**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**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sample Image</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Ear Muffs     | ![Ear Muffs](image) | ➢ More consistent protection  
➢ Usually 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 periods in hot/humid environments |
| Ear Plugs     | ![Ear Plugs](image) | ➢ Can be worn with glasses  
➢ More comfortable in hot/humid environments  
➢ Offer higher attenuation than most muffs | ➢ 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) x 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 Environmental Health and Safety at ehs@northwestern.edu.