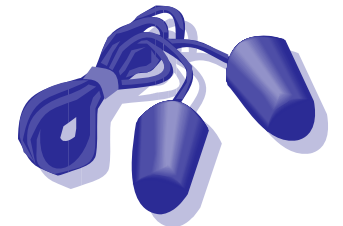


Hearing Protection



1.

Protect Yourself From Hearing Hazards

Your employer takes many steps to eliminate hazards and keep your workplace safe. One hazard found in many workplaces is noise. The main health effect of loud constant noise is loss of hearing, which can be either partial or total, and is usually permanent. Prevention is the only way to avoid health damage.

Don't take your hearing for granted—it's a priceless possession. If you lose your hearing, you lose the ability to hear:

- * Your favorite music
- * Voices of family and friends
- * Sounds of nature
- * Movies and TV shows
- * Vital information or warnings that keep you safe



This pocket guide explains government regulations, your employer's procedures, and your own responsibilities in protecting your hearing. It will help you identify noise hazards and protect yourself. It's designed as a handy pocket-sized booklet so you can carry it with you on the job and refer to it at home.

8. Hearing protectors called _____ are inserted into the ear canal and seal it to prevent noise from reaching delicate parts of the ear.
9. Hearing protectors that are soft flexible pads on the ends of a headband are called _____.
10. Some earmuffs have no metal parts so they can be used by employees who work with _____.

Answers: 1. Hearing Protection Program 2. cochlea 3. Hertz 4. noise 5. audiometric 6. dosimeter 7. Noise Reduction Rating 8. earplugs 9. canal caps 10. electricity

3. *Quiz and Training Acknowledgement*

Test your Hearing Protection Knowledge

1. OSHA's regulation says our employer must set up a _____ if noise reaches 85 decibels in an 8-hour time-weighted average.
2. The organ in the inner ear where hearing takes place is the _____.
3. The frequency of sound is measured in units called _____.
4. Unpleasant or unwanted sound is called _____.
5. An _____ test will determine your level of hearing and whether you need hearing protection.
6. Your employer may use a sound level meter and/or clip-on _____ to measure the level of noise in your workplace.
7. NRR on a hearing protection device stands for _____.

OSHA *And Your Employer Work Together to Protect Your Hearing*

OSHA has a very detailed noise and hearing conservation regulation (**29 CFR 1910.95**). **Generally, this regulation says that if noise levels in your workplace reach 85 dB (decibels) or more on an 8-hour time-weighted average (TWA) basis, your employer must set up a Hearing Conservation Program.** A decibel is the measurement of the intensity of sound and exposure to more than 90 decibels over an 8-hour workday can mean a risk of hearing loss.

Following OSHA' regulation, your employer must

- * Try to reorganize equipment, facilities, and tasks to reduce noise levels
- * Test employee's hearing, with annual follow-ups
- * Provide training in the selection, use, and care of hearing protectors
- * Monitor individual and work area noise levels and report high levels to employees
- * Provide hearing protectors where needed

Sound Levels and Exposure Limits

As many as 16 million Americans are exposed to high noise levels at work. OSHA has set safe exposure limits concerning various sound levels. This chart will give you an idea of the limits of exposure.

<i>SOUND LEVEL (dBA)</i>	<i>EXPOSURE LIMIT (hours)</i>
90	8
92	6
95	4
97	3
100	2
102	1.5
105	1
110	.5
115	25 minutes

when no such sound is reaching it

8-hour Time Weighted Average (TWA)—the sound level that would produce a given noise dose if a worker were exposed to that sound level continuously over an 8-hour period

Presbycusis—hereditary hearing loss that comes from aging (permanent)

Puretone—sound composed of only one frequency

Representative Exposure—measurement of an employee's noise dose or 8-hour time-weighted average sound level that the employee deems to be representative of exposures of other employees in the workplace

Sensory Neural Hearing Loss—a hearing loss in which the inner ear is unable to properly transmit sounds to the brain (causes: mumps, high fever, certain medicines, noise)

Sound Level—ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micro-pascals. Unit: decibels. For use with this regulation, slow time response, in accordance with ANSI S1.4-1971 (R1976) is required

Sound Level Meter—instrument for the measurement of sound level

Standard Threshold Shift—a 10dB or more average change in the level of sound a person can hear (at 2000, 3000, and 4000 Hz in either ear) as determined by baseline and subsequent audiograms

