

# HEARING LOSS PREVENTION

## For Agricultural Workers



Agricultural workers are at high risk of hearing loss due to frequent exposures to loud noise levels while working outdoors, including grain dryers, chainsaws, lawn mowers, and squealing animals. While noise-induced hearing loss is permanent, it is also preventable. The amount of hearing loss from noise exposure depends on the decibel level of the noise and the duration of exposure.

The Occupational Safety and Health Administration (OSHA) defines any noise level of 85 decibels (dB) or greater as dangerous. If a person must raise their voice to be heard above a noise, then the level of the noise is likely to be damaging, and personal protective equipment is recommended for hearing conservation.



### TERMS TO KNOW:

- A **decibel (dB)** is used to describe the loudness of a sound.
- **dBA** is used to judge loudness of a sound as it related to the hearing threshold of the human ear.
- **NRR or Noise Reduction Rating** is a measurement of how effectively a hearing protection device reduces noise levels.

### ALLOWABLE EXPOSURE DURATIONS BASED ON NOISE INTENSITY

Noise Intensity	'Safe' Exposure Duration <i>without</i> Hearing Protection	Common Sounds in Agriculture
90 dBA	8 hours	
92 dBA	6 hours	
95 dBA	4 hours	Blower compressor, full throttle lawn mower, log yarding and landing, tree felling, tractor at 50 percent load.
97 dBA	3 hours	
100 dBA	2 hours	
102 dBA	1.5 hours	Tractor at 80 percent load, animal noises, pig squeals, power tools, hand-held metal grinder, orchard sprayer.
105 dBA	1 hour	
110 dBA	30 minutes	
115 dBA	15 minutes or less	Full throttle combine, 10-HP vane-axial barn fan.
120 dBA	None/No Safe Exposure	Old chainsaw, bad muffler, sandblasting.

Source: Berger, E. H., & Kladden, C. A. (2015, June 26). Noise Navigator Sound Level Database. Indianapolis; 3M Personal Safety Division.

## Protective Action Can be Combined, by:

- Reducing the length of time exposed to the noise.
- Reducing the amount of noise.
- Providing isolation away from the noise.
- Wearing Hearing Protection Devices (HPDs).
  - Aim for just enough noise reduction to bring exposure down to 75-85 dBA to avoid overprotection.

## Consider the 5 "Cs" of Hearing Protection:

- **Comfort** is key to consistent use of hearing protection.
- **Compatibility** with other safety equipment is important.
- **Convenience** to use/access in environments with intermittent noise.
- **Communication** frequency and the need to hear speech.
- **Cost** and affordability of the equipment.

## Calculating Protected Exposure Level When Using a Hearing Protection Device:

### 1. Subtract 7dB from the NRR.

Example: NRR is 33 dB

$$33 \text{ dB} - 7 \text{ dB} = 26 \text{ dB}$$

### 2. Divide that number by 2.

$$26 \text{ dB} \div 2 = 13 \text{ dB}$$

### 3. Subtract that number from the measured average noise of the task or machine.

Example: Average noise of operating a chainsaw = 106 dBA

$$106 \text{ dBA} - 13 \text{ dB} = 93 \text{ dB}$$

*In this example, the actual noise heard while operating a chainsaw with hearing protection is 93 dB, which is still considered unsafe if exposed for over 6 hours.*

Source: OSHA's *Methods for Estimating HPD Attenuation*

Hearing Protection Devices:		NRR
Canal Caps	Devices which completely surround the outer ear and are held in place by a headband or attached to a hard hat.	 Up to 25 dBs
Pre-formed Earplugs and Expandable Foam Earplugs	Devices which slide snugly into the ear canal. They can be formable, pre-formed, or custom.	 Up to 33 dBs
Earmuffs	Devices which completely surround the outer ear and are held in place by a headband or attached to a hard hat	 Up to 30 dBs

Keep in mind, using earmuffs over plugs does not double your protection. However, they may provide an additional 5 - 10 dB of protection.

For more information and resources, visit AgriSafe's website at: [www.agrisafe.org](http://www.agrisafe.org)