AS/NZS 1269.3:2005
Reconfirmed 2016

AS/NZS 1269.3:2005

Australian/New Zealand Standard™

Occupational noise management

Part 3: Hearing protector program

STANDARDS AUSTRALIA

STANDARDS NEW ZEALAND
Paerewa Aotearoa

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This Standard was issued in draft form for comment as DR 04037.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

RECONFIRMATION

OF
AS/NZS 1269.3:2005
Occupational noise management
Part 3: Hearing protector program

RECONFIRMATION NOTICE

Technical Committee AV-003 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

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Worksafe Division, Department of Commerce, Western Australia
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NOTES

Australian/New Zealand Standard™

Occupational noise management

Part 3: Hearing protector program

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV-003, Acoustics, Human Effects to supersede, AS/NZS 1269.3:1998, *Occupational noise management*, Part 3: *Hearing protector program.*

This is Part 3 in a series of Standards as follows:

AS/NZS		
1269		Occupational noise management
1269.0	Part 0:	Overview and general requirements
1269.1	Part 1:	Measurement and assessment of noise immission and exposure
1269.2	Part 2:	Noise control management
1269.3	Part 3:	Hearing protector program (this Standard)
1269.4	Part 4:	Auditory assessment

The objective of this series of Standards is to provide requirements and guidance on all facets of occupational noise management. It is recommended that the reader refer to all Parts of AS/NZS 1269 to better understand all relevant terminology and objectives of occupational noise management.

The objective of this Part is to give requirements and guidance to people who supply, purchase or wear hearing protectors and to encourage the use of effective criteria in their selection, use, care and maintenance.

The objective of this revision is to confirm the existing Standard with a few minor changes.

Hearing protectors are items of personal protection which, as a result of their sound attenuation properties, reduce the effects of noise on hearing in order to avoid hearing damage. In order that the protection offered by hearing protectors be effectively realized, hearing protectors should be used all the time that the user is in a potentially excessive noise environment. In the selection of hearing protectors, attention is therefore drawn to the importance of considering factors which may influence comfort and acceptance.

In occupational noise management programs, measures other than personal hearing protection such as the identification of noise areas, and the assessment of personal noise exposure and noise control, require attention as priorities.

In the preparation of this document cognizance was taken of EN 458, *Hearing protectors—Recommendations for the selection, use, care and maintenance*.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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Australian/New Zealand Standard
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Part 3: Hearing protector program

1 SCOPE

This Standard specifies—

(a) the administrative responsibilities associated with a hearing protector program;

(b) the selection, use and maintenance of various types of hearing protectors; and

(c) training and motivation in regard to hearing protector programs.

It excludes the setting of occupational noise criteria. Such criteria are set by regulations or organizational policy, not by Standards Australia or Standards New Zealand. Exposure standards may be found in the occupational health and safety or related regulations that are applicable for the workplace under assessment. Criteria lower than these exposure standards may be set by the organization's noise policy.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS
1319 Safety signs for the occupational environment

AS/NZS
1269 Occupational noise management
1269.0 Part 0: Overview and general requirements
1269.1 Part 1: Measurement and assessment of noise immission and exposure
1269.2 Part 2: Noise control management
1269.4 Part 4: Auditory assessment

1270 Acoustics—Hearing protectors

NOHSC
Worksafe Australia, *Noise Management at Work—Control Guide*, 2nd Edition. Sydney, National Occupational Health and Safety Commission, 1991.

3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 1269.0, AS/NZS 1269.1 and those below apply.

3.1 Care

The day-to-day attention given by the wearer to the protector.

3.2 Criterion eight-hour equivalent continuous A-weighted sound pressure level, $L(\text{crit})_{\text{Aeq,8h}}$

The eight-hour equivalent continuous A-weighted sound pressure level above which the provision of hearing protectors is required by legislation or by the organization's noise policy, whichever is the lower.

3.3 Criterion peak sound pressure level, $L(\text{crit})_{\text{peak}}$

The peak sound pressure level above which the provision of hearing protectors is required by legislation or by the organization's noise policy, whichever is the lower.

3.4 Effective level (of a sound for people wearing hearing protectors) $L(\text{eff})$

A quantity derived by subtracting the attenuation of a hearing protector from the level of the sound in which it is worn.

The value of $L(\text{eff})$ is not measured directly, but is calculated by the methods given in Appendix A.

NOTES:

1 Because different wearers obtain different attenuation from the same hearing protector, attenuation values are expressed in statistical terms, usually as the attenuation value obtained or exceeded by 80% of wearers. Since it is derived from statistical attenuation values, $L(\text{eff})_{\text{Aeq}}$ is also expressed in statistical terms, e.g. as the value of $L(\text{eff})_{\text{Aeq}}$ below which 80% of wearers are expected to fall.

2 Analogous to the way the term 'level' is further qualified when used to refer to exposure level, immission level, octave-band level, etc., the term 'effective level' may be similarly qualified to refer to effective exposure level, effective immission level, effective octave-band level, etc. Accordingly, the symbol $L(\text{eff})$ may be subscripted following the same conventions as those used for subscripting L; thus where $L_{\text{Aeq},Ti}$ stands for partial exposure level, $L(\text{eff})_{\text{Aeq},Ti}$ stands for effective partial exposure level, etc.

3 The value of the quantity $L(\text{eff})$ is not necessarily the same as the value of the A-weighted sound level that may be measured in the ear canal of a person wearing a hearing protector.

3.5 Maintenance

The regular inspection and repair of the protector, e.g. the replacement of defective earmuff cushions.

3.6 Over-protection

The selection and wearing of a hearing protector with unnecessarily high attenuation.

NOTE: This may lead to a sense of isolation and difficulties with perception of sound.

3.7 Selection

The process of choosing the most suitable protector.

3.8 Use

The day-to-day wearing of a hearing protector by the person to be protected.

4 MANAGEMENT RESPONSIBILITY

If the protection from occupational noise requires the use of hearing protectors, the purchase and issue of such equipment forms only part of the overall management responsibility. A comprehensive and properly managed hearing protector program, as outlined in this Clause, shall be implemented.

The hearing protector program shall be established by management and an individual shall be designated to manage the program. The person should have a technical and professional background enabling them to make sound decisions based on evaluation and understanding of workplace hazards. The individual should preferably be a safety officer, occupational hygienist, occupational health nurse or physician. In a small company, the program may be managed by the company owner, foreperson or other supervisory personnel. Regardless of who assumes responsibility for the program, the program manager shall have the full support of management. The person shall develop a standard operating procedure. It should be based upon the following:

(a) Documentation showing the reasons why the hearing protectors selected were considered the most suitable.

(b) A training program in which personnel can become familiar with hearing protectors, including selection and proper fitting procedures as well as the proper use and limitations of the equipment.

(c) Provisions for assigning a selected range of suitable hearing protectors to people for their exclusive use.

(d) A record of which type of hearing protector has been issued to each person.

(e) Provisions for adequate supplies of hearing protectors at accessible locations.

(f) Provisions for regular cleaning of the hearing protectors.

(g) Provisions for proper storage of the hearing protectors.

(h) Provisions for periodic inspection and maintenance of the hearing protectors.

(i) Provisions for the identification and marking of areas where hearing protectors must be worn and ensuring that protectors are worn as required.