Stapes (stirrup)—small bone in the middle ear connected to the incus; passes vibrations into the cochlea through the oval window

Tinnitus—humming, roaring, whistling, or some other noise in ear when no such sound is reaching it

8-hour Time Weighted Average (TWA)—the sound level that would produce a given noise dose if a worker were exposed to that sound level continuously over an 8-hour period

Stapes (stirrup)—small bone in the middle ear connected to the incus; passes vibrations into the cochlea through the oval window

Tinnitus—humming, roaring, whistling, or some other noise in ear

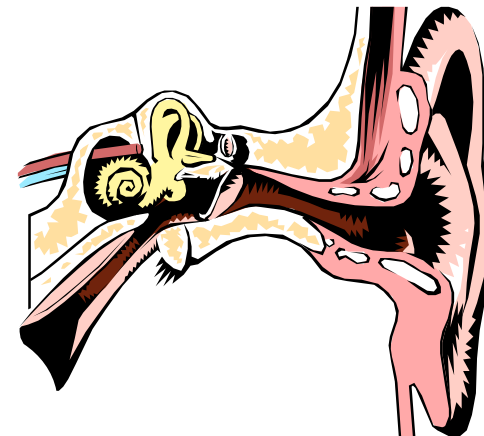
How You Hear

Sound enters the outer part of the ear (pinna), which is made of cartilage covered by skin.

Sound waves travel down the ear canal. They cause the eardrum, which is located at the entrance of the middle ear, to vibrate.

The vibrations pass on through the middle ear by causing the small bones (malleus, incus, stapes) to vibrate. The vibrations move fluid in the cochlea of the inner ear.

The cochlea is the main organ of hearing in the body and contains about 20,000 hair-like cells. The moving fluid moves or bends these cells which change vibrations into nerve impulses. The nerve impulses are carried to the brain by the auditory nerve. This nerve sends the sound signal to the hearing center of the brain.



How Sound is Measured

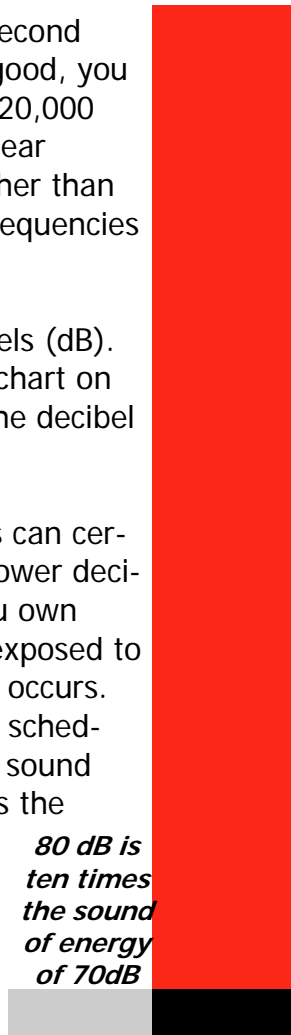
What you hear depends on the frequency (pitch) and loudness of the sound waves that reach your ears.

Frequency is measured in cycles per second (cps) or Hertz (Hz). If your hearing is good, you can hear sounds that range from 20 to 20,000 Hz. Some animals, such as dogs, can hear sounds that have frequencies much higher than humans can hear. Dolphins can hear frequencies as high as 100,000 Hz.

Sound Intensity is measured in decibels (dB). Loud sounds have high dB levels. The chart on the next page will give you an idea of the decibel levels of some sounds.

While loud sounds of high decibel levels can certainly harm your hearing, sounds with lower decibel levels can too. This depends on you own sensitivity to sound, how long you are exposed to the sound, and how often the exposure occurs. Decibels are measured on a logarithmic schedule—for instance 80 dB is ten times the sound energy of 70 dB and 90 dB is 100 times the sound energy of 70 dB.

