Washington State Department of
Labor & Industries

Noise and Hearing Loss Prevention

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UW OSHA Training Center

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Hearing Loss Prevention Training

What is noise?

How it affects your hearing

How to protect yourself from excessive noise

How hearing tests protect you

What is noise?

Effects of loud noise

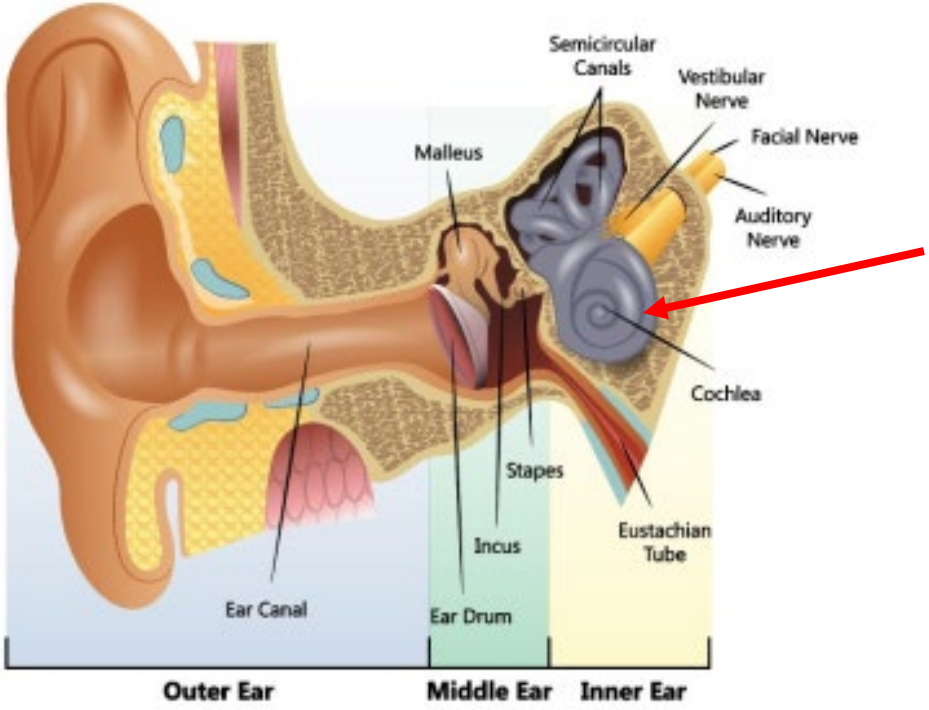
Exposure to loud noise will inevitably cause hearing loss over time.

Loud noise damages or destroys the nerves in the inner ear.

It affects all people the same.

Nobody has “tough ears”

Human Ear Diagram



Damage from loud noise happens here in the inner ear (cochlea).

Hair cells in the inner ear transmit sound to the brain

Normal Hair Cells

Damaged Hair Cells

Hearing loss from noise exposure

Hearing loss from noise exposure is often not noticed because it is usually gradual.

A person typically loses the ability to hear higher pitches first.

Often, the first noticeable effect is difficulty in hearing speech.

Tinnitus from noise exposure

Exposure to high noise levels can also cause permanent ringing in the ears or “tinnitus”.