(j) Continuing education and motivation programs, designed to promote correct wearing of hearing protectors and to maintain a responsible, positive attitude towards hearing preservation.

(k) Ongoing auditing by the program manager to ensure its continued functioning and effectiveness.

(l) Evaluation of each person assigned to wear hearing protectors to determine if he or she is physically suited.

(m) Provision for ongoing auditory assessment if appropriate (see Clause 13).

5 HEARING PROTECTORS

5.1 General

The primary function of a hearing protector is to reduce the amount of noise reaching the inner ear of the wearer. This can be achieved by—

(a) completely covering the entire ear;

(b) covering the entrance to the ear canal;

(c) completely occluding the ear canal itself;

(d) neutralizing the noise through electronic means before it reaches the ear (see Clause 5.2.5(b)); or

(e) covering a large part of the head as well as the outer ear (see Clause 5.2.4).

5.2 Types of hearing protectors

5.2.1 *Earmuffs*

Earmuffs comprise cups which fit over the ears and are sealed to the head with soft cushions, usually filled with plastic foam or liquid. The cups are usually lined with a noise-absorptive material. The two cups are usually connected by a spring band designed to be worn around the head, neck or chin, but may also be fitted separately on either side of a hard hat or other headgear.

5.2.2 *Earplugs*

Earplugs are hearing protectors which are inserted into the ear canal. There are several types of earplugs as follows:

(a) *Pre-moulded earplugs* These are inserted into the ear canal without the need for prior shaping. Pre-moulded earplugs are made from an array of materials, and available in a range of sizes.

(b) *User formable earplugs* These are generally made from a compressible material that is moulded by the user before insertion into the ear canal. After insertion, this type of plug often expands to form a seal with the walls of the ear canal.

(c) *Custom-moulded earplugs* These earplugs are custom-made from a silicone or acrylic mould of the ear canal, which means that each plug is designed to fit only the ear for which it was made.

(d) *Banded earplugs* Banded earplugs are earplugs usually of soft silicone, rubber or plastic, and suspended on a headband.

5.2.3 *Ear canal caps*

Ear canal caps seal the entrance to the ear canal, without actually entering it. A spring headband is used to hold the caps in position.

5.2.4 *Acoustic helmets*

Acoustic helmets cover a large part of the head as well as the outer ear. This may not only provide direct hearing protection, but also diminish bone conduction of the sound to the ear by reducing airborne sound to the skull.

5.2.5 *Special types of hearing protectors*

The following types of hearing protectors utilize mechanical techniques, electronic circuitry, microphones and loudspeakers in various ways to achieve noise reduction or noise reduction and communication:

(a) *Level-dependent protectors* These are designed to provide increased protection as the sound level increases. A typical example is impulse noise protectors, whose amplification circuitry allows communication at normal voice levels to be conducted, while rapidly attenuating any loud noise. They may be either electronic or non-electronic.

(b) *Active noise reduction (ANR) protectors* This type of protector reacts to noise by duplicating the noise pattern and inverting it, which results in dynamic noise cancellation inside the protector. ANR technology is usually applied to constant noise patterns, such as machines and motors.

(c) *Communication hearing protectors* These are either wireless or of the plug-in type. The protector provides hearing protection through conventional attenuation, but contains earphones which allow messages, signals, alarms or entertainment programs to be relayed to the wearer. Communication hearing protectors may also be fitted with microphones connected to two-way radios, which facilitate person-to-person conversation.

NOTES:

1 Standards for measuring the performance of these hearing protectors are still under development.

2 Recommended procedures for measurement of the sound pressure levels from headphones or insert earphones are covered in AS/NZS 1269.1.

6 SELECTION OF HEARING PROTECTORS

6.1 Compliance of hearing protectors

6.1.1 *General*

All hearing protectors used shall be type-tested to and comply with the requirements of AS/NZS 1270 where there is an appropriate category. The testing shall be carried out by a laboratory independently accredited to test according to AS/NZS 1270. Where there is no appropriate category in AS/NZS 1270, hearing protectors meeting relevant legislative requirements shall be selected.

6.1.2 *Attenuation values*

Attenuation values used in all selection procedures, including octave-band and classification methods, shall be mean minus standard deviation values derived from attenuation measurements made in accordance with AS/NZS 1270.

6.1.3 *Test reports*

Purchasers should obtain information from suppliers on the attenuation of hearing protectors they are considering purchasing. The information shall contain a statement that the hearing protectors comply with the requirements of AS/NZS 1270. The information provided shall also include the results of attenuation measurements conducted according to AS/NZS 1270, the name of the test laboratory and the date of the test. Where there is no appropriate category in AS/NZS 1270 the information from suppliers shall contain a test report containing the results of attenuation measurements, the name of the test laboratory and the date of the test.

6.2 Attenuation requirement

6.2.1 *General*

If the $L_{Aeq,8h}$ exceeds the $L(crit)_{Aeq,8h}$, hearing protectors shall be selected according to the methods specified in Appendix A. If the L_{peak} exceeds the $L(crit)_{peak}$, hearing protectors shall be selected according to the methods specified in Appendix B.

Hearing protector attenuation obtained in the working environment may be lower than that obtained in a laboratory test. The actual attenuation will depend on many factors, some of which are—

(a) desire to fit properly;

(b) glasses;

(c) long hair;

(d) protective equipment;

(e) age of protector;

(f) condition of the hearing protector; and

(g) poor fitting.

Guidance on the influence of these factors should be sought from the manufacturer. The difference can be minimized by careful selection, fitting and maintenance (see Clauses 6.5, 7.2 and 8.4).

As a practical measure many organizations make it a rule that people must wear hearing protectors whenever they are in areas or operating equipment where the immission level exceeds a specified value, such as 85 dB(A).

The noise level may be determined by either a direct measurement through the use of a sound level meter or through subjective judgement.

One commonly used subjective judgement technique is that if ambient noise is sufficiently loud to force two people to use raised voices to communicate when approximately one metre apart, then the noise level $L_{Aeq,T}$ probably exceeds 85 dB(A) (Webster 1970 and Beranek 1988, see Appendix F).

6.2.2 *Over-protection*

Attention should be paid to the risk of overprotection which may lead to a sense of isolation in the wearer, thereby adding to the wearer's difficulty in perceiving useful sounds. This, in turn, could lead to failure to wear the hearing protector in the proper manner and during all times while the person is in the hearing protection area (see Figure 1). Generally L_{eff} of 70 dB(A) or less could lead to over-protection.

NOTE: Hearing protectors are sometimes selected with regard only to the highest immission level to which the wearer is exposed, regardless of exposure duration. This may lead to the use of unnecessary protective equipment and overprotection, e.g. if exposure to the high level is brief and the remainder of the day's exposure is to much lower levels. In such cases it may be useful to work out the hearing protector attenuation requirement in more detail to minimize overprotection. Guidance on appropriate procedures may be found in Module 12: Personal protection, of the NOHSC, *Noise Management at Work—Control Guide*.

6.2.3 *Importance of wearing time*

Failure to wear the hearing protector during the entire exposure will significantly decrease the effective protection of the hearing protector (see Figure 1 and Clause 10.4).

