



**Hearing Conservation Standard**

**LMS0053A**

Revision Date: 2017/04/28

*Document Approver* Director, OS Environment and Regulatory

*Document Owner:* Manager, Industrial Hygiene and Compliance

---

**SCOPE AND PURPOSE**

This standard applies to all Suncor Energy Inc. Wood Buffalo employees and contractors, and is part of the Suncor's EHS management system.

Over exposure to noise of sufficient intensity and duration can result in hearing damage. The primary goal of the Hearing Conservation Standard is to reduce, and eventually eliminate hearing loss due to workplace noise exposures.

**HEARING CONSERVATION PROGRAM (HCP) STANDARD**

A HCP is a noise management system with elements that are designed to help prevent hearing loss in personnel, who are assigned to jobs with area or equipment or task noise levels of 85 dBA and above shall be assigned to the HCP. The HCP elements include the following:

- Noise Exposure Monitoring
- Audiometric Testing and Medical Surveillance
- Noise Control and Mitigation Measures
- Hearing Protective Devices (HPD)
- Personnel Education & Training
- Program Review

**NOISE EXPOSURE MONITORING**

All operational areas will undergo the industrial hygiene process of recognition, evaluation and control to mitigate potential noise effects from elevated noise levels.

All new plants or process areas shall be assessed for the existence of elevated noise levels within 6 months of commissioning. This assessment will serve as baseline assessment to help determine areas requiring hearing protection. Follow-up and periodic assessments will be conducted based on the re-assessment schedule indicated in the [LMS0078A](#).

All noise monitoring shall be conducted and interpreted by a competent person from the Industrial Hygiene department. The noise levels will be measured in accordance with CSA Standard Z107.56-06, Procedures for the Measurements of Occupational Noise Exposure using acceptable Type 2 instrument. Detailed noise assessment requirements are documented in Appendix II. All the evaluated noise levels will be compared to the Occupational Exposure Limits for Noise in Table 1, Schedule 3 of the Alberta Occupational Health and Safety Code, July 2009.

---

*Continued on next page*

Area and personal noise monitoring will be conducted in all operational areas. Areas where noise levels are greater than 83 dBA will be re-evaluated when significant changes affecting the level of noise have occurred or every three years, whichever comes first.

Background noise levels shall be measured in the Facilities where audiometric testing is conducted every three years, at a minimum by the contractor providing audiometry services. Noise levels must meet the levels outlined in Table 3: Permissible Background Noise Conditions during Audiometric Testing, in Schedule 3 of the Alberta Occupational Health and Safety Code, July 2009.

## **AUDIOMETRIC TESTS AND MEDICAL SURVEILLANCE**

Audiometric testing shall be conducted on all Suncor Energy noise exposed workers, whose personal noise exposure levels is in excess of 85 dBA for 8-hr shift and 83 dBA for 12-hr shift; or if they are required to work more than 25% of their time in areas with noise levels exceeding the occupational exposure limits if personal noise data is unavailable. The purpose of audiometric testing is to establish a baseline measurement of the employee's hearing and to then monitor the worker's hearing at regular intervals to detect the changes in hearing ability. Detailed audiometric testing procedure is shown in Appendix III. Audiometric testing shall be conducted in accordance with the following circumstances:

### **1. Initial Audiometric Assessment**

Suncor's noise exposed workers shall undergo initial audiometric testing as soon as possible within 6 months of hire date. The employee shall be free from excess noise exposure for at least 12 hours prior to the audiometric test. This initial audiometric test is classified into one of three categories: Normal, Early Loss Index and Abnormal. The initial audiometric test is considered the baseline and all subsequent audiograms will be compared to this. As part of the initial and subsequent audiometric evaluations, employees shall receive individual counselling on the health effects of noise hazards, the importance of wearing hearing protectors, instruction on how hearing protectors should be worn and the results of their audiogram.

### **2. Periodic Audiometric Assessment**

Periodic audiometric testing is done one year after the initial audiometric test and then on a biennial basis for all noise exposed workers. The results from the periodic audiometric test are compared to the results from the employee baseline audiometric test to determine if a change in hearing has taken place. The audiometric test may be done at any time during the employee's shift, with the best time being the latter half of the shift. The comparison results are classified into one of three categories: No Shift, Early Warning Shift and Abnormal Shift.