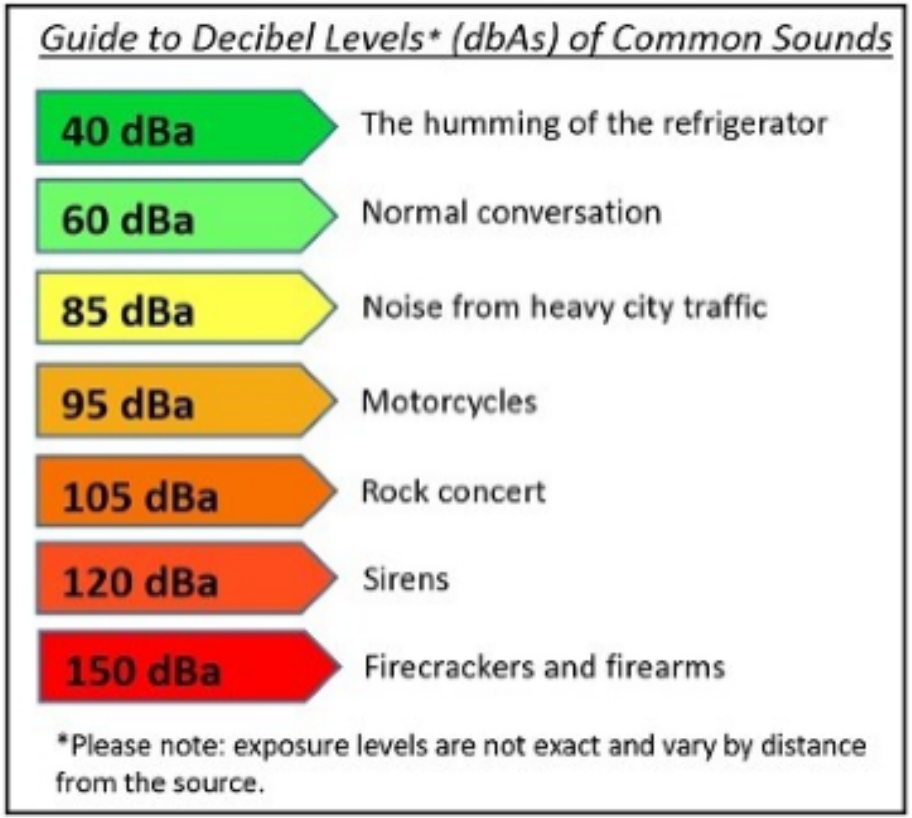
Severe tinnitus may disrupt sleep, reduce concentration and cause irritability and depression.

Tinnitus sounds

American Tinnitus Association

Noise Levels

Noise is measured in units called decibels or “dB”

