

Noise Control – Hearing protection

Guidance on selection, use and fit of hearing protectors

June 2017

Background

Employers must ensure employees' exposure to noise does not exceed the exposure standard by implementing the following hierarchy of control measures:

- eliminate the source of noise
- substitute noisy plant for quieter plant or processes or implement engineering controls
- use administrative controls
- provide hearing protection.

The noise exposure standard set out in the Occupational Health and Safety Regulations 2017 is an 8 hour average of 85dB (A) and a peak noise level of 140dB(C) at the employees ear position. Workplace noise that exceeds the noise exposure standard is considered dangerous to employees and must be controlled in accordance with the hierarchy of control.

Employers must apply each level of the hierarchy so far as is reasonably practicable before moving down to the next control measure. This means that an employer cannot go straight to hearing protection without first implementing higher level controls, so far as reasonably practicable.

Often a combination of control measures are required to effectively control risks associated with workplace noise.

When are hearing protectors required?

An employer must provide hearing protectors when employee exposure to noise cannot be reasonably eliminated or reduced to below the noise exposure standard using substitution, engineering and administrative controls.

Hearing protection is considered the least effective and least reliable noise control measure for the following reasons:

- they do not reduce noise at the source
- they are often not fitted properly and not always worn when required

- some types of hearing protection may result in overprotection which can isolate the wearer from their surroundings, make communication more difficult and make warning signals such as sirens or reversing forklifts more difficult to hear
- hearing protectors can be uncomfortable (hot, sweaty, clamping force) when worn for prolonged periods which may make employees less likely to use them diligently
- ear plugs may present hygiene issues and potential ear infections when used in dirty environments.

Hearing protectors should be used in combination with higher level risk control measures to protect employees from workplace noise.

Types of hearing protectors

Common types of hearing protectors are earmuffs, earplugs and ear canal caps.

Earmuffs

Ear muffs (figure 1) fit most people, are hygienic, easy to fit correctly and suitable for use in dirty areas. Ear muffs are also suitable for employees with a medical condition preventing them from inserting earplugs into their ears. However, earmuffs may be uncomfortable to wear for prolonged periods due to the weight and clamping force of the headband.

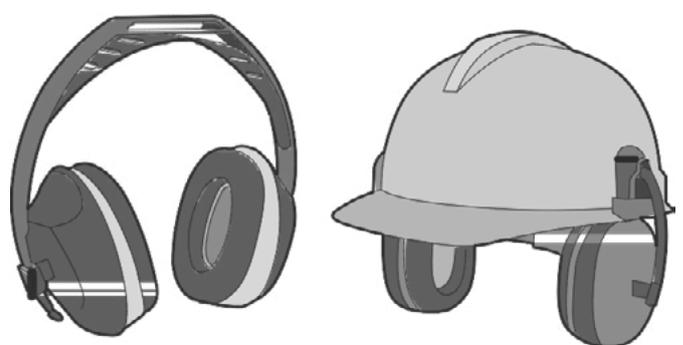


Figure 1: Examples of earmuffs

Earplugs

Earplugs (figure 2) may be made from expandable foam, pre-moulded reusable material, or custom moulded to an employee's ear canal. Earplugs tend to be more comfortable than earmuffs when used for long periods of time, particularly in hot or humid work environments. The level of protection provided by earplugs is highly dependent on achieving a good fit.

Expandable foam ear plugs are rolled up into a thin tube and inserted into the ear canal. The use of these types of earplugs may present hygiene issues when used in dirty work environments.

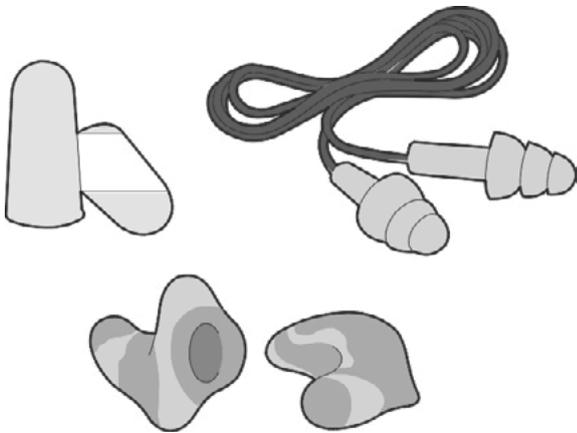


Figure 2: Top left - foam plugs, top right - reusable plugs, and bottom - custom moulded plugs

Reusable ear plugs are usually made of silicone or similar materials and are inserted or pushed into the ear canal. These plugs are washable and can be used in dirty environments as they don't need to be handled or rolled like expandable foam plugs. Custom moulded earplugs provide a high level of protection as they are moulded specifically for the wearer's ear canal.

Ear canal caps

Ear canal caps (figure 3) are usually on a headband and seal the entrance to the ear canal. They are not inserted into the ear canal. These are usually more convenient when they have to be taken on and off (eg when passing through noisy areas or being in noisy areas for very short periods of time). However, ear canal caps generally provide less noise protection.

