

Noise Information and Training

If you are reading this document it is likely that you are participating in your employer's Hearing Conservation Program and you are about to or just have finished taking an audiogram to evaluate your hearing. Michigan has an Occupational Health Standard entitled Part 380 – Occupational Noise Exposure. Many of the requirements of this standard are triggered by the level of your exposure to noise.

An initial requirement of this standard is that your employer has to determine if any employee is exposed to noise at or above the action level. When employee noise exposures equal or exceed an eight-hour, time-weighted average (TWA) of 85 decibels (i.e., the action level), the employer must establish an effective hearing conservation program as described in the standard. When employee noise exposures exceed an eight-hour TWA of 90 dBA (i.e., the permissible exposure limit), your employer must additionally provide and require the use of hearing protection and provide engineering or administrative controls, where feasible, to reduce the employee exposures to noise.

As a part of implementing a hearing conservation program, the company must conduct noise monitoring to determine who needs to be included in the hearing conservation program (i.e., exposures at or above the action level) and must wear hearing protection (i.e., exposures above the permissible exposure limit). You might fall into one of these categories. This document is designed to provide you with information on the effects of noise on hearing, the purpose of hearing protectors; the advantages, disadvantages, and attenuation of various types of hearing protectors; and instructions on the selection, fitting, use, and care of hearing protectors and the purpose of audiometric testing and an explanation of the test procedures.

The human ear can hear an audible range of sound from 20 Hertz (cycles per second, abbreviated “Hz”) to 16,000 Hz. Noise is measured in decibels (abbreviated “dB”). The hearing test (i.e., audiogram) will be used to evaluate how well you can hear. It is also used for comparison (current test with baseline test) to determine if your hearing is staying the same or getting worse over time. The testing procedure utilizes a small sound reducing booth that is connected to an audiometer, which produces pure tones at six different frequencies. The person being tested will sit in the booth, don headphones and listen for the pure tones, when the tone is heard the individual responds back to the machine, usually by pushing a button. The audiometer will test both the left and right ear and when it is completed it will generate a report for the audiologist to review and compare to your baseline audiogram.

The noise standard uses the 2000, 3000 and 4000 Hz frequencies to determine if an individual has developed hearing loss which is also called a “Standard Threshold Shift”. This shift could be either a permanent one or temporary, eventually if the noise exposure is not reduced or controlled a temporary shift will become permanent. When hearing loss develops, the individual will lose hearing in the 4000 – 6000 Hz range first, and then followed by the other frequencies. Unfortunately these are the main frequencies associated with speech and once we lose hearing in these frequencies we will have problems understanding speech. This is why it is so important to protect your hearing from the permanent damage that repeated exposure to high noise can produce.

Industrial settings can be loud. Reducing noise through engineering controls can be difficult to achieve and extremely expensive, when retrofitting existing equipment. So to protect you from the effects of noise, your employer has implemented a hearing conservation program. Part of this program is to evaluate noise levels and provide employee protection from the loud noises generated throughout your workplace. Since the noise levels can not be reduced to below the Action Level (AL) (i.e., 85 dBA averaged over an eight hour workday), the employer has provided you with hearing protection. Hearing protection, when properly inserted into the ear canal, can reduce your exposure to noise. Employee should be trained on how to insert ear plugs correctly. You should have a few varieties to choose from and a comfortable set of plugs will allow you to wear them all day long without irritation. Choose a plug that is comfortable to you when it is fully inserted into your ear canal. Muffs are a common type of hearing protection but the problem arises when safety glasses are worn in conjunction with the muffs. The temple bars of the glasses will interfere with the sealing surface of the muffs and reduce the noise reduction ability of the muffs.

Noise Reduction Ratings (NRRs)

All plugs and muffs have Noise Reduction Ratings, which are also known as NRRs. NRRs can run from 18 dBA to 32 dBA and provide an estimate on how well the plugs/muffs reduce noise. However, lab reports have determined that this number is not an accurate one when used in the field. Rule 22 of the noise standard requires the employer to evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. One method that can be used to determine the effectiveness of a plug's noise attenuation is to take the NRR number, subtract 7 dB and subtract the remainder from the A-weighted TWA to obtain the estimated TWA noise exposure under the ear protector. Hearing protectors shall attenuate employee noise exposures to at least the permissible exposure limit (e.g. 90 dBA for an eight hour TWA) or the AL (e.g. 85 dBA for an eight hour day) for employees that have experienced a standard threshold shift (STS). In very loud noise environments (i.e., 100 dBA+) it is recommended that both plugs and muffs are worn at the same time. Muffs worn in addition to plugs will provide only another five decibels worth of protection.

Plugs must be clean before they are inserted to reduce the risk of an ear infection. Dirty fingers will contribute to dirty plugs as well as leaving them out in the open factory environment. It is acceptable to reuse plugs but dirty plugs need to be replaced. The plugs need to be fully inserted into the ear canal, it is a very common sight to see partially inserted plugs because they are uncomfortable or the individual "can't hear with them in". It is also very common for hearing loss to occur in the individuals that do not properly wear their hearing protection. This is why training employees on how to properly wear hearing protection provided is an important part of a hearing conservation program.

Remember it is your hearing, when it is gone it does not come back. Wear clean comfortable hearing protection properly inserted into your ear canal and ask questions you have about your employer's hearing conservation program or you are having problems with your hearing.