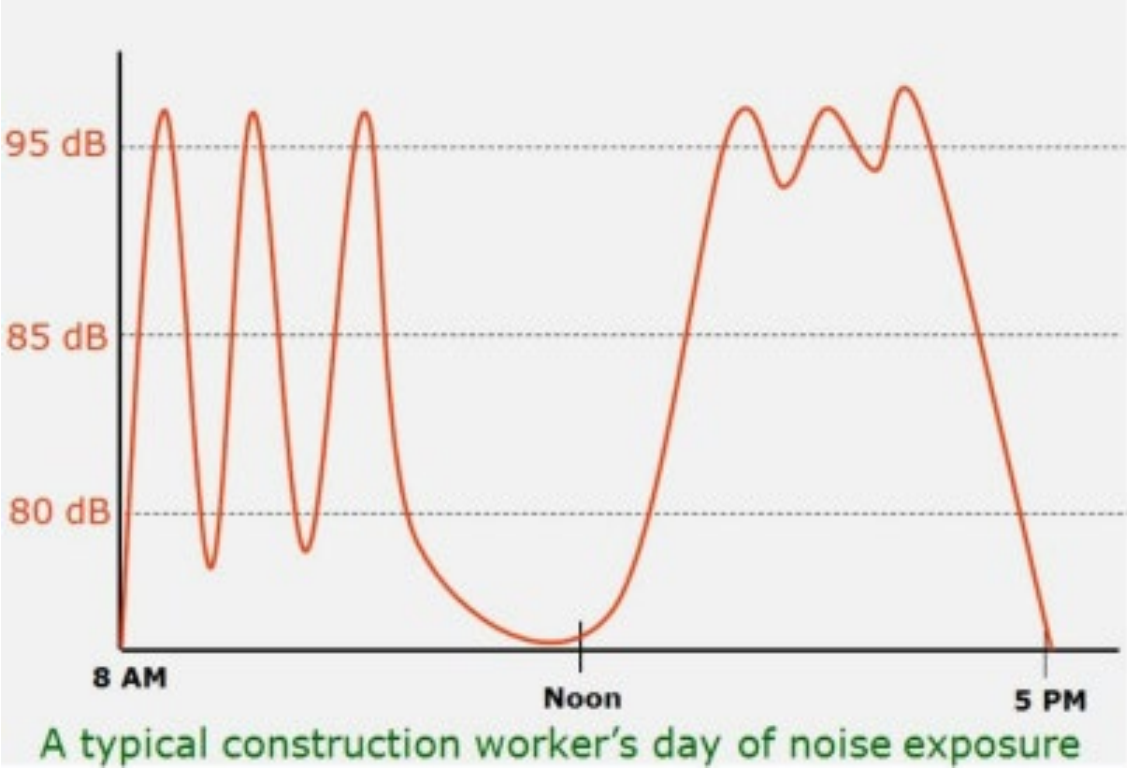


Source: NYC Health

Examples of noisy equipment

Equipment	Noise Level
Back hoe	85-95 decibels
Chain saw	110 decibels
Front-end loader	90-95 decibels
Metal grinder	95-100 decibels
Jackhammer	112 decibels
Lawn mower	90 decibels
Tractor	95-105 decibels

Average noise levels



What is too much noise exposure?

Damage from noise exposure depends on the loudness and the length of exposure.

The risk of hearing loss increases dramatically as noise levels increase.

Exposure to noise levels above 115 decibels even for five minutes is very risky.

Wood chipper – 110 decibels

Noise exposure limits

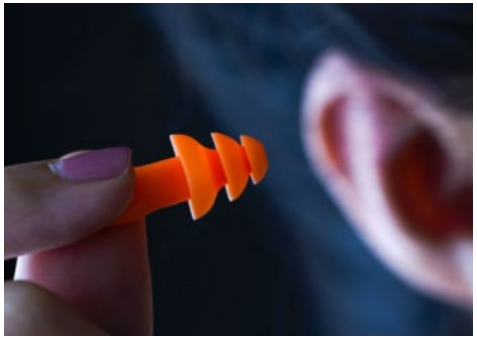
He needs hearing protection!

Noise Level	Allowable Exposure Time
85 decibels	8 hours
90 decibels	4 hours
100 decibels	1 hour
105 decibels	30 minutes
110 decibels	15 minutes
115 decibels	0 minutes
140 decibels (impact noise)	Never exceed

How do you know when the noise level is too loud?

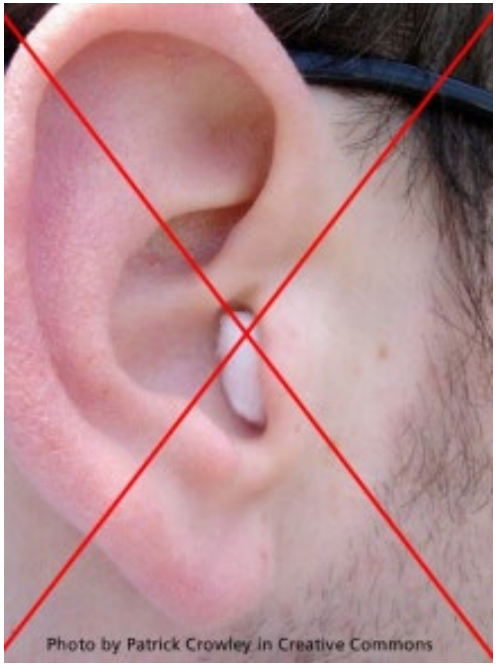
If you have to shout to be heard over the noise, it's above 85 decibels.

Two main types of hearing protection



Earplugs

Earmuffs



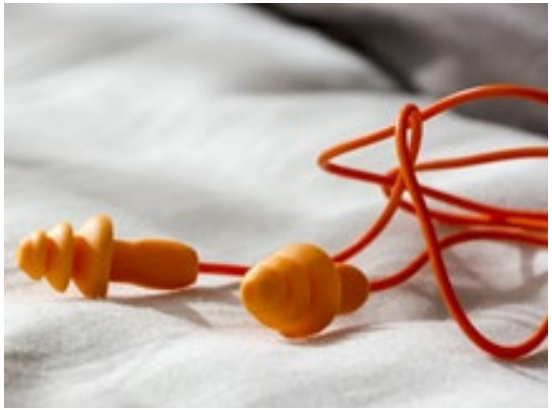
Cotton – No way!