6.2.4 *Inadequate attenuation*

If hearing protectors cannot provide adequate attenuation in the work environment, appropriate specialist advice should be sought.

NOTE: Hearing protectors that provide just-sufficient attenuation for an 8-hour exposure to a particular noise level $L_{Aeq,T}$ will have insufficient attenuation if the exposure duration exceeds 8 h. Two additional factors must be taken into account as follows:

(a) When the *exposure* duration T exceeds 8 h, the normalized noise exposure level ($L_{Aeq,8h}$) will exceed $L_{Aeq,T}$ by 10 log $T/8$.

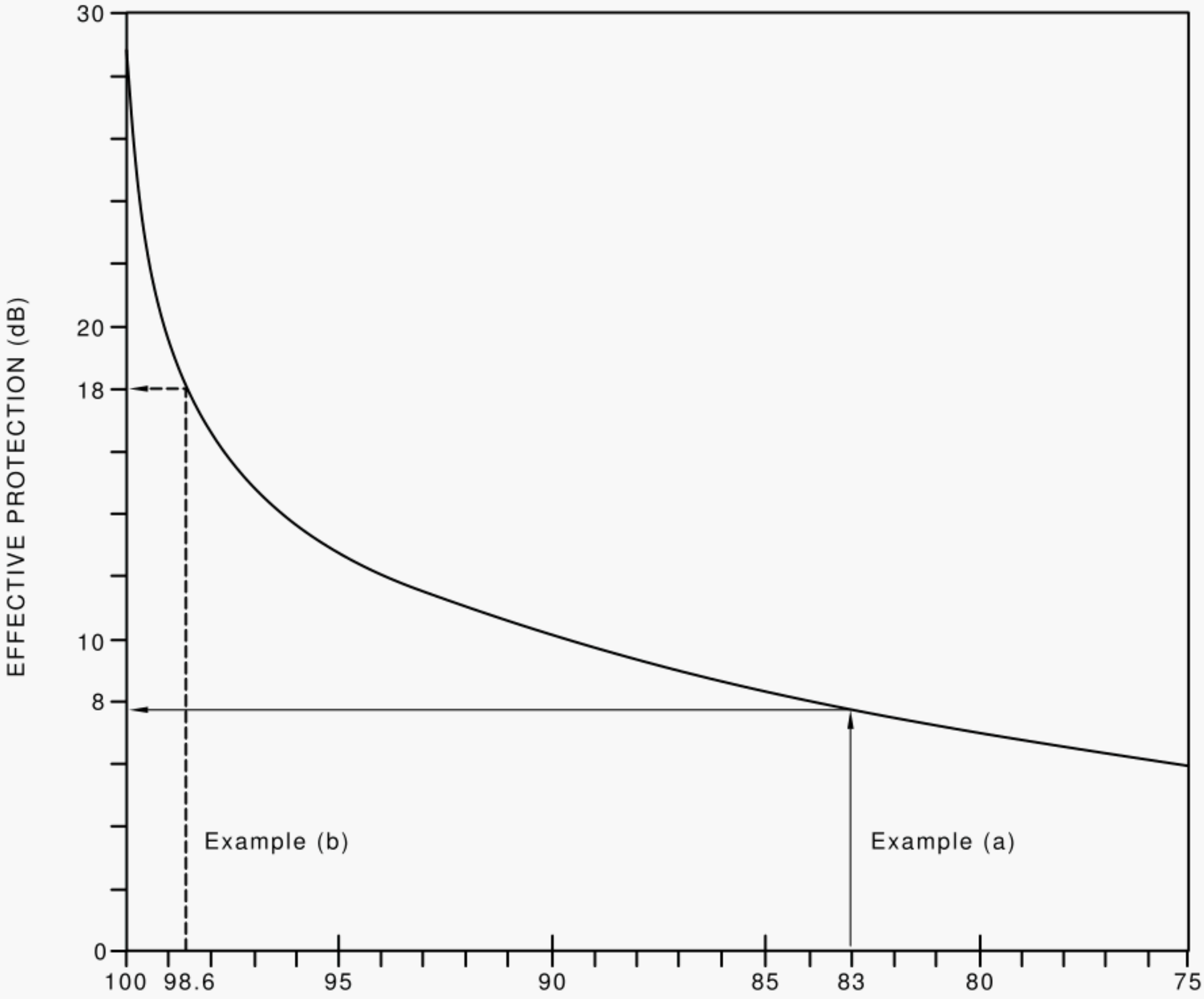
(b) For shift lengths exceeding 8 h, it is recommended (see AS/NZS 1269.1) that organizations increase the normalized noise exposure level to take account of—

  (i) the greater risk of hearing damage associated with continued exposure beyond the duration at which temporary threshold shift reaches a maximum; and

  (ii) the reduced time available for hearing recovery between exposures on successive shifts.

6.2.5 *Earplugs and earmuffs worn in combination*

When both earplugs and earmuffs are worn in combination the maximum attenuation is limited by flanking sound transmission paths in the skull. For this and other reasons the attenuation values of the individual hearing protectors cannot be simply added. With the combination of earmuffs and earplugs the dominant effect comes from the earplugs. The combination of high attenuation earplugs and high attenuation earmuffs will provide similar attenuation to the combination of low attenuation earmuffs and high attenuation earplugs. Information concerning the combined attenuation should be sought from the manufacturer or relevant authority.



NOTES:

1 Over a working day, periods of a few minutes' unprotected exposure easily accumulate, e.g. by placement and removal of the hearing protectors while in the noisy area rather than before entering and after leaving it or by removing hearing protectors briefly for any reason.

2 The following are examples of reduced effective protection:

(a) If not worn for 10 min during a total exposure time of 1 h (worn 83% of the time), the effective protection provided by a high grade (30 dB) hearing protector is only about 8 dB. This means that, worn in this way, the high grade hearing protector effectively gives the same protection as a low grade (8 dB) hearing protector worn all the time (for the full hour of exposure).

(b) If not worn for 5 min during a total exposure time of 6 h (worn 98.6% of the time), the effective protection provided by a 30 dB hearing protector is only 18 dB, making the effective protective value 12 dB less than expected.

FIGURE 1 REDUCTION IN THE EFFECTIVE PROTECTION PROVIDED BY HIGH-GRADE HEARING PROTECTORS WITH DECREASED WEARING TIME IN A GIVEN NOISE ENVIRONMENT

6.3 Comfort

An uncomfortable hearing protector is unlikely to be worn correctly, if at all. It is therefore good practice to compare various hearing protectors for comfort in the environment in which they will be used.

NOTE: Comfort may be enhanced by correct sizing and by certain accessories, such as perspiration covers.

There are no criteria that can be used to quantify the comfort of a hearing protector. It is recommended that a small range of suitable protectors be selected, allowing users to make a final personal choice of the desired model.

6.4 Communication requirements

If it is possible to maintain voice communication in the workplace without hearing protectors, communicating whilst wearing hearing protectors is normally not only possible, but could also show an improvement over not wearing a hearing protector provided the wearer has normal hearing.

Special communication earmuffs with noise-excluding microphones and hearing protectors fitted with earphones should be considered for use in areas where direct voice communication is difficult or impossible.

