

Hearing Protection Information Sheet

Hearing protection must be worn by the following personnel:

- All employees exposed to an 8-hour time-weighted average (TWA) of 85 decibels (dBA) or more.
- Employees exposed to an 8-hour TWA or more who have experienced a standard threshold shift (STS)
- TCU requires all employees entering a designated “Caution” or “Warning” space (where noise exposure exceeds 85 dBA) to wear hearing protection, regardless of the duration of exposure.

Hearing Protection Comparison:

Type	Sample Image	Advantages	Disadvantages
Ear Plugs		• Can be worn with glasses. • More comfortable in hot/humid environments. • Offers higher attenuation than most muffs	• Must seal well/fit properly to ensure adequate protection
Ear Muffs		• More consistent protection. • Typically last longer than ear plugs.	• Protection level is decreased when wearing eye/safety glasses because the muff seal around the ear is broken by the eyeglass temple piece. • Can be uncomfortable to wear for long period in hot/humid environments.

Consumer Listening Devices

AirPods, earbuds, and music headsets are **not a substitute for hearing protection**. Most consumer earbuds use **Active Noise Cancellation (ANC)** technology, which electronically cancels drone-like sounds but does not provide a physical barrier against high decibel impact sound.

Noise Reduction Rating (NRR)

Noise Reduction Rating (NRR) indicates the potential amount of noise reduction provided by a hearing protector. The higher the NRR, the greater the potential protection. Hearing protectors used at TCU must be clearly labeled on the packaging. EHS will recommend an appropriate NRR based on the specific noise environment to ensure effective protection without compromising situational awareness.

Note: Because lab conditions differ from the real world, OSHA requires us to 'de-rate' the NRR. We subtract 7 from the NRR, and divide the remainder by 2 to find the actual protection level

Estimated dBA Exposure = TWA (dBA) – [(NRR – 7) X 50%]

Example: A 92 dBA TWA with earplugs rated NRR 33 results in an estimated protected exposure of 79 dBA.
 $92 - [(33 - 7) \times 50\%] = 79 \text{ dBA}$.

Single / Dual Hearing Protection:

Single hearing protection uses one device, such as earplugs or earmuffs. **Dual hearing protection** uses both devices together and is required where noise levels exceed 115 dBA.

Do not add the two NRR values together. Instead, **add 5 dB** to the attenuation of the primary protector.

Example: A 92 dBA exposure is reduced to 79 dBA with NRR 33 earplugs. When NRR 33 earmuffs are added, the estimated protected exposure is further reduced to 74 dBA.