*90 dB is
100 times
the
sound
energy of
70 dB*



*80 dB is
ten times
the sound
of energy
of 70dB*

nose; equalizes pressure in middle ear with outside air pressure

Frequency—number of vibrations per second of any sound

Hertz (Hz)—unit of measurement of frequency numerically equal to cycles per second

Impedance Testing—hearing test that measures air pressure in middle ear and ability of middle ear to conduct sound

Incus (anvil)—tiny bone in the middle ear that transmits sound vibrations from malleus to stapes; central bone of three small bones in middle ear

Inner Ear—area of the ear in which hearing takes place; organs there convert mechanical energy into electrical signals then transmit the signals to the brain along with hearing nerves

Malleus (hammer)—tiny bone attached to eardrum which passes sound vibrations on to the incus in cochlea; receives vibrations in the endolymph, converting them to nerve impulses

OSHA—Occupational Safety and Health Administration; the federal agency responsible for developing and enforcing workplace safety and health regulations

Ossicles—collective name of the three tiniest bones in the human body, which are located in the middle ear (malleus, incus, stapes)

Otologist—Medical doctor who specializes in the ear

Otolaryngologist—medical doctor who specializes in the ear and throat

Otorhinolaryngologist—medical doctor who specializes in ear, nose, and throat

Personal Protective Equipment (PPE)—any devices or clothing worn to protect against workplace hazards

Pinna—outer, visible part of the ear, composed of cartilage covered by skin
Pitch—the highness or lowness, musically, of a sound

Cochlea—coiled tubular structure in which vibrations caused by sounds are converted into nerve impulses; main organ of hearing in the body

Conductive Hearing Loss—loss of hearing in which sound vibrations don't reach inner ear

Cortex—surface of the brain in which information received from ears and other sense organs is processed

Criterion Sound Level—sound level of 90 decibels for 8 hours. If present for 8 hours yields 100 percent noise dose.

Decibel (dB)—unit of measurement of sound level. In general, a sound doubles in intensity for every increase of 10 decibels.

dBA (Decibels-A-Weighted)—unit of measurement of sound level corrected to the A-weighted scale, as defined in ANSI S1.4-1971 (R1976), using a reference level of 20 micropascals (0.00002 Newton per square meter).

Dosimeter—an instrument that can determine average noise exposure by recording sound levels over time with a microphone worn by a worker

Discomfort Level—part of an audiometric test; the level at which pure-tones and/or speech becomes uncomfortable

Eardrum—(tympanic membrane) paper-thin, semi-transparent membrane which is con-shaped and slightly tilted as it is stretched across inner opening of the ear canal

Ear Canal—an opening into the ear that extends about one and a half inches from the outer ear to the eardrum

Earmuffs—kind of hearing protection device; padded cushions on a headband that cover the ears

Earplugs—kind of hearing protection device; foam or other molded plugs that are inserted into the ear canal

Eustachian Tube—passage in middle ear that leads to the back of the

LOUDNESS OF SOME SOUNDS



Jet Engine 140

Rock Concert 105

Pneumatic Chipper 125

Jackhammer 110

Bulldozer 110

Power Mower 105

Newspaper Printing Press 105

20-ton Truck 95

Subway Train 90

Noisy Street 90

Alarm Clock 88

Vacuum Cleaner 85

Dishwasher 80

Highway Traffic 75

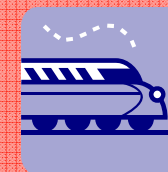
Average Home 65

Quiet House 58

Whisper 50

7 30

20



What is Noise?

Noise is unwanted or unpleasant sound. You encounter noise in the workplace and in traffic on the way home. Even at home you can't escape noise. And noises don't have to be loud to be irritating. The sound of a dripping faucet during a sleepless night can really get on your nerves.

Kinds of Noise

There are three kinds of noise that you encounter.

- * **Wide Band Noise**—noise that covers a wide range of frequencies. If you're employed in a manufacturing workplace or if you drive a truck as part of your work, you are exposed to this kind of noise.



- * **Narrow Band Noise**—noise limited to a narrow range of frequencies. Power tools, fans, planers, and some saws make noise in this range.



- * **Impulse Noise**—noise that pulsates in on-and-off patterns. A jackhammer creates impulse noise.



2. Dictionary

Acoustics—science that deals with the production, control, transmission, reception, and effects of sound

Action Level—an 8-hour time-weighted average of 85 decibels measured on the A scale, slow response, or equivalently, a dose of percent

Air-bone Gap—indicates conductive hearing loss; occurs when pure tones are heard through the bone behind the ear rather than through the eardrum

Amplitude—height of a sound wave; associated with loudness of a sound

Audiogram—chart, graph, or table resulting from an audiometric test showing a person's hearing threshold levels as a function of frequency

Audiologist—professional who specializes in the study and rehabilitation of hearing, who is certified by the American Speech, Hearing and Language Association or licensed by a state board of examiners

Auditory Nerve—nerve carrying electrical signals from inner ear to base of the brain

Baseline Audiogram—audiogram against which future audiograms are compared

Brainstem Testing—hearing test that measures hearing sensitivity without requiring responses from patient

Canal Cap—type of hearing protection device; soft pads on a headband that seal the entrance to the ear canal.