For an audiogram classified as No Shift, no further action is required. Audiograms classified as Early Warning Shift indicate a possible change in hearing ability. Additional counselling on the importance of wearing hearing protectors to prevent further loss and instruction on how hearing protectors should be worn shall be provided to employee.

If an Abnormal Shift classification is identified, the results must be validated. A follow-up audiometric test must be performed within 30 days of the abnormal shift test, with the requirement that the employees have no noise exposure for at least 12 hours prior to the test. If the Abnormal Shift classification is confirmed by the second audiometric test, the employee must be informed of the results and a relevant medical history taken. The abnormal audiogram, the baseline audiogram and the medical history must be forwarded to the Suncor contract physician or designated audiologist for review. The employee shall be advised of the recommendation from the physician or audiologist within 30 days. If an abnormal shift is confirmed, the abnormal shift audiogram will then become the baseline audiogram for future comparison purposes.

### **3. Post-Incident Assessment**

If there is an incident where employees are exposed to extremely elevated noise levels of 115 dBA or greater, post-incident audiometric testing should be conducted within 30 days of the incident to determine if there has been significant impact on employees hearing.

### **4. Exit Assessments**

Exit audiograms are conducted on noise-exposed employees leaving the employ of Suncor Energy (employees with more than 6 months service). If a periodic audiometric test has been performed within 6 months prior to exit, no additional testing is required.

### **5. Ear Fit Testing for Ear Plugs – Fort Hills Only**

During audiometric tests, ear fit testing will be conducted for the workers using 3M E-A-Rfit Dual –Ear Validation System for 3M earplugs to obtain the Personal Attenuation Rating (PAR). Ear fit testing is a short test and similar to mask fit testing, but is used to evaluate the noise reduction of 3M earplugs. It is the workers' responsibility to use the ear plug that they are fit tested for to attain the best noise attenuation. Other approved ear plugs can still be used for sufficient protection. Ear fit test cards are issued to indicate the type of 3M ear plugs fit tested. The Ear fit test card is not required to obtain ear plugs, but serves as a record of ear plugs that best fit the employee.

## **NOISE HAZARD CONTROLS AND MITIGATIONS**

The selection of the most appropriate control option(s) will be governed by the specific task and specific work area. The preferred hierarchy of control options is in the order below.

### **1. Elimination**

Regulatory requirements stipulate that any new projects, including renovations or alterations of existing facilities, must be designed and constructed such that the continuous noise levels generated are not greater than 85 dBA or are as low as reasonably practicable.

### **2. Engineering Controls**

Engineering control method should be considered in all situations and implemented where feasible. Engineering noise controls try to minimize exposure by altering or removing noise sources. Source controls are the preferred solution to noise problems. This emphasizes the economic importance of early consideration of noise controls. New equipment should have noise levels of 85 dBA or less. For areas where elevated noise levels already exist, consideration must be given to retrofitting the areas on a permanent or temporary basis to reduce the noise.

Suitable engineering controls could include the following:

- lubrication of machines;
- substitution of quieter machines for noisier machines;
- reducing rotational speed;
- enclosing the noise source or the operator;
- using sound absorbing materials;
- installation of mufflers or silencers on vents and air intakes;
- installation of vibration damping materials to isolate equipment vibration;
- reducing the velocity of air flow;
- wall & ceiling mounted noise absorbing panels; and
- installation of acoustical blanketing and/or pipe lagging.

### **3. Administrative Controls**

Administrative controls are to be applied when the elevated noise levels cannot be engineered out. Suitable administrative controls include the following:

- rotation of jobs between employees in the high noise areas;
- increasing the distance between the noise source and the employees;
- changing the length of schedules;
- changing a procedure so that a quieter tool is used for the job;
- requiring an employee to notify area when they start up noisy equipment; and
- posting warning signs at access points of areas where noise levels are greater than the occupational exposure limits.