NOTE: There is evidence that a person listening to a signal through headset earphones will set its level about 5 dB above the effective level of the ambient noise (i.e. the ambient noise level reduced by the attenuation of the headset). While this means that the signal level will be the major determinant of the overall sound level in the ear, the signal level will depend on both the ambient noise level and the attenuation of the headset and could therefore be lowered by reducing the ambient noise level or increasing the headset attenuation.

6.5 Compatibility with job requirements

Certain job requirements may influence the selection of hearing protectors. These include—

(a) other headgear worn in conjunction with hearing protectors, e.g. hard hats, respirators, spectacles and goggles, all of which may warrant the choice of earmuffs with special headbands or hard hat mounts, or earplugs;

(b) if the user's hands are normally soiled in the course of work routines, it may be difficult to use earplugs hygienically; and

(c) a person wearing safety gloves may put on and remove earmuffs without difficulty, but would have to take off the gloves in order to insert, adjust or remove earplugs.

6.6 Compatibility with the workplace

Certain environmental factors may influence the selection of hearing protectors. These include—

(a) bulky earmuffs or muffs with protruding parts which may be unsuitable for work in confined areas;

(b) deterioration of hearing protectors which may be caused by chemical substances used in the workplace;

(c) special care which may be required when wearing earplugs or ear canal caps in unhygienic working conditions; and

(d) hot or humid conditions which may mean earplugs are more comfortable.

6.7 Compatibility with personal characteristics

6.7.1 *General*

The person's physical characteristics can affect the efficacy of hearing protectors, e.g. the size of head or ears may impinge on the efficacy of earmuffs or the size and shape of the ear canal may impinge on the efficacy of earplugs.

Earmuffs attached to industrial safety helmets may not afford adequate attenuation unless both helmet and earmuff are of the correct fit.

6.7.2 *Medical factors*

Before a hearing protector is issued, a competent person should conduct an interview to ascertain that there are no medical factors that could contraindicate the use of hearing protectors. The user should be asked about any ear complaints such as irritation of the ear canal, earache, discharges, tinnitus or hearing loss or whether the user is under treatment for any ear disease or skin disorder. A person with such complaints should be referred for specialist advice.

People with existing hearing impairment may find that the use of hearing protectors leads to additional hearing difficulties. Hearing aid users should wear hearing protectors. In these cases, appropriate specialist advice should be obtained.

7 ISSUE AND FITTING OF HEARING PROTECTORS

7.1 Issue of hearing protectors

Regular users shall be given hearing protectors for their exclusive use. A record of hearing protector issue and usage should be established and maintained. This record should also show training courses and other relevant information. For hearing protectors on extended personal issue, a system of regular cleaning, inspection and maintenance should be provided.

Reusable hearing protectors not issued on a personal basis, e.g. to visitors in the work area, shall be cleaned before being reissued. They shall be inspected regularly by a competent person.

7.2 Fitting of hearing protectors

7.2.1 *General*

The fitting of hearing protectors is an important part of the hearing protector program. People are far more likely to adopt a responsible attitude towards the preservation of their hearing if the fitting routine is careful and thorough and the wearer clearly desires the best possible protection.

The attenuation of hearing protectors is measured by the procedure specified in AS/NZS 1270. The extent to which laboratory attenuation is approached in real-world workplace conditions depends on many factors including the degree of diligence in the implementation of a hearing protector program as described in this Standard.

The enormous diversity of hearing protectors (both earplugs and earmuffs, their wide range of attenuation and variation in their correct fitting) necessitates close attention to one-on-one fitting instruction, supervision, motivation and evaluation in workplace conditions.

In reality, one-to-one fitting instruction may not always be possible. In such cases, earmuffs are considered more likely to conform to laboratory findings than earplugs.

The fitting of a suitable hearing protector should be undertaken by an appropriately trained person with substantial knowledge of hearing protection.

In the case of individually moulded hearing protectors that are inserted in the ear canal, fitting instructions should be given by a competent, trained person.

NOTE: Particular care is required with the fitting of earplugs, which if poorly fitted may provide little protection.

7.2.2 *Fitting procedure*

The fitting procedure should be conducted in three stages as follows:

(a) *Initial fitting and training* (See Clause 12) The person is introduced to a variety of hearing protectors and associated accessories. They should be encouraged to select the most comfortable types. The wearer should then be instructed in the correct fitting and use of the hearing protector and associated accessories and parts. This instruction stage should take place in quiet surroundings, preferably in small groups, allowing ample time for trying the equipment and answering any questions or queries the wearer might have. The selected hearing protector should be formally issued once the wearer has had ample opportunity to evaluate the long-term comfort.

(b) *On-the-job fitting and demonstration* This should be conducted in the actual workplace as soon as practical after the initial fitting. The purpose of this is to demonstrate clearly to the wearer the effectiveness of the equipment, which can be an important aid to wearer acceptance.

(c) *Follow-up* Regular inspections should be made to the work area to ensure that the hearing protector is in good condition, worn correctly and that there are no further questions or problems associated with wearing the equipment. Should obstacles related to the wearing of the hearing protector be evident the person should be given the opportunity to select another hearing protector.

8 CLEANING AND MAINTENANCE

8.1 General

It is important that an effective storage and regular maintenance program, appropriate to the type of hearing protector, be followed. Soiled hearing protectors may lead to a decreased level of comfort which may in turn result in failure to wear the equipment. Damaged hearing protectors may lead to diminished protection performance which, while not being directly noticeable, could give the wearer a false sense of security. The hearing of a wearer may be dependent on the effective operation and ready availability of a suitable hearing protector. Wearer cooperation in the use of hearing protectors will be more readily forthcoming if the hearing protector program ensures a readily available supply of clean, functional hearing protectors, together with replacement parts and accessories.

Care of hearing protectors could, in most cases, be handled by the wearer if appropriately trained, in conjunction with regular formal inspections. Experience shows that establishment of a centralized cleaning and supply station is an effective way of implementing compliance with cleaning and maintenance routines. Such a facility should include provisions for—

(a) cleaning of equipment (e.g. cleaning tissues, detergent, water);

(b) issue of replacement parts (e.g. cushions, foam inserts);

(c) disposal and issue of non-reusable items (e.g. earplugs, comfort pads);

(d) repairs to damaged equipment;

(e) inspection for defects; and

(f) an adequate stock of replacement parts.

8.2 Cleaning

8.2.1 *General*

Hearing protectors should be kept in a clean and hygienic condition. If no recommended cleaning instructions are provided by the manufacturer then Clauses 8.2.2 and 8.2.3 provide suitable cleaning methods.

8.2.2 *Re-usable earplugs and ear canal caps*

Re-usable earplugs and ear canal caps should be washed with soap or household detergent and water after each use. It is important that they are rinsed and allowed to dry before the next use.

8.2.3 *Earmuffs*

Sealing cushions should be wiped clean before and after each use, removing dirt and perspiration. Many earmuff suppliers suggest cushion replacement every 3 to 6 months. Perspiration covers should be replaced as required. If used every day, the cushions should be thoroughly washed with soap or detergent and water at least once a week. The headband, foam inserts and insides of the cups should be cleaned as often as necessary to keep them in a hygienic condition.

8.2.4 *Electronic/communications equipment*

Hearing protectors incorporating electronic components, e.g. microphones, loudspeakers, radio transceivers, batteries, connectors and similar may require alternative cleaning procedures without the use of water. In these cases, detailed manufacturer's instructions should be obtained.

