

What is occupational noise exposure?

Noise, or unwanted sound, is one of the most pervasive occupational health problems. It's a by-product of many industrial processes. Sound consists of pressure changes in a medium (usually air), caused by vibration or turbulence. These pressure changes produce waves emanating away from the turbulent or vibrating source. Exposure to high levels of noise causes hearing loss and may cause other harmful health effects as well. The extent of damage depends primarily on the intensity of the noise and the duration of the exposure.

Noise-induced hearing loss can be temporary or permanent. Temporary hearing loss results from short-term exposures to noise, with normal hearing returning after period of rest. Generally, prolonged exposure to high noise levels over a period of time gradually causes permanent damage.

The Occupational Safety and Health Administration's (OSHA's) hearing conservation program is designed to protect workers with significant occupational noise exposures from hearing impairment even if they're subject to such noise exposures over their entire working lifetimes.

Here's a summary of the required component of OSHA's hearing conservation program for general industry. It covers monitoring, audiometric testing, hearing protectors, training, and recordkeeping requirements.

What monitoring is required?

The hearing conservation program requires employers to monitor noise exposure levels in a way that accurately identifies employees exposed to noise at or above 85 decibels averaged over eight working hours, or an eight-hour timeweighted average (TWA). Employers must monitor all employees whose noise exposure is equivalent to or greater than a noise exposure received in eight hours where the noise level is constantly 85 decibels. The exposure measurement must include all continuous, intermittent, and impulsive noise within an 80 to 130 decibel range and must be taken during a typical work situation. This requirement is performance-oriented because it allows employers to choose the monitoring method that best suits each individual situation.

Employers must repeat monitoring whenever changes in production, process, or controls increase noise exposure. These changes may mean that more employees need to be included in the program or that their hearing protectors may no longer provide adequate protection.

Employees are entitled to observe monitoring procedures and must receive notification of the results of exposure monitoring. The method used to notify employees is left to the employer's discretion.

Employers must carefully check or calibrate instruments used for monitoring employee exposures to ensure that the measurements are accurate. Calibration procedures are unique to specific instruments. Employers should follow the manufacturer's instructions to determine when and how extensively to calibrate the instrument.

* Source material provided from www.osha.gov

What is audiometric testing?

Audiometric testing monitors an employee's hearing over time. It also provides an opportunity for employers to educate employees about their hearing and the need to protect it.

The employer must establish and maintain an audiometric testing program. The important elements of the program include baseline audiograms, annual audiograms, training, and follow-up procedures. Employers must make audiometric testing available at no cost to all employees who are exposed to an action level of 85 decibels or above, measured as an eight-hour TWA.

The audiometric testing program follow up should indicate whether the employer's hearing conservation program is preventing hearing loss. A licensed or certified audiologist, otolaryngologist, or another physician must be responsible for the program. Both professionals and trained technicians may conduct audiometric testing. The professional in charge of the program does not have to be present when a qualified technician conducts tests. The professional's responsibilities include overseeing the program and the work of the technicians, reviewing problem audiograms, and determining whether referral is necessary.

The employee needs a referral for further testing when test results are questionable or when related medical problems are suspected. If additional testing is necessary or if the employer suspects a medical pathology of the ear that's caused or aggravated by wearing hearing protectors, the employer must refer the employee for a clinical audiological evaluation or otological exam, as appropriate. There are two types of audiograms required in the hearing conservation program: baseline and annual.

What is a baseline audiogram?

The baseline audiogram is the reference audiogram against which future audiograms are compared. Employers must provide baseline audiograms within six months of an employee's first exposure at or above an eight-hour TWA of 85 decibels. An exception is allowed when the employer uses a mobile test van for audiograms. In these instances, baseline audiograms must be completed within one year after an employee's first exposure to workplace noise at or above a TWA of 85 decibels. Employees, however, must be fitted with, issued, and required to wear hearing protectors whenever they are exposed to noise levels above a TWA of 85 decibels for any period exceeding six months after their first exposure until the baseline audiogram is conducted.

Baseline audiograms taken before the hearing conservation program took effect in 1983 are acceptable if the professional supervisor determines that the audiogram is valid. Employees shouldn't be exposed to workplace noise for 14 hours before the baseline test or wear hearing protectors during this time period.

What are annual audiograms?

