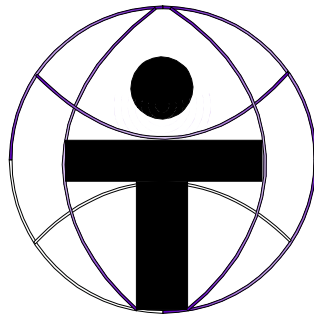


# NIH Hearing Conservation Program



Technical Assistance Branch (TAB)  
Division of Occupational Health and Safety  
Office of Research Services  
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## Disclaimer

No guarantee is expressed or implied that any information outlined in this program would prevent an employee from experiencing any form of hearing loss. If all of the instructions and recommendations are followed correctly, the program (Hearing Conservation Program) can help to lessen hearing loss caused by occupational noise exposure.

## Introduction

The Division of Occupational Health and Safety (DOHS), Office of Research(ORS), is responsible for implementing all elements of the Hearing Conservation Program (HCP) at the National Institutes of Health (NIH), which includes audiometric testing, that is conducted by the NIH Occupational Medical Service (OMS) Clinic (See Appendix A). OMS also keep and manage the current list of NIH personnel in the HCP. The HCP primarily serves NIH employees. The responsibilities of the DOHS in the Hearing Conservation Program include the following:

- 1) Identification of areas at the NIH where noise levels equal or exceed 80 dBA.
- 2) Locations with noise levels equaling or exceeding 85 dBA are classified as "Noise Hazardous Locations". Such locations are posted, and resurveyed biennially.
- 3) Identification, through monitoring, of any NIH employee whose noise exposure level equals or exceeds an 8-hour TWA of 85 dBA. Such individuals are referred to OMS for inclusion in the HCP, which includes Audiometric Testing (see appendix A).
- 4) Resurveying and monitoring of areas where noise levels exceed 80dBA, but less than 85dBA, is done every 3 years.
- 5) Remonitoring of any noise hazardous area is done, due to structural, equipment, or operational changes.
- 6) Assist, where feasible, in the implementation of engineering and administrative controls.
- 7) Evaluating hearing protection to see if adjusted noise reduction rating (NRR) is adequate.
- 8) Annual education and motivational training of employees in the HCP.
- 9) Assist, where possible, in the proper keeping of HCP records.

**Note:** An annual DOHS/OMS review of the Hearing Conservation Program is recommended. Also, a copy of the OMS aspect of the program is attached as Appendix A.

## Noise Hazard Identification

Noise is unwanted sound. Sound occurs when a vibrating surface compresses and rarefies the air around it. If the variations in noise level involve maxima at intervals of 1 second or less, it is considered continuous noise.

The Code of Federal Regulations (CFR), Title 29, which pertains to the Occupational Safety and Health Administration (OSHA, Department of Labor. In 29 CFR 1910.95, Occupational Noise Exposure, permissible noise exposure levels are defined as the following:

<b>Duration per day, hours</b>	<b>Sound Level(dBA) Slow response</b>
8	90
6	92
4	95
3	97
2	100
1	105
1/2	110
1/4 or less	115

From 29 CFR 1910.95, Table G-16-Permissible Noise Exposures

The National Institutes of Health (NIH), being aware that excessive noise exposure is a potential cause of hearing loss, establishes a hearing conservation program that is more conservative than that required by OSHA. The NIH has adopted the current American Conference of Governmental Industrial Hygienists (ACGIH) noise exposure limits referred to as threshold limit values (TLV) for noise, which are defined below.

<b>Duration per day</b>		<b>Sound Level(dBA)</b>
Hours	24	80
	16	82
	8	85
	4	88
	2	91
	1	94
Minutes	30	97
	15	100
	7.50	103
	3.75	106
	1.88	109
	0.94	112
Seconds	28.12	115

The OSHA noise standard dictates that whenever employee noise exposures equal or exceed an 8-hour time-weighted-average (TWA) of 85 dB measured on the A scale, slow response; a continuing, effective, hearing conservation program shall be instituted. No employee shall be exposed unprotected to identified continuous noise that is 115 dBA or greater. Also, no employee shall be exposed unprotected to identified intermittent or impact noise more than a peak C-weighted level of 140 dB.

The OSHB, as part of the noise monitoring, shall identify areas of the NIH where noise levels equal or exceed 80 dBA. In those areas where the noise levels equal or exceed 85 dBA, employees shall be dosimetry monitored to determine whether their noise exposure equals or exceeds an 8 hour time weighted average (TWA) of 85 dBA, thus requiring their inclusion into the NIH Hearing Conservation Program.

Records shall be maintained by the OSHB and updated at least every three years to determine if any alteration in noise levels has occurred. Those areas where the noise level is below 80 dBA will not be routinely monitored. Identification of noise levels and any subsequent noise monitoring shall be done by the Technical Assistance Section(TAS), OSHB.