Employees required to routinely work in areas where noise levels are greater than the occupational exposure limits must receive education on the following:

- description of Suncor's Hearing Conservation Program
- the hazards of noise
- development of hearing loss
- the purpose of audiometric testing
- the purpose and limitations of hearing protectors
- the proper way to wear hearing protectors
- characteristics of noise in employee's specific working environment

### **4. Personal Protective Equipment**

Hearing protective devices (HPD) are any device that can be worn to reduce the level of sound entering the ear. HPD is a proven method of protection. HPDs shall be used while engineering controls are being investigated, developed, and implemented, where such controls are not feasible and where exposure to noise is infrequent.

Hearing protective devices such as ear plugs or muffs shall only be used when engineering or administrative controls cannot reduce the noise to acceptable levels. Hearing protection shall be worn by all personnel when they must enter or work in an area where noise levels are at the occupational exposure limits or greater. Employees are allowed to select from a variety of suitable hearing protective devices that are readily available at the work locations or at entry points to the operating areas. Only Suncor approved hearing protection devices can be used for noise hazards. At Suncor Oil Sands, CSA Class A hearing protection devices or other classes are evaluated and approved by Suncor Hygiene department.

A list of Suncor approved hearing protective devices is provided in Appendix I.

As per Suncor's PPE approval process, new hearing protection devices must be vetted for approval through the Industrial Hygiene department before they can be procured and used at the site. Types of HPD and how to properly wear HPD are shown in Appendix III.

Table 1 provides the hearing protection requirements based on the noise level and shift length.

In some situations the exposure time must be limited to keep sound reaching employee's ear drum below the occupational exposure limits. Assistance from Industrial Hygiene may be required to determine these locations.

---

*Continued on next page*

Table 1: Hearing Protection Requirements

Shift Length	Noise Exposure Level (dBA)	Hearing Protection Requirement
8 hour	85 - 100	Single hearing protection
	100-105	Dual hearing protection
	>105	Dual hearing protection and time limitations required. Consult Industrial Hygiene
10 hour	84-99	Single hearing protection
	99-104	Dual hearing protection
	>104	Dual hearing protection and time limitations required. Consult Industrial Hygiene
12 hour	83-98	Single hearing protection
	98-103	Dual hearing protection
	>103	Dual hearing protection and time limitations required. Consult Industrial Hygiene

#### 4.1 Use of Hearing Aids at Site

Some hearing-impaired workers who wear hearing aids want to be able to continue to wear hearing aids in their workplaces even when exposed to high levels of noise. They feel that with the hearing aid they can communicate better with co-workers, are able to better localize sound, and can hear warning or equipment sounds.

Hearing aids, however, in addition to amplifying useful sounds also amplify unwanted background noise, therefore, hearing aids should not be turned on in areas with hazardous noise. However, on a case-by-case basis, hearing aids may be turned on underneath an earmuff. Please notify your industrial hygienist to evaluate your situation on a case-by-case basis.

Hearing aids are not hearing protectors, as hearing aids turned off do not provide enough blockage of sound to act as hearing protection, but may reduce the sound enough to prevent the worker from hearing warning signals or other essential sounds. Please notify your industrial hygienist to evaluate your situation on a case-by-case basis.

#### NOISE HAZARD EDUCATION

Noise hazard education shall be provided to employees that fall in the hearing conservation program during their audiometric testing and fit testing. Employees shall receive individual counselling on the importance of wearing hearing protectors, instruction on how hearing protectors should be worn and the results of their audiogram. The noise education shall include the effect of noise exposure on hearing, the components of the hearing conservation program, the importance of hearing protection, proper selection and use of hearing protectors, noise hazard areas and the purpose of audiometric testing.

## PROGRAM EVALUATION

The effectiveness of the hearing conservation program in each operating area will be evaluated on an annual basis. The evaluation will consider the following, as a minimum by Health & Wellness and Industrial Hygiene:

- percentage of Audiograms completed;
- percentage of Abnormal Shifts in a one year period, greater than 5% indicates need to review control measures;
- percentage of Early Warning Shifts in a one year period, greater than 10% indicates need to review control measures; and
- compliance with requirement to use hearing protection by workers in line of work (field observations)
- Abnormal audiograms are investigated for work relationship by Health & Wellness, and followed up with further IH assessments if required by Industrial Hygiene.
- The HCPs overall effectiveness is assessed and documented

## ROLES & RESPONSIBILITIES

The Manager, Industrial Hygiene and Radiation is accountable for the evaluation, maintenance and revision of this standard every three years.

