

NOISE-INDUCED HEARING LOSS
GENERAL FACTS

DESCRIPTION OF NIHL:

When an individual is over-exposed to excessive sound, sensitive structures of the inner ear can be damaged, causing noise-induced hearing loss (NIHL). These structures can be injured by exposure to an intense brief impulse of noise, such as an explosion, or from continuous exposure to loud sounds over time. Noise-induced hearing loss is cumulative and permanent. However, both forms of NIHL can be prevented through the control of sound levels or regular use of hearing protectors such as earplugs or earmuffs.

MEASUREMENTS THAT DETERMINE WHICH SOUNDS CAUSE NIHL:

Sound pitch or frequency is measured in Hertz (Hz). Although the human ear collects sounds ranging from 100-20,000 Hz, it amplifies the 2-5 kHz frequency range where much of the important speech information registers. The intensity of sound or sound pressure level (SPL) is measured in decibels (dB). For example, normal conversation is measured at a moderate noise level of 50-70 decibels (dB), while the extreme noise level of a rock concert might be measured at 110-130 decibels (dB). Because the auditory system does not have a limiting mechanism to prevent dangerous amounts of acoustic energy from being transmitted to the inner ear, over-exposure to high intensity sound is a leading cause of damage to nerve cells. Sounds above 85 dB may cause permanent hearing loss. Some examples of loud noises that can cause NIHL are:

Motorcycle/Hair dryer/Lawn mower/Leaf blower	85-90 dB
Wood shop/Chainsaw/Firecrackers (small)	100-110 dB
Rock concerts	110-130 dB
Pneumatic drill/Ambulance Siren/Jet take off	119-140 dB

EFFECTS OF NIHL:

When damage first occurs, it usually affects the part of the ear corresponding to the higher frequencies of the voice range at 4 kHz, creating a "noise notch." These frequencies respond to many of the consonant sounds and a person with this type of hearing loss may have trouble understanding speech. Hearing loss may be accompanied by tinnitus - a ringing, buzzing or fluttering in one or both of the ears. Sometimes exposure to impulse or continuous noise may cause only temporary hearing loss. Temporary hearing loss is called a temporary threshold shift. The temporary threshold shift usually disappears within 16 hours after exposure to loud noise.

WARNING SIGNS AND SYMPTOMS OF NIHL: WARNING SIGNS:

- Temporary threshold shift
- Ear discomfort after exposure
- Ringing or buzzing in ears
- Difficulty hearing in noise

EVIDENCE OF OVER-EXPOSURE:

- Tinnitus or head noise ·
- Hypersensitivity ·
- Loss of sensitivity ·
- High frequency hearing loss

TIPS FOR PREVENTING NIHL: WHEN NOISE BECOMES A HAZARD:

- Prolonged duration of exposure
- Intensity of signal
- Repeated exposure
- Individual susceptibility

CONSERVATION TIPS:

- Avoid hazardous sound environments
- Use hearing protection whenever possible
- Monitor sound at 90 dB
- Take 15-minute "quiet" breaks every few hours
- Move away from electronic speakers

SAFE SOUND LEVELS: The Occupational Safety and Health Administration (OSHA) has set guidelines for the maximum length of time a person can be exposed to continuous sound levels, beginning at 90 dB and not exceeding 105 dB.

Sound Level Duration per Day

90 dB	8 hours
91.5 dB.....	6 hours
93 dB	4 hours
94.5 dB	3 hours
96 dB	2 hours
97.5 dB	1½ hours
99 dB.....	1 hour
102 dB	½ hour
105 dB	¼ hour or less
105+dB	Extreme risk

PUBLIC AWARENESS OF NIHL:

More than 20 million Americans of all ages are exposed to dangerous environmental noise and sound levels on a regular basis. Exposure to loud noise occurs in the workplace, the home and recreational areas. We can damage our ears while attending movies, concerts, bars, and health clubs where music and sound are amplified. Even wearing earphones can be dangerous if the volume is too loud.

Of the 28 million Americans who have some degree of hearing loss, about one-third have been affected by noise.