As part of the identification of a noise hazardous location, proper signage shall be posted at the entrance to any work area where noise levels exceed 85 dBA. This requires anyone entering the area to wear proper hearing protection. The ICD Safety and Health Specialist shall be informed of any area within their respective ICD where the posting of signs is required. It is the responsibility of the area supervisor, assisted by the ICD Safety and Health Specialist, to ensure that these precautions are maintained.

## Noise Exposure Monitoring

All areas where noise levels equal or exceed 85 dBA shall be remonitored at least every two years to ensure that all exposed employees whose 8-hour TWA equals or exceeds 85 dBA are included in the Hearing Conservation Program.

Note: Both dosimeter and sound level meter (SLM) calibrators must be calibrated once per year. The calibrating of the calibrator must be done using a National Institute of Standards and Technology (NIST) standard. A record must be kept on the calibration of all equipment.

The monitoring of employees for noise exposure is made up of two parts, area and personal monitoring. Area measurements (sound level readings) are obtained first. If noise levels are at or above 85 dBA, personal monitoring using dosimeters are then performed. Sample recording sheets for both area and personal noise monitoring results are included as Attachments 1 and 2, respectively.

### **Area Monitoring:**

Area monitoring is done using a pre-calibrated and post-calibrated sound level meter (SLM) set to A scale, slow response. Only calibrator(s) recommended by the SLM manufacturer shall be used. The difference between the before and after calibration shall be within plus or minus 1 dB. The meter used shall meet or exceed the requirements for a type 2 sound level meter per the American National Standards Institute (ANSI) S1.4 (1983).

Within the area of interest, several different locations will be measured. Typical measurement locations would include:

- 1) In the hearing zone at the employee's normal work location.
- 2) Next to the noise source(s).
- 3) At the entrance(s) to the work area.
- 4) At other locations within the area where the employee might spend time working.

A sketch of the area shall be included with the results showing the locations where the noise readings were obtained.

If the noise levels are below 80 dBA in the area, no further routine monitoring will be required for that area.

Should any of the noise measurements equal or exceed 80 dBA, records shall be maintained as to the noise levels recorded, where they were taken, and the source(s) of the noise. These records shall be updated at least once every three years to determine if any changes have occurred that would warrant remonitoring of the exposed personnel. If any of the measurements equal or exceed a noise level of 85 dBA, employees who work in that area or operate such equipment shall have their noise exposure determined through personal monitoring using dosimeters. Any NIH employee who is monitored shall be notified of the results of the monitoring within 15 working days.

Note: On rare occasions monitoring is conducted in locations with a high magnetic field that can damage or destroy the SLM.

On such occasions, monitoring shall be conducted using a manufacturer supplied extension cable connecting the SLM meter to a nonmagnetic probe with a microphone attached. During monitoring, the microphone shall be placed, at ear level, in locations where workers function. A nonmagnetic stand can be used to hold the probe in place during this exercise.

#### **Personal Monitoring:**

In those areas where the noise level equals or exceeds 85 dBA, employees shall be monitored at least every two years to determine their noise exposure.

Determination of the noise exposure level will be accomplished using a pre-calibrated and post-calibrated noise dosimeter. The acoustical calibrator used must be one recommended by the manufacturer. The option setting must 80 dB threshold, 85 dB criterion level, 3 dB doubling, "A" weighting, "slow" response. All intermittent, continuous, and impulse sound level from 80-140 dB shall be integrated into the dosimetry measurement.

Each employee to be monitored will have a dosimeter placed on him at the beginning of the work shift with the microphone placed in the "hearing zone". The dosimeter will be worn for the full duration of the work shift while the employee performs his normal work routine.



At the end of the work shift, the dosimeter shall be removed and read as soon as possible. Background information will be collected from each employee detailing job description, unusual job activities, etc., for the time period sampled. Those employees whose noise exposure equals or exceeds 85 dBA on an 8-hour TWA will be referred to OMS for inclusion in the Hearing Conservation Program.

Note: On those occasions when dosimeters cannot be used to obtain a TWA (e.g., locations with high magnetic fields), obtaining the TWA shall be derived by calculation. The SLM data obtained on such occasions, and other relevant data needed to calculate the TWA, shall be documented and authenticated. The current AIHA, **Noise and Hearing Conservation Manual's** formulas shall be used to calculate dose and TWA.

Any area that has noise levels that equal or exceed 80 dBA shall be remonitored whenever a change in production process, equipment, or controls increase the noise exposure such that additional employees are exposed to noise levels at or above 85 dBA. Areas where the noise levels have dropped below 80 dBA due to alterations in equipment, controls or process changes shall be eliminated from the monitoring program. Whenever an employee exhibits a standard threshold shift, as determined by OMS, the employee's work place shall be remonitored to identify and assist in ameliorating the cause of the STS.

