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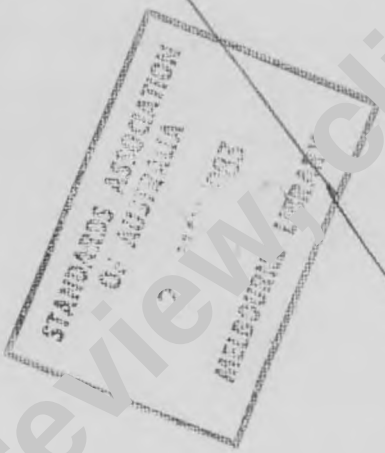
Australian Standard 1269—1983

Amdt 1

HEARING CONSERVATION

Superseded by
AS 1269 - 1989.



STANDARDS ASSOCIATION OF AUSTRALIA
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This Australian standard was prepared by Committee AK/3, Hearing Conservation. It was approved on behalf of the Council of the Standards Association of Australia on 22 February 1983 and published on 9 May 1983.

The following interests are represented on Committee AK/3:

- Audiological Society of Australia
- Australian Council of Trade Unions
- Australian and New Zealand Pulp and Paper Industry Technical Association
- Broken Hill Mining Managers Association
- Confederation of Australian Industry
- Department of Industrial Relations, N.S.W.
- Department of Public Works, W.A.
- Electricity Supply Association of Australia
- Environment Protection Authority of Victoria
- Health Commission of Victoria
- Metal Trades Industry Association of Australia
- National Acoustic Laboratories
- Otolaryngological Society of Australia
- Public Health Department, W.A.
- Royal Australian Institute of Architects
- Safety Institute of Australia (Incorporated)
- Society of Automotive Engineers — Australasia
- South Australian Health Commission
- University of Adelaide
- University of Queensland

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This standard was issued in draft form for comment as DR 82008.

STANDARDS ASSOCIATION OF AUSTRALIA
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AMENDMENT No 1
to
AS 1269—1983
HEARING CONSERVATION

CORRECTIONS

SUMMARY: These corrections apply to Clause 2.5.2.1.

Published on 8 August 1983.

Page 7. Clause 2.5.2.1.

AMDT NO 1 AUG. 1983

Paragraph 2—*delete* existing paragraph and *substitute:*

A Type 1 meter complying with AS 1259 is preferred. However, a Type 2 or 3 meter complying with AS 1259 may be used, provided that allowance is made for the reduced accuracy of these instruments where it is found necessary, e.g. in marginal situations as discussed in Clause 2.6.2.2.

Paragraph 4—*delete* the words 'Type 2' in the first sentence.

COMMONWEALTH DEPARTMENT OF HEALTH

ESTIMATED MAXIMUM ACCEPTABLE BACKGROUND NOISE LEVELS WHEN USING SOUND-EXCLUDING EARPHONE ENCLOSURES FOR AUDIOMETRIC TESTING IN ACCORDANCE WITH AS1269.

K. KEEN AND R. WAUGH

NATIONAL ACOUSTIC LABORATORIES

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Australian Standard AS1269-1976, Rule 5.6.3.5(c) specifies maximum acceptable background noise levels when conducting audiometric tests using TDH39 or TDH49 earphones fitted with MX41AR cushions (Table 5.1 of AS1269).

Note 2 of Rule 5.6.3.5 states:

> "To achieve the background noise levels it will be necessary in many circumstances to use a sound isolating booth. Alternatively, sound isolating audiometric earmuffs may be used but it should be noted that sound pressure levels corresponding to 0 dB hearing threshold levels have not yet been standardized for these devices. Furthermore, where audiometric earmuffs or other types of earphone/cushion combinations are used, the maximum acceptable noise levels should be determined from the attenuation characteristics of the configuration using the procedure derived by Berry. In this determination the value of the mean headset attenuation minus one standard deviation must be used."

The National Acoustic Laboratories have determined the attenuation characteristics of two sound-excluding earphone enclosures currently available in Australia, the Amplivox Audiocup and Auraldome AR-100, according to the procedure specified in Australian Standard AS1270-1975. In both cases the enclosure was fitted with an earphone according to the manufacturer's directions and the attenuation is that of the earphone/enclosure assembly as would be used for audiometry. Maximum acceptable background noise levels for the MX41AR cushion (from AS1269), Audiocup and Auraldome are given in Table 1. Intermediate figures in the derivation of the criteria for the two enclosure assemblies are given in Tables 2 and 3. These criteria are derived mathematically and represent an interim approximation to fulfill the present need. More accurate criteria require specific testing which has not been reported to date and which may not be carried out for some time.