Cerumen—ear wax, produced in ear canal to lubricate and protect its delicate lining

Summary

OSHA and your employer are working hard to help you keep your hearing. Testing, recordkeeping, and protective equipment all cost lots of money. But you must do your part or all that effort will be wasted.

Sometimes you might think wearing hearing protection is uncomfortable and unnecessary. But think about the consequences. Follow these suggestions:

- * ***Don't forget to wear your protectors anytime they're needed—all the time!***
- * ***Be sure to use the right hearing protection for the noise level you're exposed to***
- * ***Take care of your hearing protection devices and replace them when needed***
- * ***Have your hearing tested regularly***
- * ***Do your part to help your employer keep noise levels down and to follow OSHA regulations***

How Noise Hurts Your Hearing



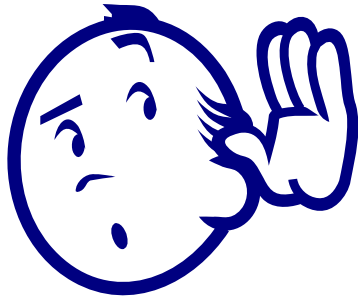
In the cochlea there are thousands of tiny hair cells. These cells are tuned to different frequencies. Sound stimulates these cells which in turn send signals to the brain.

Loud noise causes the hair cells to bend or go flat. Usually these cells rise back up if the noise goes away. Your normal hearing returns after a time. But constant noise or a sudden loud sound can be so strong that the cells don't recuperate. They are killed or permanently damaged. That's when you begin to lose your hearing. Hearing loss is usually gradual and progressive—it gets worse over a period of time.

High frequency noises, such as honking horns, rock music, or whistles cause more hearing damage than can low-pitched noises. Noise that is loud and shrill can harm delicate parts of the ear.

Some people who are exposed to long-term noise get an illness called tinnitus. This is a roaring, whistling, or ringing sensation in the ears that may come and go or become constant.

Symptoms of Hearing Loss

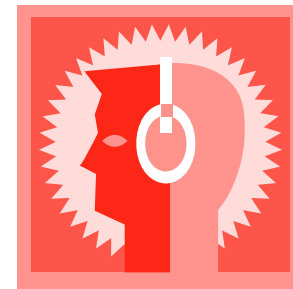
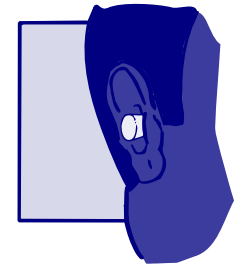


Hearing loss can come on gradually so that you hardly know that your hearing has decreased. The symptoms include

- * Trouble understanding someone speaking two feet away
- * People complaining that you turn up the radio or TV so that it is too loud for others
- * Trouble locating the origin of sounds—turning one ear in the direction of a sound
- * Hearing ringing, whistling, or roaring in your ears when there is no noise in the area
- * Having difficulty hearing certain high or soft sounds, like the ticking of a watch or soft voices

Don't:

- * Tamper with hearing-testing or noise-reduction equipment
- * Ignore or “forget” to use hearing protection
- * Use hearing protectors that are loose or cracked
- * Use hearing protectors that don't fit snugly over or into the ear
- * Ignore loud noise levels outside the job



Hearing Protection Checklist

Do

- * Help maintain machines to reduce noise levels
- * Be aware of noise levels requiring hearing protection
- * Wear assigned hearing protectors
- * Use hearing protectors in loud-noise activities off the job
- * Make sure hands are clean before inserting or putting on hearing protectors

Have your hearing tested if you have:

- * Noise or ringing in your ears
- * Trouble hearing people speaking
- * TV or radio volume turned so high others complain

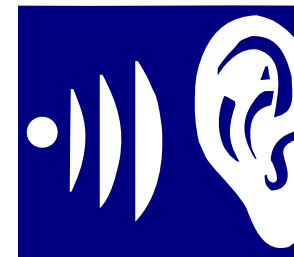


Temporary Hearing Loss

Pain usually protects your body from injury. When it comes to the effects of noise, there usually is no pain. It would take noise of about 120 dB to cause pain. Much damaging noise is around 85 to 90 dB. Long-time exposure at this level can cause temporary or permanent hearing loss without any discomfort.

