

## Hearing Conservation Program

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### A. Introduction

Excessive sound levels or "noise" (unwanted sound) can produce hearing loss that is temporary, permanent, or a combination of temporary and permanent. Since noise-induced hearing loss cannot be repaired or cured, the Washington State Department of Labor and Industries, Division of Industrial Safety and Health, had adopted a permissible exposure level (PEL, see next paragraph) of an 8-hour time weighted average (TWA) of 85 dBA for noise, which is designed to guard against unnecessary hearing damage Washington Administrative Code ([WAC 296-817](#)). Values equal to or below these levels are considered acceptable for industrial noise exposure without the use of hearing protection.

The permissible exposure level refers to a sound pressure (noise) level to which it is believed nearly all workers may be exposed throughout their working lifetime without adverse effects on their ability to hear and understand normal speech.

Incorporated into the PEL is a maximum exposure level or ceiling level for noise. Any exposure above the ceiling level mandates the use of hearing protection regardless of the exposure duration. For continuous noise, the ceiling level is anything above 115 dBA and for impact/impulse noise, the ceiling is at or above 140 dBA.

Western Washington University protects employees exposed to sound levels greater than the PEL by ensuring the use of hearing protectors (earplugs, muffs) supplied at no cost to exposed employees. The University reduces the employee's noise exposure level through feasible engineering controls and/or administrative controls whenever employee noise exposures equal or exceed an 8-hour TWA of 90 dBA (per WAC requirements).

Students in high noise areas are to receive the same hearing protectors and follow the same protective work practices as employees, including training in hearing protection and use of hearing protectors. Baseline and annual audiometric testing is available to students at their own cost.

Although noise level reductions are required, when feasible, to protect the majority of working individuals, noise sensitive workers may still suffer a significant hearing loss at levels below a 90 dBA TWA. To protect these individuals, hearing conservation standards have been adopted as described in the WAC.

The hearing conservation standard requires an effective hearing conservation program for employees exposed to noise at or above a TWA of 85 decibels (dB) measured on the A-scale of a sound level meter at slow response or, equivalently, a noise dose of 50 percent as shown on a noise dosimeter. This hearing conservation program is a permanent requirement as long as sound levels remain at or above 85 dBA.

The Environmental Health and Safety office coordinates the hearing conservation program and provides sound level monitoring. The office maintains records of audiometric testing and training and provides consultation.

Department heads and center directors provide training, hearing protectors, required posting of areas, and audiometric testing.

Supervisors are responsible to the department head for implementing the hearing conservation program and notifying the department head of any areas where the necessity for raised voices or shouting indicate a need for sound level monitoring.

Employees shall use provided hearing protection in accordance with instructions and training received. Employees shall notify supervisors regarding areas where sound pressure levels may be excessive.

## B. Hearing Conservation

The University's hearing conservation program assesses noise exposures to identify any employee or group of employees exposed to noise at or above a TWA of 85 dBA. For these employees, a program shall be implemented and maintained (at no cost to the employees) consisting of:

1. Mandatory audiometric testing;
2. Availability of hearing protectors;
3. Comprehensive training including hearing loss explanation, hearing protection devices, and the University's hearing conservation program;
4. Installation of warning signs for high noise area (115 dBA or higher);
5. Accurate record keeping; and
6. Employee access to their records as specified under WAC 296-817.

Additionally, the University shall post a copy of the hearing conservation standards or post a notice to affected employees or their representatives that a copy of the standard is available at the work place for their review.

## C. Monitoring

Individual or representative employee noise exposure levels are monitored in applicable areas to establish the adequacy of hearing protectors and to define boundaries for placement of high noise warning signs as required by WAC 296-817.

If a raised voice or shouting is necessary, a representative noise survey will be performed. Employees or their representatives or designees shall be given the opportunity to observe any monitoring conducted pursuant to WAC 296-817.

Industrial noise is divided into two segments: continuous and impulse/impact noise. Any noise characterized by peaks or maxima at intervals of less than one second (e.g. typewriter) or conversely, a noise with a duration of more than one second (a waterfall or pump whine) is considered continuous. If the peaks or maxima level intervals are of one second or more (a pile driver), or if the duration of the noise is less than one second (rifle shot), the noise is considered impact and/or impulse. Noise may contain both continuous and impulse/impact segments such as a jump saw. The noise from other machinery (background) or the idling saw may be continuous at one level. But when the saw is activated, a sharp rise in the noise level occurs for a very short duration (less than one second), and this higher level is considered impulsive.

Employee noise exposure is classified as continuous or intermittent. An example of a continuous exposure would be a planer feeder if the operator feeds the planer for the total work shift. The noise exposure would be considered intermittent though, if the operator is exposed for two or more segments at different levels during the day; i.e., if he or she rotates with another person who has a different (higher or lower) noise exposure level. The monitoring program addresses all noise exposures - continuous, intermittent, and impulse/impact noise. These are integrated together to obtain a total noise exposure for a worker.

## **D. Audiometric Testing Program**

One aspect of the University's hearing conservation program is the on-going monitoring of employees' hearing. Reliable audiometric data are intended to identify those individuals who are the most sensitive to noise-induced hearing loss before their hearing is severely impaired. It indicates whether the hearing conservation program is effective, and may indicate whether additional measures for employees' hearing protection are necessary.