Line management is responsible for ensuring the implementation and adherence to this standard.

The Health and Wellness Centre shall ensure that the initial baseline and periodic audiometric test results are maintained in employee medical files. The Health and Wellness Centre is responsible for providing the individual counselling to employees. The Health and Wellness Centre shall be responsible for the annual program evaluation with the field data collected and provided by Industrial Hygiene department. The Health and Wellness Centre shall ensure that the workers' training and audiometric testing are completed and records are kept.

The Industrial Hygiene department is responsible for identifying and evaluating sources of elevated noise and the associated occupational groups that may be exposed. The Industrial Hygiene department shall provide guidance to the Business Areas on the necessary control measures for mitigating elevated noise exposures. The Industrial Hygiene department will provide field audit data on compliance of hearing protection use to Health & Wellness as part of program evaluation. All noise survey data will be maintained by the Industrial Hygiene department in the Industrial Hygiene report database.

Employees shall participate in the program by adhering to requirements of the program including wearing the proper PPE and active participation in personal audiometric testing where required.

## EXCEPTIONS

None

## DEFINITIONS

A **Normal** baseline audiogram is one where threshold data does not exceed 25 dB hearing threshold level.

An **Early Loss Index** baseline audiogram is one where there is a 15 dB notch at 3000, 4000, and/or 6000 Hz compared to neighbouring frequencies. The deepest part of the notch will display 30 dB hearing threshold level or greater.

---

*Continued on next page*

An **Abnormal** baseline audiogram is one that meets the following three criteria:

- 1) if the hearing threshold level in either ear is more than 25 dB at 500, 1000 or 2000 Hz;
- 2) if the hearing threshold level in either ear is more than 60 dB at the selected frequencies of 3000, 4000, or 6000 Hz; and
- 3) if there is a one-sided hearing loss with the difference between the average of the better ear's threshold values measured at 3000, 4000 and 6000 Hz and the average of the other ear's threshold values measured at 3000, 4000, and 6000 Hz exceeds 30 dB.

**No Shift** means an audiogram produced from a periodic audiometric test which shows no significant change when compared to the worker's baseline audiometric test or to one of the worker's periodic audiometric tests.

**Early Warning Shift** means an audiogram produced from a periodic audiometric test which shows a shift of 15 dB or more, in either ear, at 2000 to 6000 Hz when compared to the worker's baseline audiometric test or to one of the worker's periodic audiometric tests.

**Abnormal Shift** means an audiogram produced from a periodic audiometric test which shows a drop, in either ear, of 15 dB or more at any two consecutive frequencies, from 1000 to 6000 Hz when compared to the worker's baseline audiometric test or to one of the worker's periodic audiometric tests.

## REFERENCES

**Alberta Human Resources and Employment, Occupational Health and Safety Codes, July 2009**

**NIOSH Power Tool Database**

<http://blogs.cdc.gov/niosh-science-blog/2009/11/24/hearing/>

## APPENDIX I

### LIST OF SUNCOR APPROVED HEARING PROTECTIVE DEVICES

<b>EARPLUGS:</b>			
	<b>Foam Earplugs Class A</b>	<b>Stock No.</b>	<b>Comments</b>
1	Decidamp 2	1000016007	
2	Pura Fit #6800 (Moldex)	1000016002	
3	E.A.R. Classic		Order on demand
4	3M 1100	1000016008	
5	Howard Leight Max 1D	1000024792	Order on demand

<b>CAP MUFFS (for use with Hard Hat):</b>			
	<b>Cap Muffs Class A</b>	<b>Stock No.</b>	<b>Comments</b>
1	Bilsom B2728-18	1000016005	
2	Peltor H7P3E (green)	1000016003	Order on demand
3	Hellberg Mark 10	1000016004	Order on demand
4	Sordin EXC	1000039367	Order on demand
5	David Clark [Model 40786G-02]		Order on demand
6	Peltor HTM79B		Order on demand
6	Peltor Optime 101 H7B		Order on demand

