISO 6189. Where appropriate, both International Standards have been brought into line with one another.

In order to obtain a reliable measure of hearing ability, many factors are involved. IEC 645 specifies requirements for audiometers. It is essential that audiometric equipment, when in service, be checked and the calibration maintained. This part of ISO 8253 outlines a calibration scheme. To avoid masking of the test signal by ambient noise in the audiometric test room, the levels of the ambient noise shall not exceed certain values, depending upon the method of signal presentation to the test subject, i.e. by earphone or by bone vibrator. This part of ISO 8253 gives maximum permissible ambient sound pressure levels which shall not be exceeded when hearing threshold levels down to 0 dB have to be measured. It indicates the maximum ambient sound pressure levels which are permissible when other minimum hearing threshold levels have to be measured. It sets out procedures for determining hearing threshold levels by pure tone air conduction and bone conduction audiometry. For screening purposes, only methods for air conduction audiometry are outlined.

Audiometry can be performed by using

a) a manual audiometer;

b) an automatic recording audiometer;

c) computer-controlled audiometric equipment.

Methods for threshold audiometry are given for these three types of signal presentation. For screening purposes, only methods using a manual or a computer controlled audiometer are set out.

The procedures are applicable to the majority of adults and children. Other procedures may yield results equivalent to those derived by the procedures specified in this part of ISO 8253. For very young, aged or sick people, some modification of the recommended procedures is likely to be required. This may result in a less accurate measurement of hearing.

AUSTRALIAN STANDARD

Acoustics — Audiometric test methods —

Part 1:
Basic pure tone air and bone conduction threshold audiometry

1 Scope

This part of ISO 8253 specifies procedures and requirements for air conduction and bone conduction threshold audiometry. For screening purposes, only air conduction pure tone audiometric test methods are described. The procedures may not be appropriate for special populations, for example very young children.

Some audiometric procedures need to be carried out at levels above the hearing threshold levels of the subjects. These and other tests are not described in this part of ISO 8253.

Procedures and requirements for speech audiometry, electrophysiological audiometry, and where loudspeakers are used as a sound source are not specified. Air conduction threshold audiometry for hearing conservation purposes is described in ISO 6189.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8253. 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 8253 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 : 1985, *Acoustics — Standard reference zero for the calibration of pure tone air conduction audiometers.*

ISO 7566 : 1987, *Acoustics — Standard reference zero for the calibration of pure-tone bone conduction audiometers.*

IEC 225 : 1966, *Octave, half-octave and third-octave band filters intended for the analysis of sounds and vibrations.*

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 373 : 1971, *An IEC mechanical coupler for the calibration of bone vibrators having a specified contact area and being applied with a specified static force.*

IEC 645 : 1979, *Audiometers.*

IEC 651 : 1979, *Sound level meters.*

IEC 804 : 1985, *Integrating-averaging sound level meters.*

3 Definitions

For the purposes of this part of ISO 8253, the following definitions apply.

3.1 air conduction: The transmission of sound through the outer and middle ear to the inner ear.

3.2 acoustic coupler: A cavity of specified shape and volume which is used for the calibration of an earphone in conjunction with a calibrated microphone to measure the sound pressure developed within the cavity.

NOTE — An acoustic coupler is specified in IEC 303.

3.3 artificial ear: A device for the calibration of an earphone which presents to the earphone an acoustic impedance equivalent to the impedance presented by the average human ear. It is equipped with a calibrated microphone for the measurement of the sound pressure developed by the earphone.

NOTE — An artificial ear is specified in IEC 318.

3.4 bone conduction: The transmission of sound to the inner ear primarily by means of mechanical vibration of the cranial bones.

3.5 bone vibrator: An electromechanical transducer intended to produce the sensation of hearing by vibrating the cranial bones.