Temporary hearing loss means

- * You may not hear sounds that are under 40dB after you finish work for the day
- * The first two hours of noise exposure causes most of your hearing loss



- * Your hearing returns to almost normal within two hours after the noise stops
- * If you are exposed to noise for a long time, temporary hearing loss can become permanent

Permanent Hearing Loss

If noise continues for a long period of time or at high dB levels, the tiny hair-like cells in the inner ear lose the ability to function. The result is permanent hearing loss.

Generally, you will have no physical signs of permanent hearing loss. You will not even feel pain

The only symptoms may be tinnitus. Sounds may also seem to be muffled—you might not be able to distinguish between some consonant sounds like “th” or “sh”

After the noise ceases, your hearing doesn’t get better. You have to turn the volume way up on radios or TV

You first lose the ability to hear high frequency sounds. If the exposure continues, you will lose the ability to hear sounds of all frequencies

Sudden Hearing Loss

You may be exposed to a sudden burst of loud sound that can affect your hearing.

For instance, a gunshot, car backfiring, motorcycle revving, or explosion can hurt your ears enough to cause permanent hearing loss.

Protect Your Hearing Off the Job

Remember there is no OSHA to protect your hearing away from the workplace. But there are several things you can do.

- * Don’t play your radio, stereo, or TV so loud that it’s deafening
- * Turn down headphones—you should still be able to hear others speak at least three feet away
- * Wear earmuffs when you hunt or shoot at ranges
- * Wear hearing protection when you attend auto or motorcycle races
- * Use hearing protection when you use power tools at home—semi-inserts or earmuffs can be effective and convenient
- * If you attend a concert or go to a club where you encounter loud music, wear earplugs. Try to stay a safe distance from loudspeakers. Take breaks by going outside occasionally.



Inexpensive foam earplugs are available at drugstores. Drugstores and gun shops also sell moldable and rigid plugs. An audiologist can provide custom-fitted plugs.

Hearing Hazards Off the Job

Hearing protection doesn't stop when you leave the workplace. You're exposed to high-level noise everywhere you go.

- * Many people play their radios and stereos loud enough to harm their hearing and anyone within earshot
- * Decibel levels at rock concerts can be louder than a jackhammer and a roaring chain saw
- * Power tools and chain saws in your home workshop can create noises loud enough to harm hearing
- * Garden tractors and lawn mowers make deafening noises
- * Noise at auto and motorcycle races can be dangerous
- * Sounds of gunshots during hunting or at indoor or outdoor shooting ranges can cause sudden hearing loss
- * Noise from snowmobiles and speedboats can cause hearing damage
- * Some popular headsets broadcast sound at 115 decibels—equal to standing 100 feet from a jet at take-off. This is loud enough to destroy delicate inner ear hair cells

Other Effects of Noise



Besides causing hearing loss, noise can cause other problems at work:

- * The strain of having to listen to and talk over constant loud noise can make you too tired to perform your work satisfactorily
- * Loud noises can lead to accidents—you may not hear signals from machines, or important safety warnings or directions from co-workers, or you may misunderstand what you hear
- * Constant noise causes stress that lowers your morale and the morale of your co-workers

Mental Effects of Noise

- * Nervousness
- * Lack of concentration
- * Anger

Physical Effects of Noise

- * Higher blood pressure
- * Headaches
- * Sleeping problems

Audiometric Tests



OSHA requires your employer to test your hearing annually if you have an average exposure level of 85 dB or more over an 8-hour period. An audiometric test

- * will provide a baseline level, or threshold of hearing, so that future tests can be measured against it
- * must be given within 6 months after your first 8-hour exposure to noise levels of 85 dB or higher
- * will tell whether you have already suffered any loss of hearing and, if so, that you should avoid additional exposure.

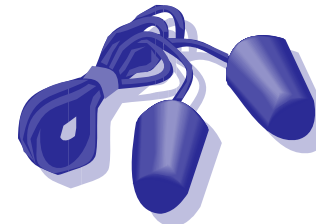
The test is conducted by a trained technician or audiologist. As you listen through headphones, the audiometer sends sounds (puretones) through the headphones to each ear. You respond to the test sounds when you first hear them. Your responses are recorded on a chart called an audiogram. The audiogram shows your thresholds (measured in decibels) for sounds at different frequencies (measured in Hertz).