8.3 Storage

Hearing protectors should be located as close as is practicable to the workplace. The following shall be observed for storage and protection:

(a) The storage area shall be positioned so that hearing protectors can be fitted before exposure to excessive noise.

(b) Personal issue hearing protectors shall be marked and stored in such a way that the risk of mistaken identity is minimized or eliminated.

(c) Hearing protectors shall be kept clean and dry and away from oil, dust, exposure to corrosive chemicals and atmospheres to avoid deterioration.

(d) Equipment not permanently issued to individuals (e.g. earmuffs for visitors) shall be stored close to the most likely point of use outside the area affected by excessive noise.

8.4 Maintenance

Continued use of the hearing protectors will necessitate periodic repair or replacement of their components. Such repairs and parts replacement should be carried out in accordance with the manufacturer's recommendations. Equipment manufacturers supply literature which details the components of their hearing protectors and also includes servicing information. The manufacturer will also provide replacement parts for re-usable equipment. Replacement parts for hearing protectors shall be those approved by the manufacturer of the equipment.

9 INSPECTION FOR DEFECTS

9.1 General

An important part of a hearing protector program is inspection of the hearing protectors. If performed carefully, inspections will identify defective or damaged hearing protectors.

9.2 Inspection schedules

All re-usable hearing protectors should be inspected—

(a) before and after each use by the wearer;

(b) during cleaning; and

(c) at regular formal inspections by a competent person.

9.3 Inspection considerations

Table 1 itemizes some of the primary defects to look for when inspecting a hearing protector and suggested actions are also given. It may be necessary to contact the manufacturer of the equipment or the equipment vendor.

TABLE 1

INSPECTION CONSIDERATIONS

Hearing protector	Inspection procedure Inspect for	Suggested action
Reusable earplugs or ear canal caps	Dirt and grease	Clean thoroughly
	Cracks	Replace
	Distortion	Replace
	Damage or slackening of the spring headband, if present	Replace
Sealing cushion of earmuffs	Dirt and grease	Clean thoroughly
	Hardening due to perspiration	Replace sealing cushion
	Physical damage to the cushion surface	Replace sealing cushion
	Difficult or inadequate attachment to the cup	Replace sealing cushion
Cups of earmuffs	Dirt and grease	Clean thoroughly
	Dirty or old foam insert	Replace foam inserts
	Cracks or other damage to cup	Replace cup if possible, or entire earmuff
	Secure attachment to headband	Replace necessary parts or entire earmuff
Headband of earmuff	Dirt and grease	Clean thoroughly
	Functioning size adjustment mechanism, making sure that the headband stays in the desired position when adjusted	Tighten or replace necessary parts
	Deformation of the headbands. Headbands may be subject to deformation (this may be due to abuse or careless handling or storage, or exposure to extreme heat and humidity) and should be checked for geometry against an unused, undamaged example of the protector if there is any suspicion of loss of clamp force (see Note)	Replace
	Correct attachment to ear cups	Replace

NOTE: A better indication of the clamp force can be obtained by using the simple procedure outlined and illustrated in Appendix C.

10 HEARING PROTECTOR AREAS

10.1 Identification of excessive noise areas

Any area where people may be exposed to noise above the noise exposure criteria should be identified as a 'hearing protector area'. Every entrance to a hearing protector area should be clearly marked with appropriate signs (see AS 1319). Temporary noise areas should also be signposted as appropriate.

10.2 Entry into excessive noise areas

Before entry into any area where hearing protectors may be required, it is essential that the nature of the noise and the noise exposure level be known. Entry into such areas should be restricted to wearers of the appropriate hearing protector. All people entering the area shall be aware of the need to wear hearing protectors and the need to wear the protectors at all times while remaining within the hazard area (see Figure 1).

However, care should be taken to avoid wearing hearing protectors with a higher attenuation than required for a particular area. For instance, if a person routinely works in two job locations, one of which is a high-noise area, and the other is a medium or light-noise area, appropriate hearing protectors should be worn (see Clause 6.2.2).

10.3 Use of excessively noisy equipment

Where excessively noisy equipment is used and sign-posting is not practicable, alternative arrangements should be made to ensure that people can recognize circumstances in which hearing protectors are required. Methods of achieving this include—

(a) attaching prominent warning notices to tools and equipment indicating that hearing protectors must be worn when operating them; and

(b) providing written and verbal instructions on how to recognize circumstances in which hearing protectors are needed.

10.4 Correct use of hearing protectors

People entering areas where hearing protectors are required should only do so under the condition that the hearing protector is worn correctly and at all times. Special attention should be paid to the correct placement of headbands and earcups. Temporary removal of hearing protectors during voice communication should be discouraged (see Figure 1).

11 ENSURING THE CONTINUED EFFECTIVENESS OF THE HEARING PROTECTOR PROGRAM

The following steps should be taken to maximize the effectiveness of the hearing protector program:

(a) *Monitoring of noise levels* The noise levels within a workplace will vary as changes are made. This will include changes in operational procedures and processes, installation of new plant and machinery and the implementation of engineering noise controls.

As a matter of routine, noise measurements should be carried out in such a way that they become formal records of changes in levels or the continuing conditions. In this way improvements in noise conditions can be publicized and variations in the requirements for hearing protection can be met. If noise conditions are found to deteriorate, immediate remedial action can be adopted.

(b) *Program auditing* The actual hearing protector program should be audited at least annually. Adjustments should be made to the provision of hearing protection in accordance with the results of the audit. Audits are to be conducted with respect to the standard operations procedure as outlined in Clause 4.

(c) *Cleaning, inspection and maintenance* Hearing protectors should be regularly cleaned, inspected for defects and repaired or replaced as necessary, as detailed in Clauses 8 and 9.

(d) *User awareness* In order to ensure the continued effectiveness of a hearing protector program, wearers of hearing protectors require periodic re-education to restate the need for protection.

NOTE: This can be done through a modified version of Appendix D.

Management responsibility for the hearing protector program includes maintaining the continued awareness of the need for hearing protection. All opportunities should be used to maintain this awareness. For example, during regular hearing protector maintenance procedures the opportunity exists to again emphasize the importance of hearing protection.

12 TRAINING IN THE USE OF HEARING PROTECTORS

12.1 General

Occupational health and safety legislation requires personnel to be adequately trained and supervised to carry out their work safely.

When a hearing protector program is adopted, training shall be given. This shall occur at the commencement of employment, at routine intervals thereafter and at any time when equipment or circumstances change. The frequency of retraining will depend on the complexity of the program and the degree of the hazard, but shall be at least annually.

People who need to wear protectors shall be trained in their correct use and limitations. Managers need to be trained in their responsibilities for training and inspection.

Special care should be taken when training non-English-speaking persons or those speaking English as a second language to ensure that instructions are fully understood.

NOTES:

1 For a recommended structure of a training program, see Appendix D.

2 Training in noise control management should also be provided for relevant personnel (see AS/NZS 1269.2).

12.2 The training program

12.2.1 *General*

Training of all personnel is necessary, particularly to gain the necessary level of understanding and acceptance of the hearing protector program and its goals. The training program should commence with management-supported talks to provide expert advice on the importance of protecting hearing and the correct use of hearing protectors.

