AS ISO 7029—2003
ISO 7029:2000

Australian Standard™

Acoustics—Statistical distribution of hearing thresholds as a function of age

Standards Australia

This Australian Standard was prepared by Committee AV-003, Acoustics Human Effects. It was approved on behalf of the Council of Standards Australia on 23 May 2003 and published on 4 July 2003.

The following are represented on Committee AV-003:

Association of Australian Acoustical Consultants
Association of Consulting Engineers Australia
Australian Acoustical Society
Australian Chamber of Commerce and Industry
Australian Hearing
Department of Consumer & Employment Protection, WorkSafe Division, W.A.
Department of Labour, New Zealand
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This Standard was issued in draft form for comment as DR 02545.

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First published as AS ISO 7029—2003.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5362 0

PREFACE

This Standard was prepared by the Australian members of 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, rather than an Australian/New Zealand Standard.

This Standard is identical with and has been reproduced from ISO 7029:2000, *Acoustics—Statistical distribution of hearing thresholds as a function of age.*

The objective of this Standard is to provide descriptive statistics of the hearing threshold for populations of various ages.

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 International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker

This Standard provides for the use of the following Australian/New Zealand Standards as equivalents to particular International Standards referenced herein:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS/NZS	
389	Acoustics—Referenced zero for the calibration of audiometric equipment	1591	Acoustics—Instrumentation for audiometry
389-3	Part 3: Reference equivalent threshold force levels for pure tones and bone vibrators	1591.1	Part 1: Reference zero for the calibration of pure-tone bone conduction audiometers

INTRODUCTION

It is well known that the sensitivity of human hearing usually falls progressively with age and that the impairment of hearing develops more rapidly for sound at high frequencies than at low frequencies. Moreover, the magnitude of this effect varies considerably among individuals.

When testing the hearing of persons markedly over 18 years of age, part of any observed hearing loss will probably be associated with age, and it is important to be aware of this when estimating the amount of hearing loss attributable to other causes under investigation.

It should be noted that a decrease in hearing ability may not necessarily be caused by ageing itself, but by many injurious influences during life time, which are not known in detail.

This International Standard is based on a thorough examination of literature data on the change of hearing with age for populations of otologically normal persons as defined herein. Distinction is made between males and females since the difference is found to be of significance in the case of older age groups. The data have been derived from investigations using pure tones transmitted to the ear from an earphone, but no evidence is known that disqualifies their use for noise band stimuli or for sound transmitted to the ear from an external sound field.

NOTES

AUSTRALIAN STANDARD

Acoustics — Statistical distribution of hearing thresholds as a function of age

1 Scope

This International Standard provides descriptive statistics of the hearing threshold for populations of various ages. It specifies the following, for the range of audiometric frequencies from 125 Hz to 8 000 Hz and for populations of otologically normal persons of a given age within the age limits of 18 years to 70 years inclusive:

a) the expected median value of hearing thresholds given relative to the median hearing threshold at the age of 18 years;

b) the expected statistical distribution above and below the median value.

The data are applicable for estimating the amount of hearing loss caused by a specific agent in a population. Such a comparison is valid if the population under study consists of persons who are otologically normal except for the effect of the specific agent. Noise exposure is an example of a specific agent and for this application selected data from this International Standard are referred to as “Data Base A” in ISO 1999.

The data may also be used to assess an individual’s hearing in relation to the distribution of hearing thresholds which is normal for the person’s age group. However, it is not possible to determine for an individual precisely which part of an observed hearing loss is attributable to an accumulation of detrimental effects on the hearing which increase with age, and which part has been caused by other factors such as noise.

The *hearing threshold deviation* as defined herein and the *hearing threshold level* as defined in other standards (ISO 389-1, ISO 8253-1, ISO 8253-2, IEC 60645-1) express the hearing threshold of an individual or an individual ear relative to, respectively,

a) the median hearing threshold of a population of 18-year-old persons, or

b) a reference zero level specified in various parts of ISO 389.

To the extent that the reference zero level represents the median of the 18-year-old population, the values of the two terms will be the same.

2 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

2.1
otologically normal person
person in a normal state of health who is free from all signs or symptoms of ear disease and from obstructing wax in the ear canals, and who has no history of undue exposure to noise

NOTE This definition is the one that was used to select subjects for the data presented in this International Standard. A stricter definition of an otologically normal person is presently used in hearing threshold standards (also excluding persons with a history of exposure to potentially oxotoxic drugs and familial hearing loss).