#### Earplugs approved for Fort Hills

<b>Description</b>	<b>Part Number</b>	<b>Size</b>	<b>Comments</b>	<b>NRR , CSA Class</b>
3M E-A-Rsoft™ Yellow Neons™	312-1250	Regular	No material master # as LVHV item	33 dB, AL
3M E-A-Rsoft™ FX™	312-1261	Regular	No material master # as LVHV item	33 dB, AL
3M E-A-Rsoft™ Yellow Neons™	312-1251	Large	No material master # as LVHV item	33 dB, AL
3M E-A-R™ Classic™	310-1103	Small	No material master # as LVHV item	29 dB, AL
3M No-Touch™	P2000	Regular / will fit small ear canals	No material master # as LVHV item	29 dB, AL
3M E-A-R™ Push-Ins™	318-1004	Regular/will fit small ear canals	No material master # as LVHV item	28 dB, AL

## APPENDIX II

Noise level surveys should be conducted by the industrial hygienist (a trained, experienced and competent employee or an approved consultant who specializes in noise surveys) at all Suncor Energy work sites where noise levels exceed the occupational exposure limits as 85 dBA for 8 hours and 83 dBA for 12 hours.

### Area Noise Mapping

Area noise assessment shall use an integrating sound level meter meeting the Type 2 or Type I instrument requirements specified in American National Standards Institute (ANSI) Standard S1.4-1983 (R2006). Areas noise maps should be created from the area noise results.

Area noise mapping results will be used to:

- Ensure that personal exposures to noise do not exceed established government safe limits;
- Determine the effectiveness of specific engineering/administrative controls in minimizing exposures to noise;
- Determine the location or effectiveness of required noise warning signage;
- Determine the adequacy of selected noise control measures including PPE.

Area noise mapping must be carried out as per applicable regulations.

- At a minimum every five years;
- Within 12 months at a new worksite;
- Within 12 months after the any significant physical alterations, renovation or repair to the workplace;
- On all tasks or processes where there is a potential for noise overexposure that have not been previously evaluated.

### Personal Noise Monitoring

At work sites where employees are regularly exposed to noise in excess of 85 dBA for 8 hours and 83 dBA for 12 hours; personal noise monitoring shall be conducted to measure and record noise levels while the employee is completing their shift. Personal noise assessment shall use a Type 2 noise dosimeter as per requirement specified in ANSI Standard S1.25-1991 (R1997), and shall be conducted by Suncor Energy Industrial Hygienist or other qualified person appointed by Suncor Energy Industrial Hygienist.

Personal noise monitoring results will be used to:

- Ensure that personal exposures to noise do not exceed established government safe limits;
- Determine the effectiveness of specific engineering/administrative controls in minimizing exposures to noise; and
- Determine the adequacy of selected noise control measures including PPE.

---

*Continued on next page*

Personal noise monitoring must be carried out as per applicable regulations:

- At a minimum every three years for high risk exposure groups where noise exposure levels are at or greater than the noise occupational exposure limits.
- Every five years for low risk exposure groups with noise exposure levels are less than the noise occupational exposure limits with more than 25 % work time in elevated noise areas.
- Within 24 months for working groups at a new worksite;
- Within 24 months for working group with any significant physical alterations, renovation or repair to the workplace.

### **Noise Data Management**

All the area noise mapping and person noise monitoring results will be entered and managed in:

- Medgate GX2 (sound level surveys and dosimetry)
- Noise at Work Software (sound level surveys)

### **Instrumentation**

Sound level meters and noise dosimeters are used to assess an employee's exposure to noise. Octave band analyzers are used to identify the frequencies at which the noise is generated and are mainly used to aid in selecting engineering controls.