Employers must provide annual audiograms within one year of the baseline. It is important to test workers' hearing annually to identify deterioration in their hearing ability as early as possible. This enables employers to initiate protective follow up measures before hearing loss progresses. Employers must compare annual audiograms to baseline audiograms to determine whether the audiogram is valid and whether the employee has lost hearing ability or experienced a standard threshold shift (STS). An STS is an average shift in either ear of 10 decibels or more at 2,000, 3,000, and 4,000 hertz.

What is an employer required to do following an audiogram evaluation?

The employer must fit or refit any employee showing an STS with adequate hearing protectors, show the employee how to use them, and require the employee to wear them. Employers must notify employees within 21 days after the determination that their audiometric test results show an STS. Some employees with an STS may need further testing if the professional determines that their test results are questionable or if they have an ear problem thought to be caused or aggravated by wearing hearing protectors. If the suspected medical problem isn't thought to be related to wearing hearing protection, the employer must advise the employee to see a physician. If subsequent audiometric tests show that the STS identified on a previous audiogram is not persistent, employees whose exposure to noise is less than a TWA of 90 decibels may stop wearing hearing protectors.

The employer may substitute an annual audiogram for the original baseline audiogram if the professional supervising the audiometric program determines that the employee's STS is persistent. The employer must retain the original baseline audiogram, however, for the length of the employee's employment. This substitution will ensure that the same shift isn't repeatedly identified. The professional also may decide to revise the baseline audiogram if the employee's hearing improves. This will ensure that the baseline reflects actual hearing thresholds to the extent possible. Employers must conduct audiometric tests in a room meeting specific background levels and with calibrated audiometers that meet American National Standard Institute (ANSI) specifications of SC-1969.

When is an employer required to provide hearing protectors?

Employers must provide hearing protectors to all workers exposed to eight-hour TWA noise levels of 85 decibels or above. This requirement ensures that employees have access to protectors before they experience any hearing loss.

Employees must wear hearing protectors:

- For any period exceeding six months from the time they are first exposed to eight-hour TWA noise levels of 85 decibels or above, until they receive their baseline audiograms if these tests are delayed due to mobile test van scheduling.
- If they have incurred standard threshold shifts that demonstrate they are susceptible to noise.
- If they're exposed to noise over the permissible exposure limit of 90 decibels over an eight-hour TWA.
- Employers must provide employees with a selection of at least one variety of hearing plug and one variety of hearing muff. Employees should decide, with the help of a person trained to fit hearing protectors, which size and type protector is most suitable for the working environment. The protector selected should be comfortable to wear and offer sufficient protection to prevent hearing loss.

Hearing protectors must adequately reduce the noise level for each employee's work environment. Most employers use the noise reduction rating (NRR) that represents the protector's ability to reduce noise under ideal laboratory conditions. The employer then adjusts the NRR to reflect noise reduction in the actual working environment.

The employer must reevaluate the suitability of the employee's hearing protector whenever a change in working conditions may make it inadequate. If workplace noise levels increase, employees must give employees more effective protectors. The protector must reduce employee exposures to at least 90 decibels and to 85 decibels when an STS already has occurred in the worker's hearing. Employers must show employees how to use and care for their protectors and supervise them on the job to ensure that they continue to wear them correctly.

What training is required?

Employee training is very important. Workers who understand the reasons for the hearing conservation programs and the need to protect their hearing will be more motivated to wear their protectors and take audiometric tests. Employers must train employees exposed to TWAs of 85 decibels and above at least annually in the effects of noise; the purpose, advantages, and disadvantages of various types of hearing protectors; the selection, fit, and care of protectors; and the purpose and procedures of audiometric testing. The training program may be structured in any format, with different portions conducted by different individuals and at different times, as long as the required topics are covered.

What exposure and testing records must employers keep?

Employers must keep noise exposure measurement records for two years and maintain records of audiometric test results for the duration of the affected employee's employment. Audiometric test records must include the employee's name and job classification, date, examiner's name, date of the last acoustic or exhaustive calibration, measurements of the background sound pressure levels in audiometric test rooms, and the employee's most recent noise exposure measurement.

Beginning January 1, 2003, employers also will be required to record work-related hearing loss cases when an employee's hearing test shows a marked decrease in overall hearing. Employers will be able to make adjustments for hearing loss caused by aging, seek the advice of a physician or licensed health-care professional to determine if the loss is work-related, and perform additional hearing tests to verify the persistence of the hearing loss.