## Engineering and Administrative Controls

Engineering control should be the first line of defense used to lessen hazardous noise levels. It is also the best long term solution to effectively reduce hazardous noise levels.

Note: Noise control is best done at the source. Also, it is imperative that all engineering controls are carefully designed and installed.

It is essential that prior to the designing of an engineering control structure, a detailed noise evaluation must be conducted. An octave band analyzer, a spectrum analyzer, is an instrument used to determine frequency distribution of sound energy before designing any type of engineering control. Frequency bands in octave band analyzers are expressed as center frequencies, which are used one at a time. When the sound wave is not constant, a real time analyzer shall be used which observes the desired noise source continuously.

Noise levels emitted by any industrial equipment should be evaluated before purchasing and installing the equipment. Low frequency noises should be avoided when possible because of their difficulty to engineer out. If a high noise level is an integral part of the machinery, a manufacturer produced noise attenuation equipment should be obtained along with the machinery.

Engineering controls should be utilized to reduce noise levels to 85 dB or lower. It may not be feasible for controls to reduce the noise levels to 85dB. Therefore, other sources of similar machinery should be explored to obtain one that is able to engineer out noise levels above 85 dB.

Retrofitting for noise reduction should be avoided when possible. Historically, retrofitting has been proven to be a difficult and expensive undertaking with a high rate of failure.

Administrative controls are not used as a primary control measure because of the potential for error. Engineering controls are the best long-term solutions to any occupational noise problem.

## Audiometric Evaluation

Any NIH employee whose noise exposure equals or exceeds an 8-hour TWA of 85 dB shall be referred to OMS for audiometric evaluation and inclusion in the hearing conservation program.

An employee baseline audiogram shall be established within six months of the 85 dB TWA being established, and annual audiograms shall be conducted thereafter, provided they remain in a designated noise hazardous area. Employees shall not be exposed to high occupational noise levels before an audiogram and shall be informed not to expose themselves to high nonoccupational noise levels up to 14 hours before an audiogram.

The following list of compliancies is mandatory.

(1) Audiometric Measuring Instruments shall comply with 29 CFR 1910.95 Appendix C; (2) Audiometric Test Rooms shall comply with 29 CFR 1910.95 Appendix D; and 3) Acoustic Calibration of Audiometers shall comply with 29 CFR 1910.95 Appendix E.

Note: An annual audiogram can become a baseline standard according to OSHA criteria. A technician who performs an audiometric test must be responsible to an audiologist, otolaryngologist or physician. He or she does not need to be certified (certification is recommended).

A Standard Threshold Shift (STS), which is a comparison of the annual audiogram to the baseline audiogram (change of 10dB or more at 2000, 3000, & 4000 Hz in either ear) is indicated, retesting may be done within 30 days. If on retesting, an STS persists, the employee shall be informed of this fact in writing, within 21 days of the determination. An audiologist, otolaryngologist or physician shall review problem audiograms and determine if there is a need for further evaluation.

Unless a physician determines that STS is not work related, the following procedures shall be followed:

- o Employee must be fitted with hearing protectors or existing protectors shall be checked for adequacy
- o Refit and retrain employees already wearing protectors
- o Conduct or refer employee for clinical evaluation and retesting as deemed necessary
- o Inform employees with non-work related ear problems of the need for an otologic exam.

**Note: For more detailed information on Audiometric Evaluation, see Appendix A.**

## Hearing Protection Devices

Personal hearing protection devices are classified as follows:

1. Aural inserts or ear plugs

- A. Formable
- B. Premolded

2. Circumaural protectors or ear muffs

**NOTE:** It is essential that the hearing protection issued is adequate to reduce the steady state noise exposure to a TWA less than or equal to 85dB. The noise reduction rating (NRR) developed by the Environmental Protection Agency (EPA) requires that the NRR must be shown on each hearing protection package. Therefore, the NRR of each issued hearing protection shall be known by the individual wearer.

The initial issuance of hearing protection devices is handled through both the OMS and DOHS. The OMS will issue and fit the initial hearing protection devices. The DOHS has a variety of hearing protection devices for employee evaluation and the information to order them. It is the responsibility of the employee's supervisor, assisted by the ICD Safety and Health Consultant to assure that sufficient and proper hearing protection is available at all times. Training in the use of hearing protection devices is done by both OMS during the regular audiometric exam, by the ICD Safety and Health Consultant as required, also by DOHS during the annual training program sessions.

Personnel who work in noise hazardous areas shall have hearing protection supplied to them. Issued hearing protection shall be maintained as an item of individual issue and not shared with anyone. Employees shall be instructed in the proper use of hearing protection devices.