### **Sound Level Meters (SLM)**

All sound level meters used will conform, as a minimum to CSA Z107.56-06 Procedures for the Measurement of Occupational Noise; American National Standards Institute (ANSI) Standard S1.4-1993 (R2006). Such a meter shall incorporate the following characteristics as a minimum:

- an A-weighting network;
- a dynamic range of 50 dB;
- a crest factor capability of 30 dB; and
- Type 2 tolerance (in accordance with ANSI S1.4)

### **Dosimeters**

All dosimeters used will conform, as a minimum to CSA Z107.56-06 Procedures for the Measurement of Occupational Noise; ANSI S1.25-1991 (R2007). Such a meter shall incorporate the following characteristics as a minimum:

- an A-weighting network;
- a dynamic range of 50 dB;
- a crest factor capability of 30 dB;
- Type 2 tolerance (in accordance with IEC 61672-1 or ANSI S1.4 or ANSI S1.25); and
- a threshold level at least 10 dB below the applicable criterion level.

## APPENDIX III

### PERSONAL HEARING PROTECTIVE DEVICES

Personal hearing protection device (HPD) should only be used as the last line of defense when workplace noise cannot be feasibly controlled to within safe levels (85 dBA in 8-hour work-shift and 83 dBA in 12-hour work-shift environment). Proper personal hearing protection should be chosen based on the combination of personal comfort, compatibility with other in-use PPE, and the required noise attenuation.

Personal hearing protection devices are sound barriers that block a certain amount of sound energy transmitted from the surrounding environment to the middle and inner ear. The degree and nature of sound reduction or "attenuation" provided is an important consideration in choosing a particular type of hearing protection device. Security of the device on the head and comfort are other important considerations.

#### Types of HPDs

##### Foam Earplugs

Foam earplugs (also called "roll-down" foam earplugs to emphasize the fact that such products must be rolled and compressed prior to insertion) are made from slow-recovery material. They are often referred to as "disposable plugs", but most brands can usually be reused a few times before they must be discarded (for reasons of personal hygiene and deteriorating performance). Some models are offered in more than one size.

##### Custom-Moulded Earplugs

Some employees use custom moulded earplugs. Suncor does not provide these, but does not prohibit workers from using them. Please consult Industrial Hygiene for guidance on selection of custom moulded earplugs. Custom-moulded earplugs are made to fit a particular ear canal exactly. They are most often manufactured from mouldable silicone compounds, although some are available in vinyl or acrylics. Ear canal impressions are made using a viscous material with a consistency varying from that of thick syrup to soft putty. Like premoulded earplugs, they should be inspected periodically. If these custom-fitted earplugs shrink, harden, or crack, or if the wearer gains or loses substantial weight, then they should be remade.

##### Earmuffs

Earmuffs normally consist of rigid moulded plastic earcups that seal around the ear using foam-, fluid-, or gel-filled cushions, or cushions composed of a fluid-filled bladder combined with a layer of foam. Earmuffs can be worn in various positions, according to the manufacturer's instructions. They are held in place with metal or plastic spring-loaded headbands. The cups are lined with acoustical material, typically an open-cell foam, to absorb high-frequency noise within the earcup.

---

*Continued on next page*

## Cap-Mounted Earmuffs

These are earmuffs with the cups directly attached to a hardhat by short arms that are spring-loaded to press the cups snugly against the ears. The cups can be easily removed for maintenance purposes. Some types have earcups that can be retracted, so that the wearer can communicate easily in quiet environments and put the earcups back in place when the noise is present.

## Sound Attenuation

The attenuation of hearing protection devices is measured in laboratories, under controlled conditions, and reported as attenuation and standard deviation values measured at specified frequencies. Another way of reporting the attenuation is as a single-number or multi-number rating obtained through calculations from the laboratory results. Attenuation values are used to calculate the noise level reaching the ear. The results from the laboratory measurements are in general much higher than those obtained in the field. Using high attenuation values results in unrealistically low predicted effective exposure levels, giving a false sense of security to the wearer.

There are several reasons for the difference between the laboratory and real-world results; poor fit, lack of proper training, and inadequate motivation of users are principal ones. Providing proper training on correct fitting and motivating wearers through an understanding of the very real hazard of permanent hearing loss are the best ways to increase the attenuation in the field (real-world attenuation).