Earplugs

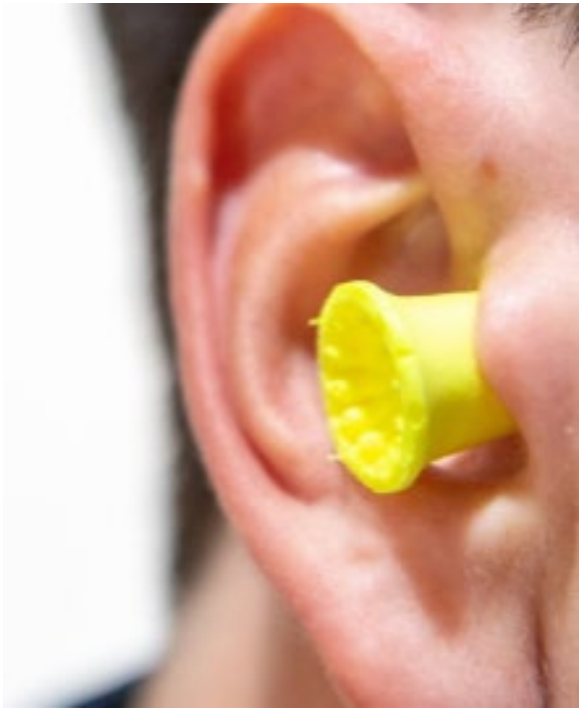
Earplugs are made of foam, rubber or plastic and are either one-size-fits-all or sizes small, medium or large.

Some are disposable, some are re-usable.

They are lightweight and require no maintenance.

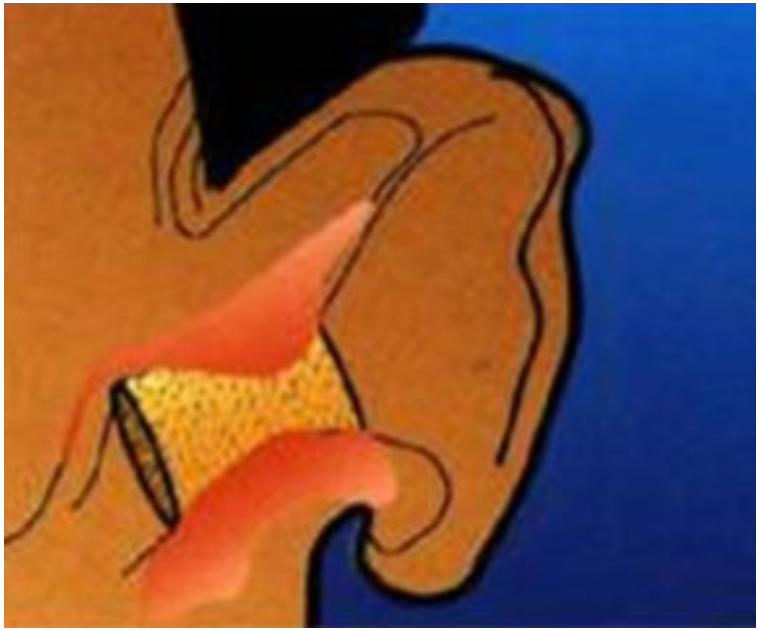


What's wrong with these photos?