12.2.2 *Substance*

Instruction should include a description of hearing, the harmful effects of noise, the desirability of noise control, the role of audiometry and the purpose use, care and maintenance of hearing protectors. Emphasis should be placed on the social handicaps of noise-induced hearing loss.

12.2.3 *Training methods*

It is important to encourage free discussion so that any doubts, misconceptions, or objections may be expressed openly and answered immediately.

These talks should be prepared by a competent person and ideally presented by the same person. Various methods, including visual presentations and interpreters, could be used to ensure understanding by non-English speaking persons.

NOTE: There is usually little difficulty in motivating people to use hearing protectors in very noisy environments. Special attention should be paid to people exposed to lower, but nevertheless potentially hazardous, noise levels.

13 AUDIOMETRY AND THE PURPOSE OF AUDIOMETRIC TEST RESULTS

Audiometric testing of regular users of hearing protectors may be used for four distinct purposes—

(a) the identification and documentation of existing hearing loss;

(b) the early detection of deterioration of hearing in users of hearing protectors;

(c) the prompt direction of those individuals who are identified as having a hearing loss to an appropriate rehabilitation program; and

(d) the supply of any special communication or warning system that may be required within the workplace for an individual with a hearing loss.

Audiometric testing should NOT be used as a monitor of noise control measures that may have been implemented. Audiometric testing cannot determine the cause of any hearing damage or noise injury. Should such a hearing loss be detected, a comprehensive study should be undertaken to determine its cause.

When carrying out audiometric assessment for an individual, discussions should be used as a further training opportunity to reinforce the objectives of the hearing protector program.

Recommended procedures for carrying out audiometry and acting on the results are provided in AS/NZS 1269.4.

APPENDIX A

METHODS OF SELECTING A HEARING PROTECTOR WHEN $L_{Aeq,8h}$ EXCEEDS $L(crit)_{Aeq,8h}$

(Normative)

A1 SCOPE

This Appendix describes the methods to be used to select a hearing protector when the $L_{Aeq,8h}$ exceeds $L(crit)_{Aeq,8h}$.

A2 SELECTION RULES

A2.1 Classification method

If $L_{Aeq,8h}$ is less than 110 dB(A) and the noise exhibits none of the characteristics mentioned in Paragraph A2.2 then the classification method should be used (see Paragraph A3.1).

NOTE: More information about the classification method is given in Appendix E.

A2.2 Octave-band method

If $L_{Aeq,8h}$ is greater than or equal to 110 dB(A), if the noise is narrow band in character with significant tonality or has significant high or low frequency components or exhibits other complexities, then the octave-band method (see Paragraph A3.2) shall be used. The attenuation of the selected hearing protector shall be such that $L(eff)_{Aeq,8h}$ is less than $L(crit)_{Aeq,8h}$.

A2.3 Other selection procedures

There are several other selection procedures not covered in this Appendix which can also be used to select hearing protectors (e.g. the SLC_{80} or HML procedures). An alternative procedure may be used, provided the attenuation of the selected hearing protector is such that $L(eff)_{Aeq,8h}$ is less than $L(crit)_{Aeq,8h}$. Attenuation values shall be mean minus standard deviation values derived from attenuation measurements made in accordance with AS/NZS 1270.

A3 SELECTION METHODS

A3.1 Classification method

A3.1.1 *General*

To use this method it is necessary to know only the $L_{Aeq,8h}$ value to which the wearer is exposed.

A3.1.2 *Procedure*

In Column 1 of Table A1 find the range within which $L_{Aeq,8h}$ falls. Select a hearing protector from the corresponding Class given in Column 2 of Table A1. In general, over-protection is to be avoided. (See Clause 6.2.2.)

TABLE A1

CLASS OF HEARING PROTECTOR REQUIRED

$L_{Aeq,8h}$, dB(A)	Class
Less than 90	1
90 to less than 95	2
95 to less than 100	3
100 to less than 105	4
105 to less than 110	5
Greater than 110 or equal to 110	See A2.2 and seek specialist advice

NOTE: See Clause 6.2.3 and Figure 1 before using above Table.

Table A1 for the selection of hearing protectors according to the classification method applies for organizations who have set $L(\text{crit})_{\text{Aeq,8h}}$ as 85 dB(A). An example is provided in Paragraph A3.1.3.

If an alternative $L(\text{crit})_{\text{Aeq,8h}}$ is chosen then Table A1 will require adjustment in use. An example of adjustment if an $L(\text{crit})_{\text{Aeq,8h}}$ of 80 dB(A) is adopted is provided in Paragraph A3.1.4.

A3.1.3 *$L(crit)_{Aeq,8h}$ of 85 dB(A)*

Assuming an $L(\text{crit})_{\text{Aeq,8h}}$ of 85 dB(A), and if a person is exposed to noise with a $L_{\text{Aeq,8h}}$ of 97 dB(A) a Class 3 hearing protector is suitable.

A3.1.4 *$L(crit)_{Aeq,8h}$ of 80 dB(A)*

Assuming an $L(\text{crit})_{\text{Aeq,8h}}$ of 80 dB(A), and if a person is exposed to noise with a $L_{\text{Aeq,8h}}$ of 97 dB(A) a Class 4 hearing protector is suitable.

A3.2 Octave-band method

A3.2.1 *General*

This method involves subtracting the octave-band attenuation of the hearing protector from the octave-band levels of the noise in which the hearing protector is worn, then calculating the A-weighted sound level of the resulting attenuated spectrum.

A3.2.2 *Procedure*

Use of this method requires measurement of the $L_{\text{eq},T}$ octave-band levels of the noise to which a person is exposed. For a given hearing protector the procedure for calculating $L(\text{eff})_{\text{Aeq}}$ is as follows:

(a) *Step 1* In each octave, subtract the mean-minus-standard deviation octave-band attenuation of the hearing protector from the octave-band levels of the noise to which the wearer is exposed.

NOTES:

1 The mean-minus-standard-deviations are used as estimates of the attenuations obtained or exceeded by approximately 80% of wearers.

2 If the noise has significant low or high frequency components, the 63 Hz and 16 kHz octave-bands should be included into the calculations. For the 63 Hz and 16 kHz octave-bands, use the mean-minus-standard deviation values for the 125 Hz and 8 kHz octave-bands respectively. The A-weighted corrections at 63 Hz and 16 kHz are –26 dB and –7 dB respectively.

(b) *Step 2* Add the A-weighting corrections (see Table A2) to the octave-band levels obtained from Step 1.

TABLE A2

A-WEIGHTING CORRECTIONS

Octave-band centre frequency, Hz	125	250	500	1000	2000	4000	8000
A-weighting correction, dB	−16	−9	−3	0	+1	+1	−1

(c) *Step 3* Combine the octave-band levels obtained from Step 2 to obtain $L(\text{eff})_{\text{Aeq}}$.

A3.2.3 *Example*

This Paragraph provides an example of the octave-band method procedure.

In this example a person is exposed to a noise having the octave-band levels given in Table A3.

