Hearing Protection Guide – Quick Tips

It is estimated that approximately 22 million people in the U.S. are occupationally exposed to hazardous noise levels. One of the most common methods for minimizing worker exposure to these hazardous noise levels is the use of hearing protectors. Before selecting hearing protection for use in your facility, several questions should be considered, including:

- Are we required to provide hearing protection?
- Does the hearing protector provide adequate noise reduction?
- What types of hearing protectors are available?
- Is the hearing protector compatible with any other personal protective equipment (PPE) we are using?

This hearing protection guide will address these issues and provide some guidelines for selecting the most appropriate hearing protectors for your application.

Regulations

The use of hearing protectors is detailed in the Occupational Noise Exposure Standard – 29 CFR 1910.95. **Section (i)** of this standard states:

“Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels (dB) or greater at no cost to the employees.”

This section further requires that employers must provide their employees a variety of hearing protectors to choose from, training on use and maintenance of hearing protectors and ensure that hearing protectors are worn by all employees who meet the requirements of this standard.

Noise Reduction Rating

The **noise reduction rating (NRR)** is defined as the maximum number of decibels (dB) that the hearing protector will reduce the sound level when worn. **Section (j)** of 1910.95 states that the hearing protector should have a NRR sufficient to reduce employee exposure to a time-weighted average (TWA) of 90dB (or 85dB for employees who have had a standard threshold-shift). Appendix B of the same standard also provides some correction factors when using the NRR to assess the adequacy of the hearing protector.

1. If using a C-weighted TWA, subtract the NRR from the TWA to determine the attenuated noise level. (i.e. TWA[C] NRR = Attenuated Noise Level).*
2. If using an A-weighted TWA, first subtract 7dB from the NRR, then subtract the remainder from the TWA to determine the attenuated noise level. (i.e. A –

weighted TWA[A] (NRR – 7db) = Attenuated Noise Level).*

OSHA also recommends reducing the NRR by an additional safety factor of 50%; however, this is only a suggestion, and citations cannot be issued for not using this 50% reduction factor.

**For a full definition of the A and C weighting scales, see Appendix I of OSHA's Noise Exposure Standard.*

Types of Hearing Protection

A wide variety of hearing protection is available, each with their own unique set of advantages and disadvantages. The most common types are:

Disposable earplugs: These are the most common type of hearing protection. They are usually made of a PVC (polyvinyl chloride) or PU (polyurethane) foam. Disposable earplugs are compressed or rolled down prior to insertion, and then they slowly re-expand to fill the ear canal. These earplugs are usually available with or without a pre-attached cord and are usually one size fits all. (Some sized plugs may also be available.) This type of earplug is intended for single use. Disposable earplugs are not intended to be cleaned or reused.

Figure 1

Reusable earplugs: Made of flexible material, such as silicone, and tapered to fit the ear canal. These are intended to be reused and can be cleaned using soap and water. Available either corded or uncorded. While these are more durable than disposable earplugs, they typically have a lower NRR. Both reusable and disposable earplugs are small enough to be used with any other head/face/eye protective equipment, such as hard hats, face shields or safety glasses.

Figure 2

Hearing bands: Consist of a pair of earplugs connected to a flexible band, which can be worn in a number of positions (over the head, under the chin or behind the neck). The NRR of these bands is similar to most earplugs. The band allows this item to be stored around the neck while not in use. Depending on which position the band is worn

in, these can be used with most any hardhat, face shield or glasses.

Figure 3

Earmuffs: Rigid cups with soft cushions seal around the ears to block noise. Typically an earmuff with a higher NRR tends to be bulkier (larger cups with more sound-reducing insulation) than an earmuff with a lower NRR. Earmuffs are usually constructed of plastic materials (these are called **dielectric** and are ideal for work around electrical hazards) or a combination of metal and plastic for added durability. The three common designs of earmuffs are **over the head** (Figure 4a), **cap mounted** (Figure 4b) and **behind the neck** (Figure 4c). Cap-mounted earmuffs are designed to mount directly to most hard hats with side-accessory slots. Behind-the-neck style can also be used while wearing a hard hat or face shield.

Figure 4a

Figure 4b

Figure 4c

Electronic earmuffs: These provide the same hearing protection as standard earmuffs but also offer other features, such as AM/FM radio reception, two-way radio reception, active noise reduction or amplification of low sound levels.

Figure 5

Commonly Asked Questions

1. **Can earmuffs and earplugs be used together to provide more noise reduction?**
2. Yes. OSHA allows for earplugs to be worn underneath earmuffs. The NRR this will produce is calculated by adding 5dB to the NRR of whichever protector (the earplug or the earmuff) has the higher NRR. Keep in mind that this is after the necessary reduction factor of 7dB (if using the A – weighted scale) has been calculated. For example, if you were using an earplug with an NRR of 32dB with an earmuff with 27dB NRR, your noise reduction calculations would be:

- 32dB[A] (earplug) – 7db (OSHA Safety Factor) = 25dB
- 25dB + 5dB (for using earmuff and earplug together) = 30dB
- Total corrected NRR = **30dB**

Related Content

Hazard Assessment Form

Sources

29 CFR 1910.95, Occupational Noise Exposure
Centers for Disease Control and Prevention

applicable government regulations, industry standards, or other standards specific to your business and/or activities and should not be construed as legal advice or opinion. Readers with specific questions should refer to the applicable standards or consult with an attorney.

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