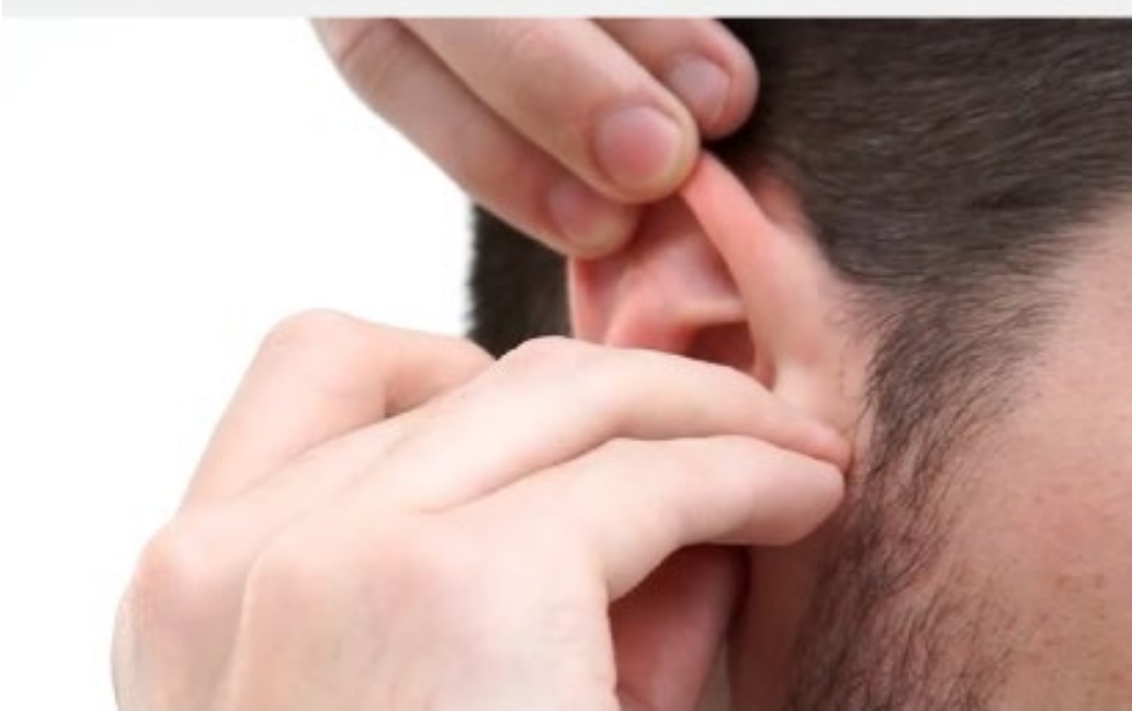
Inserting foam earplugs

Incorrectly inserted



Correctly inserted

Inserting foam earplugs properly



Earplug comfort

Earplugs may be uncomfortable for some people at first.

Earplugs rarely cause infection or prolonged irritation of the ear canal.

Most people can find a comfortable fit by trying several sizes, types, or brands.

Custom-molded earplugs can be made for maximum comfort.

Photo courtesy of EarPeace

Earmuffs

Ear muffs cover the whole ear and are preferred by some people.

They are reusable and last longer then most plugs.

They have replaceable pads.

Earmuff limitations

Earmuffs can be uncomfortable in hot weather.

They don’t work with hard hats unless attached to the hard hat or worn behind head.

Glasses can interfere with the seal.

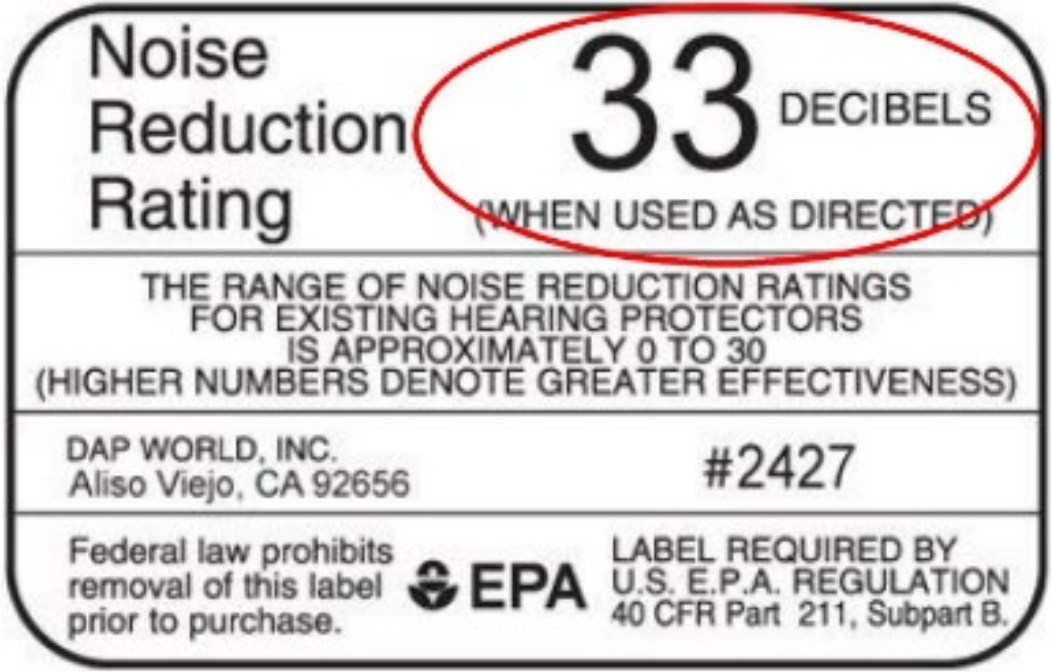
A third option - earcaps

Earcaps are like earplugs, but do not go all the way into the ear canal.