Q. Can hearing protectors cause head aches, nosebleeds, or eyestrain?

A. If your protection fits too tightly, you could get a headache. In this case, the protection should be refitted or try another device. There is no way that hearing protection could cause nosebleed or eyestrain.

Q. Why should I worry about losing my hearing? I can just get a hearing aid.

A. Wrong. Hearing aids can't correct problems caused by noise. Noise damage is due to destruction of nerve cells in the inner ear—there aren't enough hair cells to receive amplified sounds produced by a hearing aid.



- Q.** If I wear hearing protection, will I be able to hear changes in machinery that might signal trouble?
- A.** Yes. You'll get used to the way your equipment normally sounds when you're wearing hearing protection, so you'll notice the difference.
- Q.** What should I wear— earmuffs or earplugs?
- A.** Earmuffs don't work any better than earplugs. When plugs and muffs of the same quality are compared, plugs generally turn out to be better. But every situation and every user is different. Your employer will help you select the protection that's right for your workplace.
- Q.** Can earplugs give me ear canal infections or damage my ears?
- A.** Not if you keep your hearing protection clean. Never push them so far into your head that you feel discomfort.
- Q.** Once I put in my hearing protection, can I just forget about it until I take off for my break?
- A.** No. Hearing protection can work loose and needs to be readjusted once in a while.

Signs of ear canal infection:

- * Redness inside ear
- * Pain
- * Itching
- * Fever
- * Ringing, hissing, roaring, or other noises in ear
- * Discharge or draining from ear

Other Hearing Tests

Audiologists can also give other kinds of tests that help diagnose hearing loss.

- * **Impedance testing** measures air pressure in the middle ear and the ability of the middle ear to conduct sound. This test identifies disorders in the middle ear and problems with nerve functions in the ear.
- * **Brainstem testing** measures hearing sensitivity without requiring responses from the person being tested. It can be performed on people of any age, including infants.
- * **Bone-hearing level** may be determined. Pure tones are sent directly to the inner ear through a vibrator on the bone behind the ear. Differences between hearing through the ear and through the bone are called air-bone gaps. These differences show conductive hearing loss.

It's a good idea to have your hearing and the hearing of family members tested regularly. A basic audiogram only takes a few minutes. The cost may range from \$50 to \$125. People age 35 or over should have their hearing checked once a year. Children should have hearing tests annually before the school year starts.

Identifying Hearing Hazards

Following OSHA's regulations, your employer regularly checks the level of noise in the workplace by using certain kinds of sound meters.

A sound level meter measures noise at different times during the day. This meter provides a reading on average noise levels. It can also be placed near particular workers to measure how much noise these workers receive. Potential hearing damage can be estimated by using

- * the sound level in decibels
- * the duration and distribution of exposure during a typical workday
- * total exposure time during work life

A noise dosimeter may also be used. It is a small sound level meter clipped onto your pocket or collar. A dosimeter measures the amount of noise you receive over a given period of time, such as an average workday. Multiple dosimeter readings are necessary covering different work areas and different shifts on different days.

Concerns About Hearing Protection



You may have some concerns regarding hearing protectors. Maybe these questions and answers will help you understand why protecting your hearing is vitally important.

- Q.** Why should I wear protection? They're all uncomfortable.
- A.** Hearing protection may be uncomfortable at first. But hearing loss due to noise exposure is permanently uncomfortable. You have to get adjusted to wearing hearing protection just as you might have to get used to wearing a new pair of shoes. If you have the opportunity, check out different kinds of hearing protection to see which kind gives you the least discomfort. Maybe it's only a matter of resizing or refitting your hearing protection.
- Q.** Why should I wear hearing protection? I'm getting used to the noise.
- A.** You don't get used to noise. You just lose more and more of your hearing. It seems like you're getting used to the noise because you're hearing less and less of it. Having to listen to noise doesn't make your ears any tougher. But you can save the hearing you have left by wearing protection.

Which Kind of Protection Should You Use?

This chart will help you compare the qualities of each kind of hearing protection device.