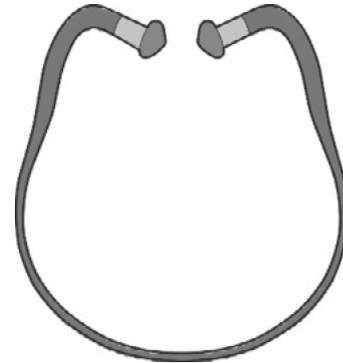


Figure 3: Example of ear canal caps

Selection of hearing protectors

It is important to ensure that the hearing protector chosen provides adequate protection and is worn at all times in noisy areas. Moreover, hearing protectors should not reduce noise exposure to below 75 dBA. This is because overprotection may isolate an employee from their surroundings, make communication more difficult and warning signals such as sirens and reversing forklifts, difficult to hear.

The following factors need to be considered when selecting hearing protectors:

- level of noise reduction (attenuation) provided
- compliance with AS/NZS 1270:2002, *Acoustics – Hearing protectors*
- compatibility with job requirements such as working in hot environments
- using other protective equipment such as helmets and goggles that may affect the hearing protector
- comfort for the wearer to ensure that they are fitted properly and worn
- hygiene and the potential for ear infections in unhygienic or dirty work environments
- safety considerations including overprotection and the ability to hear warning signals.

Information about Noise Control – Hearing protection

Selection of hearing protectors based on noise reduction (attenuation) required.

The main methods of selecting a hearing protector include the **octave band method**, the **SLC₈₀ method** and the **classification method**. These methods are described in AS/NZS 1269.3:2005 - Occupational noise management – Part 3 – Hearing protector program. Of these, the classification method, is the simplest and most widely used.

The **classification method** rates hearing protectors from Class 1 to 5. To use this method, it is necessary to know the employee's eight hour exposure level (LAeq8h) and then select the class of protector as indicated in the table below. The corresponding SLC80 values are also shown in the table below.

Relationship between class and SLC₈₀ of hearing protector

Class	SLC80 range	LAeq8hr dB(A)
1	10 - 13	Less than 90
2	14 - 17	90 to less than 95
3	18 - 21	95 to less than 100
4	22 - 25	100 to less than 105
5	26 or greater	105 to less than 110

Table 1: Modified Table E1, AS/NZS 1269.3

The Class, SLC₈₀ value and the noise reduction (attenuation) data at various frequencies (for the octave method) are usually described in packaging or on the hearing protector itself.

Earplugs and earmuffs used together

If a high level of protection is required because of excessive noise levels, earplugs and earmuffs can be used in combination. It is important to note that when earplugs and earmuffs are worn together the noise reduction provided by the individual hearing protectors cannot be added together to give the combined noise reduction.

For example:

Protector A - SLC80 = 26 dB

Ear plug - SLC80 = 22 dB

Protector A and ear plug worn together = 35 dB

Information on the combined noise reduction may be available from the manufacturer. As a general rule add 5 dB to the higher value to estimate the total noise reduction.

Wearing hearing protectors

Employers should ensure employees wear hearing protectors when and where they are needed and for the entire time they are needed. Removing hearing protectors even for short periods of time can significantly decrease the protection provided.

Table 2 below illustrates how the protection provided by a hearing protector rated at 30dB is affected when it is not worn for short periods of time.

Percentage of exposure time worn	Effective protection (dB(A))
100%	30
98.6%	18
84%	8

Table 2: Effective protection vs percentage of exposure time worn

As shown above, if hearing protection is worn 98.6 per cent of the exposure time it only provides 18 dB overall reduction instead of 30dB. Similarly, if it is worn for 84% of the time, it only provides an effective reduction of 8dB instead of 30 dB.

Therefore, it is better to select a protector that is comfortable as it is more likely to be worn during the entire exposure rather than selecting a high noise reduction protector that may be uncomfortable and likely to be removed for short periods of time.

Involving employees in the selection of hearing protectors where they are able to personally trial and choose their own device may assist in ensuring their use. Managers and supervisors should also encourage the use of hearing protectors by setting an example themselves and providing supervision to ensure hearing protectors are worn at all times where required.

Information about Noise Control – Hearing protection

Education and training

Employers must provide employees with all the information, instruction, training and supervision necessary to enable them to perform their work in a way that is safe and without risk to their health.

Employers should provide employees with instructions on how to correctly fit, use, clean, maintain and store their hearing protectors (in accordance with manufacturer instructions).



Figure 4: How to correctly fit earplugs.

Signage requirements

If hearing protectors are used to control employee noise exposure, employers should clearly identify when and where the hearing protectors are to be worn. This may include signposting areas or rooms or by labeling plant.



Figure 5: Example of a hearing protection sign

Signs used to identify these areas should conform to AS 1319 - *Safety signs for the occupational environment*. An example of a suitable sign is illustrated in Figure 5 above.

Hearing tests (audiometric testing)

If hearing protectors are required to be worn to control noise exposure below the standard, then hearing tests (audiometric testing) are required.

Further information

Contact the WorkSafe Victoria Advisory Service on **1800 136 089** or go to **worksafe.vic.gov.au**

WorkSafe Publications

Noise Control – A step by step approach

Noise Control – Circular saws

Noise Control – Compressed air noise

Noise Control – Enclosures, barriers and screens

Noise Control – Fan and ventilation noise

Noise Control – Grinders

Noise Control – Hearing protection

Noise Control – Impact, vibration and materials handling noise

Guidance Note: Audiometric (hearing) testing

AS/NZS

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

AS/NZS 1270:2002, Acoustics - hearing protectors

AS 1319 - Safety signs for the occupational environment

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This guidance has been reviewed and updated for the sole purpose of amending year and regulation references relating to the Occupational Health and Safety Regulations, in line with amendments which came into effect on 18 June 2017.