A pre-placement audiogram shall be performed as a baseline to which future annual audiograms will be compared. Baseline audiograms for employees must be preceded by at least 14 hours without exposure to workplace noise. (Hearing protectors may be worn to satisfy this requirement.) If high levels of noise will be encountered (on or off the job) the employee is cautioned to wear appropriate hearing protection during these periods. If the employee does not receive needed quiet time prior the hearing test, some temporary hearing loss may still remain. This temporary loss will be recorded on the employee's audiogram; therefore, an accurate representation of the hearing threshold will not be indicated.

The University's audiometric program is under the supervision of a licensed or certified audiologist, otolaryngologist, or other qualified physician. Audiograms may be given by a certified technician who is responsible to an audiologist, otolaryngologist, or qualified physician.

Annual audiograms may be conducted at any time during the work shift. If an indication of hearing loss (threshold shift) appears, retesting at a different time may be required after a thorough review of the worker's audiogram and baseline and the audiometric test room and equipment calibration data.

Whenever a standard threshold shift occurs (an average of 10 dB or more change from the worker's baseline at frequencies of 2 khz, 3 khz, and 4 khz in either ear), the University complies with WAC 296-817 follow-up procedures.

Audiometric testing complies with specifications in the standard regarding procedures and equipment.

## **E. Hearing protectors**

Hearing protectors shall be made available to each employee exposed to noise at or above 85 dBA TWA. Supervisors shall ensure their use.

Hearing protectors are intended to reduce the noise level at the inner ear. Due to variations in ear canal size and shape and environmental factors such as dust, grease, temperature, and humidity, at least two types of hearing protectors must be available from which employees can choose. The four basic types of hearing protectors are: (1) molded earplugs, (2) custom-molded earplugs, (3) self-molded earplugs, and (4) earmuffs.

Molded earplugs are usually made of plastic or silicone rubber. They are available in a variety of shapes and sizes and are usually characterized by one or more ribs or contours. Molded earplugs are considered multiple use; therefore, they must be cleaned and properly stored after each use.

Custom molded plugs are generally made of plastic and are designed from a molded wax insert of the wearer's ears. They are considered multiple use but cannot be switched from ear to ear. Self-molded earplugs are generally made of mineral down or plastic foam and are molded or formed by the wearer. Generally, one size fits all and they may be either single or multiple use. Earmuffs are designed to for multiple uses and may be designed to be worn with the harness over or behind the head, or below the chin to facilitate hard hats or personal preference. The ear pads can be foam or liquid filled, and generally one size fits all.

Hearing protectors must reduce the employee's noise exposure level at the inner ear to 85 dBA or below. Actual noise reduction provided by hearing protectors varies widely; therefore, the Environmental Health and Safety staff will assist departments in ensuring employee noise exposure is actually reduced through evaluation of the noise reduction provided by each type, or combination.

Hearing protection shall be re-evaluated whenever noise exposure increases (the person assumes a noisier job) to assure that the type of protection selected will still reduce the employee's time-weighted average to 85 dBA or less. If hearing protectors are to provide the intended attenuation, they shall be worn as designed and instructed. Any modification or use not authorized or approved by the manufacturer may render them ineffective. For example, knit wool "watch caps" under earmuffs will not allow a proper ear cup to head seal.

Similarly, cutting off a portion of an earplug or not inserting it properly will reduce its effectiveness drastically. Remember, hearing protectors must be comfortable to be worn, and must be properly worn to be effective.

For similar reasons, radio earphones (those not specifically designed for employee communication) are not allowed as protection from excessive noise levels. Actual noise reduction of most brands is relatively poor, and workers tend to "cover up" or mask outside noise by turning up the radio volume.

## **F. Training**

Initial employee training shall be conducted prior to receiving the baseline audiogram so employees can fully understand the purpose of the program and the audiogram. Once understood, the audiogram will become one of the most important motivating measures for the employee because it shows actual hearing ability. The remaining program must comply with the requirements of WAC 296-817.

Required annual training shall be provided to reinforce employee understanding and update changes in hearing protection equipment, work processes, and noise abatement programs.

## **G. Warning Signs**

Warning signs shall be posted at entrances to or at the periphery of all well-defined work areas in which employees may be exposed to 115 dBA or more. Warning signs shall clearly indicate that the area is a high noise area and that hearing protectors are required.

## **H. Record Keeping**

The University shall keep accurate records of all employee exposure monitoring and audiometric testing data, including equipment calibration and test room background levels.

Employee exposure monitoring records include time-motion studies, sound level meter results, dosimeter results, equipment identification (model number, serial number), and calibration data. These records must be maintained for the duration of employment plus three years. Longer retention will prove beneficial in cases where engineering controls and/or administrative procedures are being instituted and evaluated.

Audiometric testing data include employee name and job classification, employee audiograms, date of audiogram, examiner's name, date and type of last audiometric calibration, and the employee's most recent noise exposure assessment. Data on background sound pressure levels inside the test room shall also be retained. Audiometric testing data shall be retained for the duration of the affected employee's employment plus three years.

All records required by this section shall be provided upon written request to employees, former employees, employee representatives, and the Director of the Department of Labor and Industries or his or her designee. The provisions of WAC 296-817 apply to records required under the hearing conservation program standards.