TABLE A3

EXAMPLE OCTAVE-BAND LEVELS

Octave-band centre frequency, Hz	125	250	500	1000	2000	4000	8000
Octave-band level, dB re 20 μPa	103	105	107	102	97	99	92

It is required to select a hearing protector so that $L(\text{eff})_{\text{Aeq}}$ is less than 85 dB(A). An earmuff with the attenuation characteristics given in Table A4 is considered.

TABLE A4

EXAMPLE ATTENUATION OF AN EARMUFF

Octave-band centre frequency, Hz	125	250	500	1000	2000	4000	8000
Attenuation (mean-minus-standard deviation), dB	11	17	26	34	35	35	25

To work out whether the earmuff has sufficient attenuation proceed as follows:

(a) *Step 1* Subtract the mean-minus-standard deviation octave-band attenuation of the hearing protector from the octave-band levels of the noise (see Table A5).

TABLE A5

CALCULATION TO OBTAIN ATTENUATED LEVELS

Octave-band centre frequency, Hz	125	250	500	1000	2000	4000	8000
Octave-band level, dB re 20 μPa	103	105	107	102	97	99	92
Attenuation (mean-minus-standard deviation), dB	11	17	26	34	35	35	25
Attenuated levels	92	88	81	68	62	64	67

(b) *Step 2* Add the A-weighting corrections to the octave-band levels obtained from Step 1 (see Table A6).

TABLE A6

CALCULATION TO OBTAIN A-WEIGHTED ATTENUATED LEVELS

Octave-band centre frequency, Hz	125	250	500	1000	2000	4000	8000
Attenuated levels from Step 1	92	88	81	68	62	64	67
A-weighting correction, dB	−16	−9	−3	0	+1	+1	−1
A-weighted attenuated levels	76	79	78	68	63	65	66

(c) *Step 3* Combine the A-weighted attenuated levels obtained from Step 2 according to the following equation to obtain $L(\text{eff})_{\text{Aeq}}$:

$$L(\text{eff})_{\text{Aeq}} = 10 \log_{10} \sum_{i=1}^{i=7} 10^{(L_i/10)}$$

where L_i = the A-weighted attenuated level in the ith octave-band.

Using the data from the above example—

$$L(\text{eff})_{\text{Aeq}} = 10 \log_{10} \left(10^{76/10} + 10^{79/10} + 10^{78/10} + 10^{68/10} + 10^{63/10} + 10^{65/10} + 10^{66/10}\right)$$

$$= 83 \text{ dB(A)}$$

(d) *Result* The calculations show that $L(\text{eff})_{\text{Aeq}}$ is 83 dB(A), 2 dB less than the 85 dB(A) target. It is concluded that the earmuffs have sufficient attenuation for use in this noise.

NOTE: The process outlined in Paragraph A3.2.3 may be repeated using data on a number of hearing protectors to obtain a range of devices from which the a suitable selection may be made. The calculations may be best performed using a computer spreadsheet.

APPENDIX B

METHOD FOR SELECTING A HEARING PROTECTOR WHEN L_{peak} EXCEEDS $L(\text{crit})_{peak}$

(Normative)

B1 GENERAL

There is no standard method for quantifying the attenuation of hearing protectors to impulse sound. As a result, there is no standard method for defining a quantity '$L(\text{eff})_{peak}$', calculating its value and comparing it with $L(\text{crit})_{peak}$, analogous to the method given in Appendix A for calculating and comparing $L(\text{eff})_{Aeq,8h}$ with $L(\text{crit})_{Aeq,8h}$. Until a suitable method is available, the following rules shall be used for selecting hearing protectors for use in noise with an L_{peak} value greater than the value of $L(\text{crit})_{peak}$ or 140 dB, whichever is the lower.

B2 SELECTION RULES

B2.1 Impulse noise from impacts, small-calibre weapons or tools

Hearing protectors having a classification of 5 shall be used.

B2.2 Impulse noise from large-calibre weapons and blasting

Well-fitted earplugs having a classification of at least 3 in combination with earmuffs of any classification, shall be worn.

APPENDIX C

HEADBAND CLAMP FORCE COMPARISON

(Informative)

C1 GENERAL

The headband of an earmuff type hearing protector may become deformed due to abuse, careless handling or storage or exposure to extremes such as heat or humidity. If there is any suspicion that the headband may have suffered loss of clamp pressure, a comparative test can be made by using a simple set of electronic scales (see Paragraph C2), or by comparing the suspected headset with an undamaged, unused headset.

C2 CONSTRUCTION

A set of electronic scales (e.g. office letter scales) can be used for comparing headband clamp force as follows:

(a) Stand the scales on end.

(b) Add a backing, such as a small box to make the thickness of the construction 145 ±2 mm (this is the spacing required in AS/NZS 1270).

(c) Place the earmuffs over the construction, so that one of the cups is resting on the centre of the weighing tray of the scales (see Figure C1).

(d) Compare the resulting readings between the used and the unused pair. These readings should not differ by greater than ±20%.

NOTE: When testing various models, each model should be fitted around the scales in the same position.