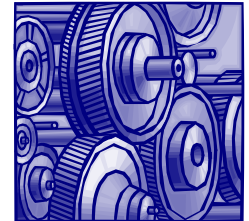
DEVICE	ADVANTAGES	DISADVANTAGES
Earplugs	Small, inexpensive, portable, comfortable in hot weather, easy to clean can't be shared	Hard to fit and careless use can introduce dirt into ear canal; molded plugs may be expensive at first and refitting may be necessary later; easily lost Bulky and uncomfortable in hot weather; inconvenient to store
Canal Caps	Comfortable, cool, lightweight	Don't always seal well enough to ensure complete protection
Earmuffs	Easy to put on and take off; protect all parts of	

Remember: Never use homemade hearing protection—cotton balls, stereo headsets, etc. These devices don't really protect your hearing

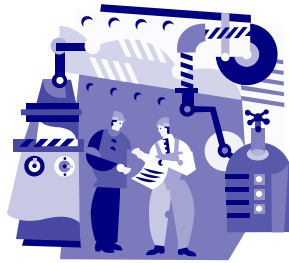
What Can Be Done About Noise?

There are many things your employer does to protect you and your co-workers from noise:

- * Maintain and lubricate equipment to eliminate rattles and squeaks
- * Install newer, quieter machines to replace older, noisy ones. Sometimes old machines can be rebuilt or changed so that they make less noise, such as replacing leather transmission belts with rubber belts. Loose rotating discs can be tightened.
- * Repair equipment regularly so that broken parts don't create unnecessary noise
- * Install materials that lessen environmental noise by using dampers, such as pads, carpets, mufflers, etc.
- * Mount machinery or other equipment on tables or other stable construction to eliminate vibration
- * Place walls, shields, remote control booths, or other sound barriers between workers and sources of noise



Move workers away from sources of noise or place noisy equipment in isolated areas



- * Rotate groups of workers in and out of noisy environments so that it shortens the amount of time workers are exposed to dangerous noise
- * Perform high-noise maintenance operations during hours when few people are affected
- * Use large, low-speed fans instead of noisier small, high-speed ones
- * Use sound-absorbing acoustical tiles or baffles on floor, ceilings, and walls

Remember: Your employer needs your help. Don't interfere with, remove, or modify noise abatement equipment. Properly maintain all equipment for which you are responsible. Report and equipment malfunctions to your supervisor.

How to Care for Hearing Protection

Remember: Never use alcohol, acetone, or chemicals to wash hearing protectors.

Earplugs

Formable Plugs:

- * Wash in mild detergent and warm water
- * Squeeze out excess water
- * Let dry in air

Pre-molded plugs:

- * Wash in warm, soapy water
- * Rinse well
- * Dry well with cloth and store in carrying case

Always store earplugs in a clean location when not being used. You might use the container they came in as a storage box.

Replace earplugs if they

- * Aren't soft and pliable
- * Become misshapen
- * Become cracked

Canal Caps

- * Clean them the same way as pre-molded earplugs
- * Don't bend or try to change headband

Earmuffs

- * Clean cushions with warm soapy water
- * Rinse
- * Replace cushions about twice a year—sooner if they become stiff, cracked, or don't seal
- * Don't stretch headband

How to use Earmuffs:

- * Adjust headband so cushions press equally against both ears
- * Pull hair back and away from beneath cushions
- * Don't place anything under the cushions



For proper fit, earmuffs must

- * have a headband that's neither too tight nor too loose
- * have cups that fit comfortably
- * be lightweight so you can wear them many hours

There are special earmuffs:

- * Dielectric earmuffs have no metal parts. These are used by employees who work with electricity, such as live electrical lines
- * Electronic earmuffs reduce dangerous noise, but they magnify other needed sounds, such as voices
- * Folding earmuffs can be used by workers who need quick, but not full-time protection

Hearing Protection Devices

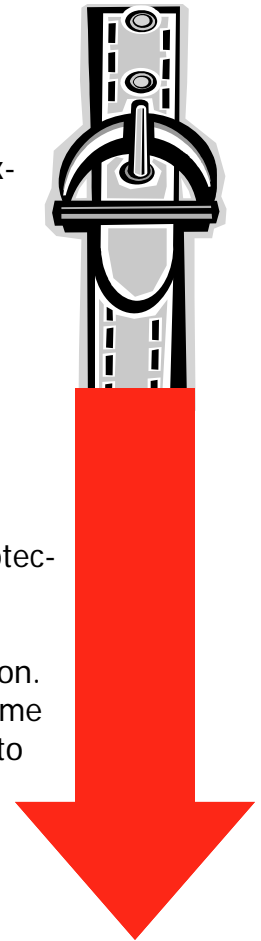
The OSHA Hearing Protection Program states that hearing protection devices must be made available if 8hour noise exposure can't be reduced below 85 dB.