Table 1 MAXIMUM ACCEPTABLE BACKGROUND NOISE LEVELS

Octave Band Centre Frequency	125	250	500	1000	2000	4000	8000
MX41AR (AS1269)	52	35	15	14	29	36	28
Amplvox Audiocup (NAL)	56	40	29	31	43	51	50
Auraldome AR-100 (NAL)	63	43	26	26	33	45	36

It must be emphasised that no Australian or International Standard exists for the calibration of either the Audiocup or Auraldome earphone/enclosure assembly. There is some evidence that measured thresholds may be raised due to earphone-pinna decoupling when using some enclosures. (Deviation from International Standards for hearing threshold levels of up to 8 dB have been reported.) Earphone enclosures therefore may only be used to measure relative changes in threshold, if and only if the same type of earphone/enclosure assembly is used for both test and retest. They may not be used to determine threshold with reference to International Standards for normal hearing. This means that although suitable for monitoring audiometry, the audiograms obtained are not suitable for calculation of percentage loss of hearing for compensation claims and may be misleading in pre-employment screening.

TABLE 2

CALCULATION OF MAXIMUM ACCEPTABLE BACKGROUND NOISE LEVELS

FOR AMPLIVOX AUDIOCUP SOUND EXCLUDING EARPHONE/ENCLOSURE ASSEMBLY

⅓ Octave Band Centre Frequency	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
1. Berry: 0 dB HL (500Hz+) Criteria for MX41/AR	54	50	46	42	38	33	24	19	19	20	21	23	26	34	37	41	43	40	37	37	-
2. Berry:Attenuation (Mean) of MX41/AR	1	2	3	4	5	5	6	7	9	11	15	17	20	25	28	31	31	28	25	23	-
3. NAL: Attenuation (Mean minus one S.D.) of Audiocup	1.2	0.8	1.0	1.2	0.5	-1.7	6.3	11.1	16.0	19.5	20.6	17.2	23.1	30.9	29.9	30.7	35.1	36.8	31.9	31.7	28.4
⅓ Octave Band Criteria for Audiocup {1-(2-3)}	54.2	48.8	44.0	39.2	33.5	26.3	24.3	23.1	26.0	28.5	26.6	23.2	29.1	39.9	38.9	40.7	47.1	48.8	43.9	45.7	(45.7)

Octave Band Centre Frequency	125	250	500	1000	2000	4000	8000
NAL: 0 dB HL (500Hz+) Criteria for Audiocup	55.1	40.4	29.4	31.4	42.6	51.4	49.9

TABLE 3

CALCULATION OF MAXIMUM ACCEPTABLE BACKGROUND NOISE LEVELS

FOR AURALDOME AR-100 SOUND EXCLUDING EARPHONE/ENCLOSURE ASSEMBLY

⅓ Octave Band Centre Frequency	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
1. Berry: 0 dB HL (500Hz+) Criteria for MX41/AR	54	50	46	42	38	33	24	19	19	20	21	23	26	[illegible]	[illegible]7	41	43	40	37	37	-
2. Berry:Attenuation (Mean) of MX41/AR	1	2	3	4	5	5	6	7	9	11	15	1[illegible]	20	25	28	31	31	28	25	23	-
3. NAL: Attenuation (Mean minus one S.D.) of Auraldome	9.1	8.7	4.3	3.7	1.3	1.6	4.8	6.8	10.0	14.[illegible]	1[illegible].3	13.2	16.1	20.2	21.7	24.9	30.4	27.1	22.7	14.5	16.7
⅓ Octave Band Criteria for Auraldome {1-(2-3) }	62.1	56.7	47.3	41.7	34.3	29.6	22.8	1[illegible].8	20.0	23.7	19.3	19.2	22.1	29.2	30.7	34.9	42.4	39.1	34.7	28.5	(28.5)

Octave Band Centre Frequency	125	250	500	1000	2000	4000	8000
NAL: 0 dB HL (500Hz+) Criteria for Auraldome	63.[illegible]	42.6	25.6	26.0	33.4	44.6	36.4

AUSTRALIAN STANDARD

HEARING CONSERVATION

AS 1269—1983

First published 1976
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Third edition 1983

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PREFACE

This edition of this standard was prepared by the Association's Committee on Hearing Conservation to supersede AS 1269—1979. It is primarily concerned with the preservation of the hearing of persons exposed to noise in the course of their occupations. It does not deal with other physiological or psychological effects of noise.

The standard has been widely used since its introduction in 1976 and its revision in 1979. The 1979 edition was called up in statutory regulations relating to protection of hearing of persons exposed to occupational noise.

This edition incorporates changes to Table 5.1 which now includes additional data for new types of earphone/cushion or earphone/enclosure combination fitted to audiometer, and a new Appendix D which takes into account the latest work of ISO/TC 43 in the revision of ISO 1999, Acoustics — Assessment for Occupational Noise Exposure for Hearing Conservation Purposes. Other changes include new explanatory material in the form of a Note under Fig. 3.1 providing the mathematical relationship between partial noise dose, sound pressure level, and duration of exposure. Test procedures using audiometers, which were included in Section 5 are now retained in Appendix F. The audiometry procedures in Section 5 are currently under review.

