

# Noise Exposure

Noise exposure in the workplace is a significant hazard that affects workers in many industries. Prolonged exposure or sudden intense exposure can cause a permanent, untreatable disease called “noise induced hearing loss”.

How do you know if you are at risk? Check if you have to raise your voice to be heard by someone who is an arm’s length away. If so, then you should be concerned and have a risk assessment done.

The hazard noise poses is exposure-related. That is, the higher the exposure of noise a worker receives, the greater the risk to hearing.

A worker’s noise exposure depends on three major factors:

1. **Intensity or loudness** - measured by a noise level meter and expressed in decibels. The abbreviation for decibel is “dB”.
2. **Frequency or pitch** - measured using an “A” weighted filter on the noise level meter. When A-weighting is selected on a meter, only noise that is hazardous to the human ear is measured.
3. **Duration or time** - measured by the clock.

All three factors combine to result in a noise exposure. Change one of the factors, and the noise exposure changes.

Regular exposure to noise levels over 80 dBA and particularly over 85 dBA over an eight hour time period can cause noise-induced hearing loss. Regular exposure to higher levels for shorter lengths of time can result in an equivalent amount of exposure.

Here are some example equivalent noise exposures:

Noise Level Duration	
85 dBA	8 hours
88 dBA	4 hours
91 dBA	2 hours
94 dBA	1 hour
97 dBA	30 minutes
100 dBA	15 minutes
103 dBA	7.5 minutes

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All of these combinations of noise level and duration have the same noise exposure--they all have the same risk to an exposed worker's hearing. The exposure does not have to be continuous; it can be a few minutes here and a few minutes there. It all adds up over the day.

If the noise level increases by 3 dB, but the duration stays the same, then the noise exposure doubles. This is called "3 dB doubling". In other words, 88 dBA of noise for 8 hours is double the noise exposure, of 85 dBA for 8 hours.

Here are some examples of rough approximations of noise exposure in some common industries.

**NOTE:** these are examples only, actual exposures in a specific workplace may vary.

- a. **Sawmill** - average noise exposure in a mill is about 93 dBA, so if a worker is present for about an hour and a half (90 minutes), then he/she is likely overexposed.
- b. **Small woodworking shop** - average noise is about 91 dB, so over-exposure is reached at about 2 hours of exposure in a day. It does not have to be continuous exposure—it could be 15 minutes here and there. If it adds up to 2 hours in a day, then that's excessive noise.
- c. **Auto body shop** - noise levels can vary a lot, depending on the work being done. An auto

body technician has about 90 dBA of noise levels, so about 2 hours and 15 minutes in a day can result in over exposure.

- d. **Nightclub** - noise levels vary a lot in this industry. However, a typical average exposure is 93 dBA. Over-exposure can occur after just over 1 hour of work.

The first step in deciding if there is a need for further measurement of noise is exposure is to do an area noise measurement (measurements of general noise levels in a work area) or a spot measurement (measurements taken near a piece of noisy equipment or during a specific work process). These tests may be used to decide if further measuring is needed.

Area or spot measurements do not always represent a worker's average exposure during a day. For example when a worker uses different equipment or works in multiple areas throughout the day. In these cases a personal noise monitoring may be needed.

Noise measurements should be done following standards such as the Canadian Standards Association (CSA) Procedures for the Measurement of Occupational Noise Exposure.

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