



Hearing Protection Information Sheet

Hearing protection *must* be worn by the following personnel:

- Employees exposed to an 8-hour TWA of 85 dBA or more who have not yet had a baseline audiogram
- Employees exposed to an 8-hour TWA of 85 dBA or more who have experienced a standard threshold shift
- All employees exposed to an 8-hour TWA of 90 dBA or more

Northwestern recommends that *all* employees entering a space where noise exposure may exceed 90 dBA wear hearing protection, regardless of duration of exposure.

Hearing Protection Comparison

Type	Sample Image	Advantages	Disadvantages
Ear Muffs		<ul style="list-style-type: none"> ➤ More consistent protection ➤ Usually last longer than ear plugs 	<ul style="list-style-type: none"> ➤ 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 periods in hot/humid environments
Ear Plugs		<ul style="list-style-type: none"> ➤ Can be worn with glasses ➤ More comfortable in hot/humid environments ➤ Offer higher attenuation than most muffs 	<ul style="list-style-type: none"> ➤ Must seal well/fit properly to ensure adequate protection

Noise Reduction Rating (NRR)

Noise Reduction Rating (NRR) is a unit of measurement used to determine the effectiveness of hearing protection devices to decrease sound exposure within a given working environment. The higher the NRR number associated with a hearing protector, the greater the potential for noise reduction.

Attenuation is the estimated reduction in the noise level at the eardrum. A 7 dB subtraction to the NRR is used for A-weighted measurements, which is the weighting of sound most similar to human hearing. A 50% safety factor adjusts labeled NRR values for workplace conditions and is used when considering whether engineering controls are to be implemented. The 50% safety factor produces the most reliable results but is not used for enforcement purposes.

Estimated dBA exposure = TWA (dBA) – [(NRR – 7) x 50%]

e.g. If an employee is exposed to a TWA of 92 dBA and is wearing ear plugs with an NRR of 31, then their actual exposure would be $92 - [(31-7) \times 0.50] = 80$ dBA

Single/Double Hearing Protection

Dual hearing protection involves wearing two forms of hearing protection simultaneously (e.g. earplugs *and* ear muffs). Using double protection will add 5 dB of attenuation.

e.g. Using the same example as above, if the employee adds NRR 30 ear muffs over the NRR 31 ear plugs, the employee will have 80 dBA exposure minus an additional 5 dBA for a final exposure of 75 dBA.

For questions contact Risk Management, Gwen Butler at gwen.butler@northwestern.edu or 847.491.4936.