They are not as protective as earplugs or muffs.

They are okay for occasional use or for people who find earplugs uncomfortable.

Noise reduction of hearing protection



Example: grinder noise – 95 decibels

Noise reduction rating of some ear muffs is 30 decibels

30 - 7 = 23 decibels actual noise reduction

95 - 23 = 72 decibels at worker's ear

How can you hear anything with earmuffs on?

Hearing protection in noisy areas reduces overwhelming loud background noise.

What happens if you take your earmuffs off for just a few minutes?

Noise level at this location – 110 decibels

- No effect –

  it is just a few minutes

OR

- It might make my ears ring

OR

- It will cause some hearing loss

Allowable exposure times

Noise Level	Allowable Exposure Time
85 decibels	8 hours
90 decibels	4 hours
100 decibels	1 hour
105 decibels	30 minutes
110 decibels	15 minutes
115 decibels	0 minutes

Keep them on!

Noise Warning Signs

- Noise warning signs are required at entrances to areas where the noise level is 115 decibels or above.

Hearing aids and loud noise

Smart phones and noise cancelling headphones

Regular earbuds are not protective.

Some noise cancelling headphones can provide protection.

Audiometric Testing (Hearing Tests)

Audiometric testing (hearing tests) is required for employees exposed to excessive noise.

It is required yearly to detect early stages of hearing loss.

We must provide it at no cost to you.

Audiometric testing schedule

When you are first hired, a baseline test is taken.

The tests are repeated every year and compared to the baseline test result.

If a hearing loss is detected, we must have a healthcare provider determine what is the cause.

Determining the cause of hearing loss

Besides noise, hearing loss can be caused by ear infections, excessive ear wax, certain drugs, or a hereditary condition.

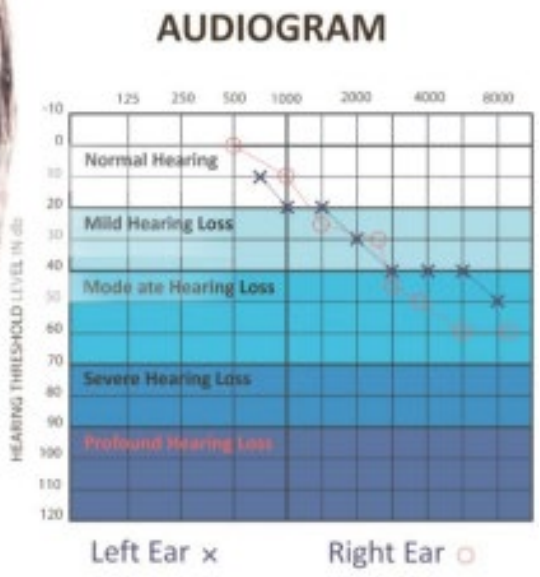
If the cause is not medically related, it is probably caused by exposure to excessive noise at home or at work.

Audiometric testing results

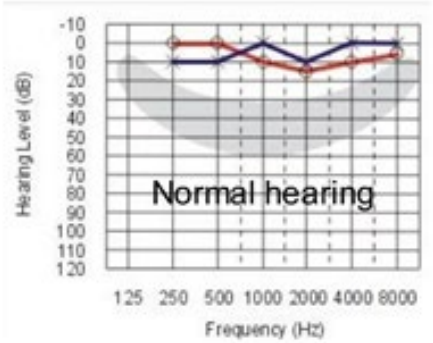
Audiometric testing results which show hearing ability at several pitches or frequencies.

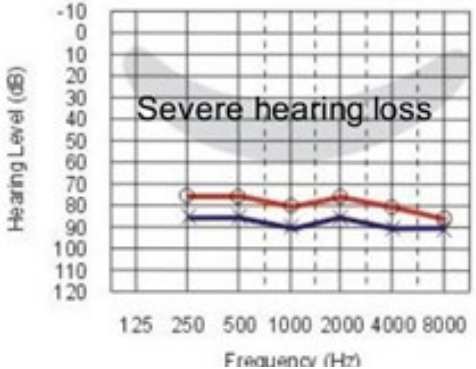
These frequencies include those of the human voice.