The effective attenuation of a hearing protection device depends on the amount of time it is worn in the noisy environment. What is not obvious to most wearers is the drastic reduction in protection when the protector is removed even for short periods of time (called "off time"). In some cases, this reduction can be as high as 95% or more if the protectors are removed for as little as three or four minutes. Therefore, it is important to wear the hearing protection devices during the entire period of exposure to excessive noise levels.

## Risk of overprotection

Understanding speech (speech intelligibility) in a noisy environment (where noise levels exceed 85 dBA) generally improves with the use of protectors. However, it decreases for those with hearing loss or for those not fluent in the language.

Individuals wearing a hearing protection device that provides too much attenuation may feel isolated from the surrounding environment. In addition, the sound may be perceived not only as fainter but also as distorted - it sounds muffled. The result is that speech, noise from a machine, warning sounds, and any other sounds are perceived in an altered form by the wearer.

The negative effects of overprotection are enhanced with increasing attenuation, leading individuals to resist wearing protectors. Care shall be taken to select protectors with sufficient but not excessive, attenuation, so as to reduce the ambient levels to or below the recommended maximum 8 h exposure of 85 dBA, but not below 70 dBA.

---

*Continued on next page*

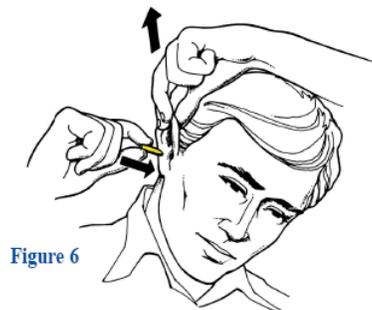
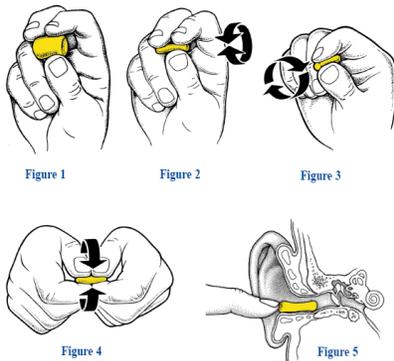
The practical estimate of actual protection from hearing protections can be obtained by reducing the labelled NRR for that hearing protector by 50 %. The maximum of additional noise attenuation by second hearing protector was 5 dB.

Table 2: Protection outcome for an 8 hour shift at various attenuated noise signal with hearing protection devices

Attenuated noise signal with HPD (dBA)	Protection Outcome
>85	Insufficient
80 – 85	Acceptable
75 – 80	Ideal
< 75	Overprotection

### How to Properly Insert an Earplug

- Hands and plugs should be clean prior to use.
- Begin by rolling the plug into a very thin crease-free cylinder. The cylinder should be as small in diameter as possible.
- Crease-free rolling is accomplished by squeezing lightly as you begin rolling, then applying progressively greater pressure as the plug becomes more tightly compressed.
- Once the plug has been properly rolled and compressed, immediately insert it well into the ear canal.
- As with all earplugs fitting is easier if the ear canal is straightened and enlarged by pulling the outer ear (pinna) outward and upward during the insertion.
- Pull the pinna firmly, usually in the direction the ear extends from the head. Don't just press it flat against the skull.
- Plugs should be inserted into the right ear using the right hand and into the left ear with the left hand. The pinna should be pulled with the opposite hand by reaching behind or over the head.
- This allows the hand inserting the plug to have the best line of approach for proper fitting.
- After insertion, it may be necessary to hold the plug in place with a fingertip for a few moments until it begins to expand and block the noise.
- Occasionally when a foam plug is first inserted, it may be slightly uncomfortable if fitted deeply. So instead of immediately withdrawing a deeply fitted plug, it is better to wait 30 seconds for the plug to expand to see if the discomfort subsides, if not withdraw the plug slightly.



#### Special Pinna Tip

A correct pinna pull is especially helpful. If the plug doesn't slide into the canal, keep trying to insert it as you continuously change the direction of pinna pull (up, out, back, etc.), until the plug slides into place.



The following individuals have approved and signed this document.

UserName: Sheila Chernys (schernys)

Title: Dir OS Enviro & Reg

Date: Friday, 28 April 2017, 12:54 PM Mountain Time

Meaning: Approver 1 Signed

=====