

Fact Sheet - Hearing Protective Devices (HPDs)

When the noise levels exceed the threshold exposure limit (TLV), 8-hour, time-weighted average (TWA) of 85 decibels (dBA) – you must reduce the noise exposure to or below the TLV. You must establish a hierarchy of control to reduce noise exposure, including engineering and administrative (work-practice) controls. If these types of controls are still insufficient to reduce exposure below the noise exposure limit (TLV), then hearing protection (PPE) is required in conjunction with the other controls to reduce exposures to the lowest achievable level.

The primary function of a hearing protection device is to reduce the amount of noise reaching the inner ear of the wearer. This will be achieved by:

- Completely covering the entire ear; or
- Covering the entrance to the ear canal.

There are two main types of hearing protective devices: earplugs and earmuffs.

- Earplugs fit in the outer part of the ear canal. To be effective, they must totally block the entire circumference of the ear canal with an airtight seal. They are available in different shapes and sizes and can be custom made. An improperly fitted, dirty, or worn-out plug will not seal and can also irritate the ear canal.
- Earmuffs fit over the entire outer ear – they will not seal properly over glasses, hats, or long hair. They are typically held in place by a headband that must be properly adjusted to hold the earmuff firmly around the ear.



Noise Reduction Rating (NRR)

The NRR is a scale that summarizes a hearing protection device's performance. NRR is labelled on every HPD. To calculate for noise reduction, HPD is subtracted from the C-weighted average noise level (over an 8-h period) to obtain the A-weighted noise level at the users ear. Where only the A-weighted average noise level is available, the NRR value for a HPD, minus 7 dB, is subtracted from the A-weighted average noise level to obtain the A-weighted noise level at the user's ear.

In the field, actual noise reduction by hearing protection devices is much less than in the lab, therefore NRRs should be adjusted from the manufacturers' claims:

- Earmuffs: Subtract 25% from the manufacturer's labelled NRR
- Foam earplugs: Subtract 50% from the manufacturer's labelled NRR

Effective Noise Level = Workplace noise level in dBA - (adjusted NRR - 7) (NIOSH Adjusted)

For example: Measured machine workshop noise level is 95 dBA

HPD: 3M Peltor Optime II earmuffs NRR of 31

Adjusted NRR = $0.25 \times 31 = 7.75$

$= 31 - 7.75 = 23.25$

Effective (attenuate) noise level when worn = $95 - (23.25 - 7)$

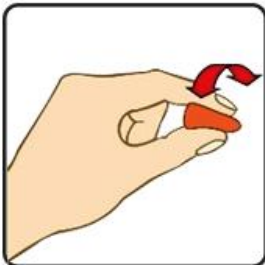
$= 78.75$ dBA

HPDs Fitting

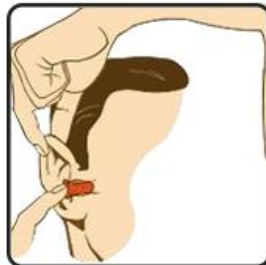
Proper fitting of ear plugs and ear muffs is important to ensure proper protection.

Ear Plugs

Instructions to Insert Earplugs



Firmly hold the earplug between your thumb and forefinger.



Reach over the head and pull your ear up and out to open the ear canal with the opposite hand.



Push the rounded tip of the earplug completely into the ear canal.



Here is the reusable earplug properly positioned into the ear canal.



You should do a quick fit check by performing visual and sound checks:

1. Visual Check - The earplug should sit well inside the ear canal and not stick out.



2. Acoustical Check - Cup hands over ears and release. Earplugs should block enough noise so that covering your ears with hands should not result in a significant noise difference.



The Goal is
ZERO

Ear Muffs

1. Place earcups over each outer ear



2. Adjust the headband by sliding the headband up or down at the attachment buttons



3. The ear cushions should seal firmly against the head



The Goal is



Figure 33 Problems of fitting earmuffs with long hair



Figure 34 Problems of fitting earmuffs with jewellery



Figure 35 Problems of fitting earmuffs with safety glasses

Ensure ear muffs completely sealed the ear as gaps will make it less effective.