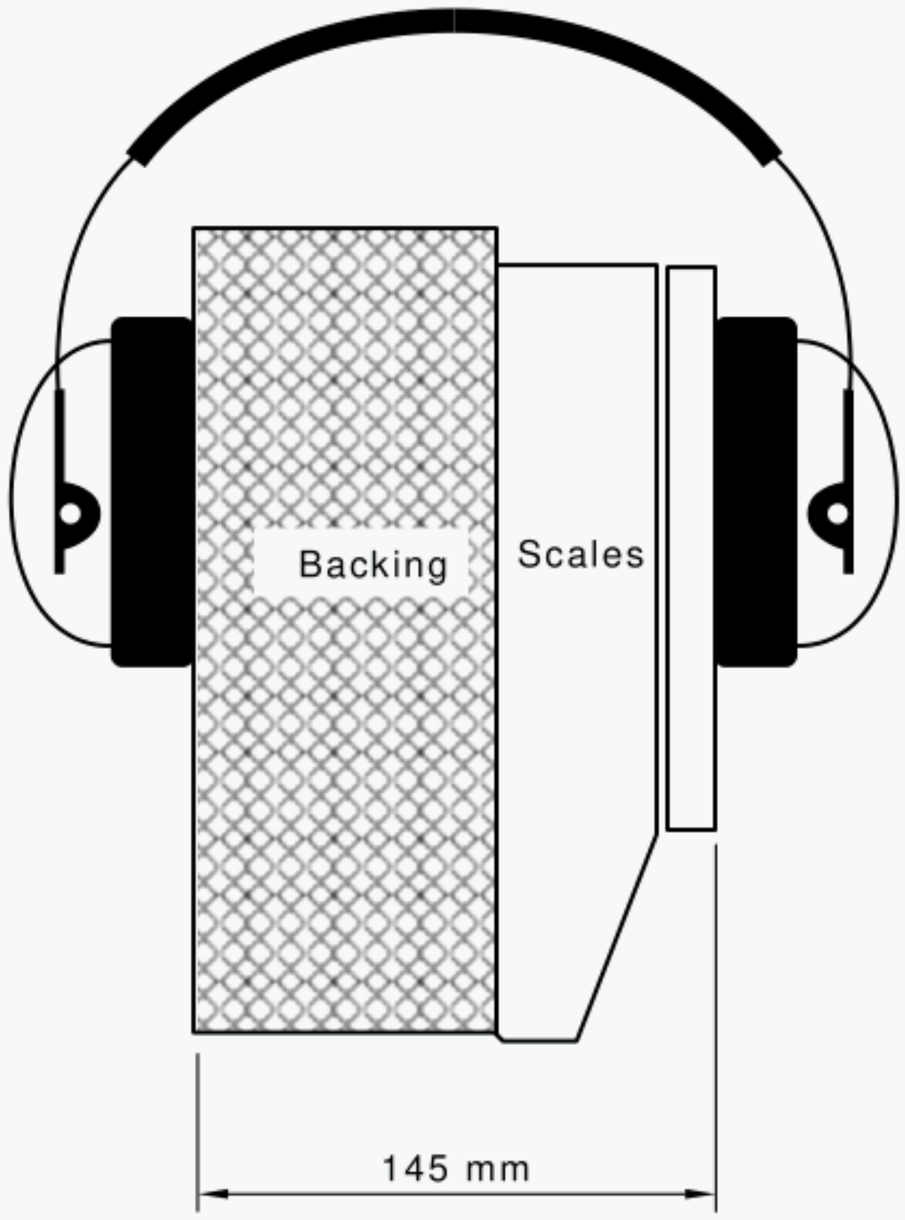


FIGURE C1 USE OF ELECTRONIC SCALES FOR HEADBAND CLAMP FORCE COMPARISON

APPENDIX D

TRAINING PROGRAM FOR THE SELECTION, USE AND MAINTENANCE OF HEARING PROTECTORS

(Informative)

D1 OUTLINE

The format of this Appendix allows the instructor to adapt the training program to the individual requirements of the facility. This may be accomplished in the following way:

(a) Where indicated, record the appropriate information for your facility, e.g. which types of noise are present, what are their sources and in what location or for what task are the hearing protectors required?

(b) Refer to specific information in this Standard, e.g. a discussion on the various types of hearing protectors available. People may not be aware of all types, but only those that they will encounter in the workplace. Therefore, when the guide indicates that the information is to be at that point in the presentation, only the relevant parts of the Standard need be utilized.

D2 FORMAT

When planning a training session, remember that trainees usually retain only about 20% of what they hear, about 40% of what they see and about 70% of what they both see and hear. For the best results, therefore, a program of lectures supplemented by audiovisual presentations and demonstrations, is recommended. The following suggestions are made to help increase the effectiveness of the training program:

(a) Cover the material suggested in the Appendix (see Paragraph D4).

(b) Use visual aids to emphasize major points.

(c) Illustrate specific areas with personal experiences or accounts related to the subject.

(d) Have samples of the hearing protectors used in your facility available during the training session and highlight areas concerned with their selection, use and maintenance.

(e) Supplement the material in this Standard with company operating procedures or instructional material supplied by the equipment manufacturer/supplier.

D3 INSTRUCTIONS TO TRAINEES

An integral part of the training program is the free exchange of information and questions between instructor and trainees. Therefore, the following comments (made by the instructor) are suggested at the beginning of the training session:

(a) During this session your full participation is needed.

(b) If you do not understand what is being discussed, ask questions.

(c) If you have any personal accounts and experiences on the subject to contribute, share them with us.

(d) If you have any of your own ideas to contribute, give us the benefit of your experience.

(e) Finally, if there is any additional information or guidance you require, please ask.

D4 GUIDE FOR THE SELECTION, USE AND MAINTENANCE OF HEARING PROTECTORS

D4.1 Brief overview of noise, hearing and program

The following should be included:

(a) *How the ear works* Including how hearing loss occurs and how hearing is tested (audiometry).

(b) *Types of noise* Including low and high frequency noise, constant and intermittent noise and impulse noise.

(c) *Noise levels and noise measurement* Include discussion of the concept of decibels and noise exposure. Give illustrations of various noise levels, ranging from a soft whisper to a jet engine.

(d) *Noise areas and the types of noise occurring in those areas* Identify high noise areas in the relevant workplace, e.g. by showing a floor plan of the premises.

(e) *Management responsibilities related to the hearing protector program.*

D4.2 Reasons for wearing hearing protectors

The following should be included:

(a) *The importance of hearing preservation* Including the difficulties experienced by people with hearing impairments, i.e. without sounding alarmist or using scare tactics, discuss the social isolation and psychological problems associated with mild and severe hearing loss.

(b) *Relevant legislation* Discussion of the relevant noise exposure criteria and management and staff obligations.

(c) *Engineering controls* Explain what engineering controls are in place, such as shields and enclosures and their limitations, resulting in the continuing need for wearing hearing protectors.

D4.3 Selection of hearing protectors

The following should be included:

(a) *Noise assessment* Including identification of noise areas and tasks and the types of noise encountered over a work shift.

(b) *Selection* Including types of hearing protectors, the benefits, drawbacks and limitations of hearing protectors, the importance of correct attenuation and the effects of overprotection (isolation, poor communication).

D4.4 Use and proper fitting of hearing protectors

The following should be included:

(a) *Fitting techniques* Incorporate individual fitting demonstrations of hearing protectors for each trainee.

(b) *The importance of comfort* Discuss hot and cold environments, perspiration, dirt and dust, sensitive ears and hearing protectors used in combination with other safety equipment, e.g. hard hats, respirators, goggles and similar.

(c) *Good and bad habits* Emphatically discourage modification of the hearing protector and casual or slack behaviour. Encourage washing of hands before adjusting earplugs and similar.

(d) *Medical factors* Such as physiological and psychological considerations. See Clause 6.7.2.

D4.5 Wear time

Include the importance of wearing the hearing protector at all times while in the work area, i.e. explain the accumulating effects of noise and the highly destructive effects of removing the hearing protector even for a very short time (see Figure 1).

D4.6 Maintenance and storage

The following should be included:

(a) *Cleaning* Give a practical demonstration.

(b) *Storage* Show where and how the equipment is to be stored.

(c) *Inspection for defects and replacement of defective parts* Give a practical demonstration.

(d) *Fault reporting* Explain what to do if any problem occurs.

D4.7 Summary

The following should be included:

(a) Noise and hearing.

(b) Types and selection of hearing protectors.

(c) Use and proper fitting.

(d) Wear time.

(e) Storage and maintenance.

(f) Questions, queries and discussion.

APPENDIX E

CLASSIFICATION OF HEARING PROTECTORS

(Informative)

The use of the classification method is intended to simplify the process of the selection of appropriate hearing protectors for those working in the field. With the classification method the only required information is the $L_{Aeq,8h}$. However, like all simplified systems certain assumptions and approximations have been made. If you have any doubt as to the classification system applicability then either consult someone more experienced or use the octave-band method. The relationship between class and SLC_{80} is given in Table E1.

TABLE E1

RELATIONSHIP BETWEEN CLASS AND SLC_{80} OF HEARING PROTECTOR

Class	SLC_{80} range
1	10 to 13
2	14 to 17
3	18 to 21
4	22 to 25
5	26 or greater

NOTES:

1 The SLC_{80} values in Table E1 are rounded to the nearest integer.

2 For further information on SLC_{80} refer to AS/NZS 1270.

3 See Clause 6.2.3 and Figure 1 before using the above Table.

APPENDIX F

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NOTES

NOTES

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