The utilization of a criterion based on a Daily Noise Dose (DND) of 90 dB(A) exposure per 8-hour day] may not necessarily provide adequate protection for all persons in the working population. Some persons have been shown to be more susceptible than others to noise-induced deafness (see Appendix D). As a general rule it appears essential that either routine audiometry be introduced or personal hearing protection be provided at lower levels than those specified in statutory regulations in the interest of protecting the more susceptible members of the working community.

The detection of the early stage of noise-induced hearing loss is of crucial importance. Persons highly susceptible to noise-induced hearing loss will show a hearing loss quite early in their exposure history, which may be detected by audiometric monitoring. By protecting such individuals in the manner referred to in this standard, it is possible to avoid the danger of more serious hearing loss. Audiometric monitoring also serves as a valuable guide to the adequacy of a hearing conservation program.

This standard does not cover the effects of exposure to ultrasound. Reference for this purpose may be made to AS 2243, Safety in Laboratories, Part 5—Non-ionizing Radiations.

The various aspects of the hearing conservation program are dealt with in this standard as follows:

Section 1 — Scope and General
Section 2 — Noise Measurement and Assessment
Section 3 — Evaluation of Noise
Section 4 — Engineering Noise Control
Section 5 — Hearing Protection Program.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for HEARING CONSERVATION

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard describes the establishment of a hearing conservation program to protect persons who are occupationally exposed to noise.

For the purpose of this standard, a hearing conservation program is a planned procedure to evaluate and control noise and to prevent impairment of hearing in persons exposed to excessive noise. The components of the program are as follows:

(a) Motivation and education of all concerned to accept responsibility for their part in the hearing conservation program.

(b) Measurement of the noise.

(c) Evaluation of any noise problem.

(d) Reduction of noise exposure.

(e) Provision of personal hearing protection and regular hearing testing if noise exposure remains excessive.

This standard does not specify limits for exposure to occupational noise. Attention is invited to the appropriate limits for exposure to occupational noise specified in the relevant statutory regulations.

1.2 OBJECTIVES.

1.2.1 Noise Reduction Program. As a primary aim, the standard seeks to reduce exposure to noise by reducing noise levels. The standard describes methods of measurement (see Section 2) which can be used to determine whether statutory noise exposure limits are exceeded, and provides advice on methods of reducing noise levels by engineering means. Where such methods of hearing conservation are not immediately feasible, it becomes necessary to introduce other methods, such as the wearing of hearing protection devices.

1.2.2 Hearing Protection Program. The standard also describes methods for personal hearing protection and regular hearing testing (see Section 5) to be adopted when technical or economic problems delay the reduction of noise levels by engineering means or administrative procedures.

NOTE TO CLAUSE 1.2: Aspects of the implementation of the programs regarded as mandatory, if the programs are to be effective, are indicated by the use of words 'shall', or 'is necessary'. Aspects to be regarded as highly advisable are indicated by the use of the word 'should'. Clauses of both types, together with informative material for further guidance, are collated into a continuous text for easier comprehension.

1.3 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

AS 1259	Sound Level Meters
AS 1270	Hearing Protection Devices
AS 1319	Rules for the Design and Use of Safety Signs for the Occupational Environment
AS 2399	Personal Noise Dosemeters
AS 2586	Audiometers
AS XXXX	Acoustics — Tape Recording Equipment for Use in Acoustical Measurement Systems*
AS Z41	Octave, Half Octave and One-third Octave Band Pass Filters Intended for the Analysis of Sound and Vibrations
SAA MP44	Guide for the Use of Sound Measuring Equipment Part 1 — Portable Sound Level Meters Part 3 — Equipment for Integration of Sound Signals*

1.4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.4.1 Daily noise dose (DND)—the sum of partial noise doses which are based on the various sound levels and their durations to which an employee is exposed throughout a representative working day. It is the ratio of the noise exposure experience by a person in a working day to a reference value of noise exposure.

NOTE: AS 2399 defines the reference value of noise exposure as being 3.2 $Pa^2.h$. This reference value corresponds to a daily noise dose (DND) of 1.

1.4.2 Equivalent continuous A-weighted sound-pressure level ($L_{Aeq.8}$)—that A-weighted sound pressure level (dB(A)) which, if present for 8 h per day, produces the same daily noise dose as that obtained from the summation of the partial noise doses over the same period.

NOTE: For the basis of $L_{Aeq.8}$ calculations, see Clause 3.2 and Appendix A.

1.4.3 Noise dosemeter (noise dosimeter)—an instrument for measuring the noise exposure and displaying the result in terms of noise dose.

NOTES:

1. The instrument may be worn by the person concerned (personal noise dosemeter) or placed at a suitable location to estimate the noise dose received by one or more persons, stationary or otherwise, in the vicinity (area monitor noise dosemeter).
2. The term 'noise dosimeter' has been used by some authorities outside Australia.

1.4.4 Noise exposure limit—the upper limiting short-period noise level or, where this is not exceeded, the criterion noise level or criterion noise dose.

1.4.5 Partial noise dose—a parameter determined by a sound level and its duration during a representative working day.

*In course of preparation.