Your employer is required to

- * provide this equipment
- * train you in how to use and care for it

It's your responsibility to use hearing protection to prevent hearing loss

There are three kinds of hearing protection. Each type has certain advantages. In some very noisy environments, you may have to wear two kinds of hearing protection at the same time.



Hearing protectors can reduce sound levels by 20 to 40 dB

Select the Right Hearing Protection

Like other kinds of personal protection equipment, you must use the right protection for the job. Consider the following:

- * Kinds of noise. What are the noise hazards in your workplace? How loud is the noise?
- * Noise reduction rating (NRR) on equipment means the device has been designed and tested for noise reduction
- * Length of exposure. How long will you be exposed to dangerous noise? Will your exposure be for the whole workday or will you come and go in a noisy environment?
- * Your workplace. What safety hazards exist? Is your workplace confined?
- * Proper fit. Does the hearing protection provide you with the safety you need? Can you comfortably wear it?
- * Easy to use. How easy is the protection to insert or put on? Is it easy to clean?
- * Durability. Will the protection last a long time in order to cut down on cost?

Remember: Use proper ear protection when you're exposed to loud noise at home, too

Earmuffs (Circumaural)

Earmuffs help protect you against moderate to high-level noise. Of course, in some high-noise areas, you may have to wear earmuffs and earplugs together.

Earmuffs have three basic parts:

Headband. This spring-loaded band holds the cups against your ears. Some earmuffs are attached directly to your hard hat.

Ear Cups. These plastic cups cover the ears. They are filled with sound-absorbing material, such as foam.

Ear Cushions. These soft cushions are filled with air, liquid, or foam. They seal around the ears to provide both comfort and protection.

Earmuffs are easy to put on and take off. However, they are bulky and uncomfortable in hot weather.

Earmuffs must fit tightly over the ears to block noise. If the air seal between the ear and the ear cushions is broken, the muff's effectiveness is reduced.



How to Use Earplugs:

Formable Plugs:

- * Slowly roll and compress plug into a thin cylinder
- * Pull up and back on ear with other hand
- * Insert compressed plug deep into ear canal
- * Hold finger against plug until it begins to expand

Pre-molded Plugs:

- * Reach around back of head
- * With one hand pull outward and upward on ear while inserting plug with other hand
- * Push and twist plug until it fits snugly

Canal Caps (Semi-inserts)

Canal caps are soft, flexible pads on the ends of a light-weight headband. Canal caps must fit snugly so they seal the entrance to the ear canal instead of going into it like earplugs do.

Canal caps are comfortable, cool and easy to put on and take off. They are good to use when you enter or leave noisy environments. However, they provide less protection than earplugs or earmuffs. They don't always seal the ear canal and they aren't recommended for long-term wearing.

How to use Canal Caps:

- * Hold large ends of pads
- * Swivel them to place tips into ear canal openings
- * Push and wiggle pads into canals until they seal snugly

Earplugs (Inserts)

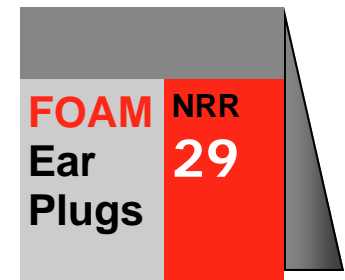
Earplugs are inserted into the ear canal. They seal the ear canal and prevent noise from reaching delicate parts of the ear. If they're carefully fitted, earplugs can cut noise levels by up to 20 dB.

Some kinds of earplugs are disposable while others are reusable. Disposable earplugs are usually made of waxed cotton or acoustical fibers. They are used once then thrown away.

Semi-disposable plugs are made of foam material. They can be used for about a week.

Reusable plugs may be two kinds:

- * Pre-molded plugs are usually made of silicone, rubber, or plastic. They often come in two or more sizes and can be fitted individually to each ear. Have the fit checked after a week if the plugs are not comfortable.
- * Custom-molded plugs are usually made of silicon rubber or a plastic compound. They are made to the exact fit of the ear. They may last three to five years.



Compare kinds of earplugs:
Check for the presence of the NRR on the package.