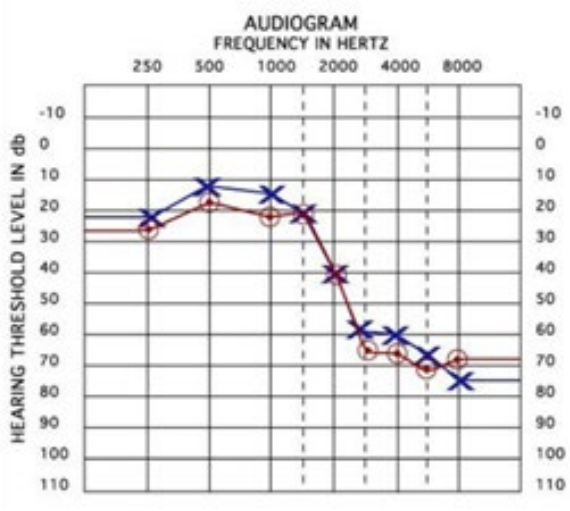
Retesting is required if you have an average 10 decibel or greater hearing loss in three frequencies.



Example audiograms







Hearing loss from noise exposure

Our responsibilities

- Take noise measurements.
- Provide you with hearing protection and make sure you wear it where needed.
- Pay for your hearing tests. (audiometric testing)
- Allow you to see noise measurement records.
- Give you copies of your hearing test results.
- Control noise levels where feasible.

Noise meter

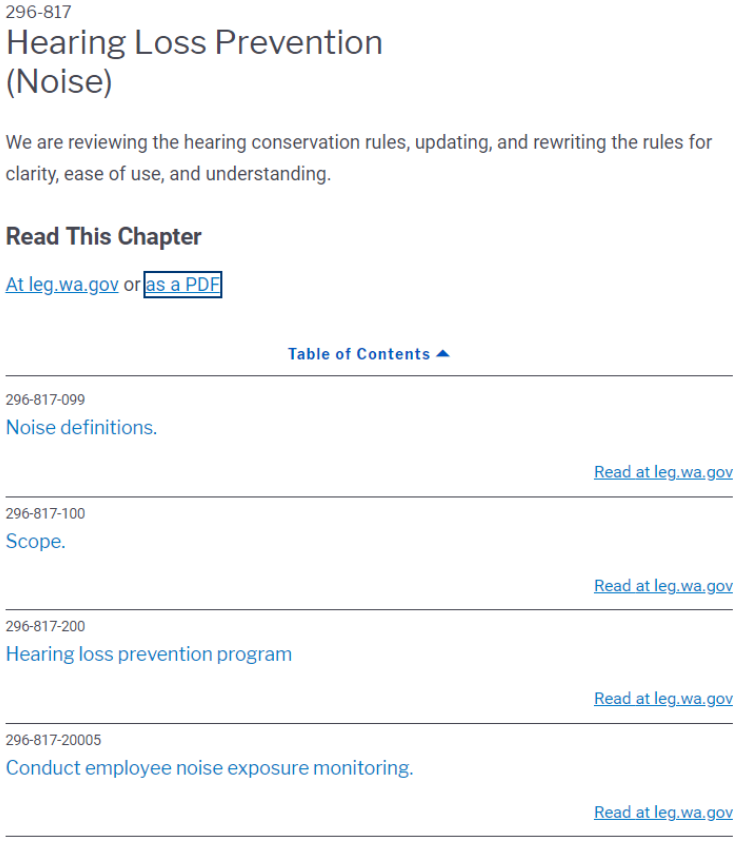
The following areas or use of equipment is where hearing protection is required:

Noise level measurements results were:

We have done the following to reduce noise levels:

Hearing Loss Prevention Rule

[Link to Hearing Loss Prevention Rule]



296-817

Hearing Loss Prevention (Noise)

We are reviewing the hearing conservation rules, updating, and rewriting the rules for clarity, ease of use, and understanding.

Read This Chapter

At leg.wa.gov or as a PDF

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Noise definitions.
Read at leg.wa.gov

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Scope.
Read at leg.wa.gov

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Hearing loss prevention program
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296-817-20005
Conduct employee noise exposure monitoring.
Read at leg.wa.gov