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ISO 389-3:1994

Reconfirmed 2014

Australian/New Zealand Standard

Acoustics—Instrumentation for audiometry

Part 1: Reference zero for the calibration of pure-tone bone conduction audiometers

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

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APPITA

Auckland Manufacturers Association
Audiological Society of Australia
Australian and New Zealand Environment and Conservation Council
Australian Acoustical Society
Australian Chamber of Commerce and Industry
Australian Hearing Services Authority
Department of Labour, New Zealand
Department of Labour, South Australia
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Better Hearing, Australia
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RECONFIRMATION
OF
AS/NZS 1591.1:1995
Acoustics—Instrumentation for audiometry
Part 1: Reference zero for the calibration of pure-tone bone conduction audiometers

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New South Wales Nurses' Association
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NOTES

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Acoustics—Instrumentation for audiometry

Part 1: Reference zero for the calibration of pure-tone bone conduction audiometers

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV/3 on Acoustics, Human Effects. It is identical to ISO 389-3:1994, *Acoustics —Reference zero for the calibration of audiometric equipment—Part 3: Reference equivalent threshold force levels for pure tones and bone vibrators*.

This is Part 1 in a proposed series of Standards on instrumentation for audiometry with the objective of specifying data applicable to the calibration of bone vibrators for pure-tone bone conduction audiometry.

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		1591.2	Part 2: Reference zero for the calibration of pure-tone audiometers
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	—	
IEC		AS/NZS	
373	Mechanical coupler for measurements on bone vibrators	1591	Acoustics—Instrumentation for audiometry
		1591.4	Part 4: A mechanical coupler for calibration of bone vibrators

* To be reissued as ISO 389-1

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INTRODUCTION

Each part of ISO 389 specifies a specific reference zero for the calibration of audiometric equipment. ISO 389:1991 (to be re-issued as ISO 389-1) and ISO 389-2 are applicable to audiometric equipment for the transmission of pure tones by air conduction.

For clinical diagnostic and other audiometric purposes, it is often necessary to compare the measured hearing threshold levels of a person for sound transmitted to the inner ear by the air-conduction and bone-conduction pathways, respectively. Bone-conducted sound is provided for this purpose by an electromechanical vibrator applied to the mastoid prominence or to the forehead of the person under test.

The reference zero for the calibration of audiometric equipment for air conduction is defined in ISO 389:1991 and ISO 389-2 in terms of reference equivalent threshold sound pressure levels (RET SPLs), i.e. threshold sound pressure levels produced in a coupler, ear simulator or artificial ear of specified characteristics by supra-aural or insert earphones of various patterns, when excited electrically at a level corresponding to the threshold of hearing of young otologically normal persons. Similarly, this part of ISO 389 provides a reference zero for bone-conduction audiometry in terms of reference equivalent threshold force levels (RET FLs), i.e. the vibratory force levels produced by a bone vibrator on a specified mechanical coupler when the vibrator is excited electrically at a level corresponding to the threshold of hearing of young otologically normal persons. In some countries, the preferred location is the mastoid prominence; in other countries, the forehead location is used in addition to the mastoid prominence. Different RET FL values are valid for each of the two positions (see annex C).

For bone-conduction measurements, it is necessary to specify the static force of application of the vibrator to the skull of the test subject and to the mechanical coupler, as well as certain geometrical features of the vibrator tip. In addition, it is usually necessary to apply masking noise to the ear not under test, since excitation of the skull by the vibrator may be heard by that ear instead of (or in addition to) the ear intended for the test. An appropriate specification of the masking noise is, therefore, required as an adjunct to the reference equivalent threshold force levels, and such a specification is given in this part of ISO 389. Due to the so-called "occlusion effect" whereby the wearing of the transducer needed to provide the (air-conducted) masking noise causes a lowering of the bone-conduction threshold of hearing of the ear receiving the masking signal, it is necessary for the level of masking noise to be raised to cancel out the occlusion effect and provide adequate masking of the ear not under test. The specification of masking noise given in this part of ISO 389 is based on the procedures used in the experimental investigations from which the reference zero of this part of ISO 389 is derived.

Use of this reference zero to calibrate audiometers will ensure that measured bone-conduction hearing threshold levels of persons with unimpaired hearing or with