It is the responsibility of supervisors at all levels to ensure that hearing protectors are worn by all personnel working in noise hazardous areas or while using noise hazardous equipment (see NIH Manual issuance #1340: NIH Occupational Safety and Health Management).

It is the responsibility of all NIH employees who work in noise hazardous areas to wear their hearing protection at all times. Employees shall promptly report to their supervisors any problems related to their hearing protection (see NIH issuance manual #1340).

**Maintenance and Sanitation of Hearing Protectors:**

Employees shall ensure that hands are clean before inserting formable ear plugs into their ears. Clean reusable earplugs with mild soap, rinse thoroughly, and dry with clean absorbent paper or cloth before returning to case. Use disposable plugs once and discard appropriately.

Inspect ear muffs' ear seals and replace unserviceable seals. If seals cannot be replaced, replace the entire ear muff. The head band shall be checked periodically, particularly if the ear muff is losing its air tightness. The entire ear muff shall be kept clean and properly stored when not in use.

Contract workers shall be supplied with necessary hearing protection by their management according to OSHA, 29 CFR 1910.95.

## Education and Motivation

In order to motivate and encourage participation of all employees in the hearing conservation program, employees and management shall be educated about the program. The importance of management and employee responsibilities must be emphasized and woven into every phase of the training class.

NIH shall institute a training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels, and shall ensure employee participation in the program. This training program shall be repeated annually for all employees included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in work processes and protective equipment.

### **The training program shall include the following:**

1. The effect of noise on hearing
2. The purpose, advantages, disadvantages, and attenuation of various types of hearing protectors
3. The selection, fitting, care, and use of hearing protectors
4. The purpose and procedure of audiometric evaluations
5. The structure and components of the hearing conservation program.

## Record Keeping

The Occupational Medical Service(OMS), and DOHS are responsible for the keeping of employee hearing conservation records.

### **Record Retention**

Noise level survey records shall be kept for a minimum period of two years by OSHB.

Audiometric test records shall be kept by OMS for the duration of the affected employee's employment. These records should be kept in accessible archives after the employee has left NIH for a period not to exceed thirty years.

### **Access to Records**

Access as defined by 29 CFR 1910.20 (C)(1): The right and opportunity to examine and copy. Therefore, on request, preferably in writing, an employee shall be allowed to see their audiometric and noise exposure records, and provided with a copy. This also applies to former employees or their representatives.

### **Transfer of Records**

If the employer or their agent ceases to do business, the employer or their agent shall transfer all records to their successors or their agents. These successors are responsible for the records in the same way as the original employers.

The records of a new employee who formerly worked in a noise hazardous location should be in his current file. A copy of a new employee's audiometric records, particularly if he or she is to work in a noise hazardous area at NIH, should be transferred to the new record.

## Program Evaluation(Evaluation checklist)

The NIH hearing conservation program (HCP) is to be evaluated annually. This annual evaluation can be done internally and/or externally. The primary purpose of the evaluation is to assess the program's effectiveness. Additionally, this assessment serves to advise management on the compliance status of the HCP.

### **Evaluation checklist:**

- a. Noise hazard evaluation: Are noise hazard evaluations audited?
- b. **Controlling noise by engineering methods** is the most effective means of reducing or eliminating the hazard.
  - b1. Have noise control needs been prioritized?
  - b2. Are employees and Supervisors been appraised of noise control measures, where and when it is feasible? Are they consulted on various approaches?
  - b3. Have employees and supervisors been counseled on the operation and maintenance of noise control devices?
- c. When engineering controls are not feasible, or until they are installed, **hearing protection devices** are worn to prevent damage to the inner ear.
  - C1. Have hearing protection been made available to all employees whose average daily noise exposure is 85 dBA or above?
  - C2. Are employees given the opportunity to select from a variety of appropriate protectors?
  - C3. Are employees thoroughly trained in the use and care of their hearing protection, not only initially but once per year?
  - C4. Do employees wear hearing protection in all noise hazardous settings, and encouraged to wear them even when away from work?



- d. Administrative controls can be affected by keeping organized and current on administrative matters:
  - d1. Has there been any change in Federal Regulations, and are those changes been reflected by changes in the NIH HCP?
  - d2. Is the performance of key personnel evaluated periodically? If their performance is above average, are they being recognized in any form? If their performance is less than acceptable, are steps taken to correct them?
  - d3. Are necessary materials and supplies being ordered with a minimum of delay?
- e. **Monitoring audiometry:**
  - e1. Is the purpose for having audiometry understood by workers on HCP?
  - e2. Are referral procedures clearly specified?
- f. **Training and Education:** Some failures in a hearing conservation program can be traced to inadequacies in various elements of the program, particularly the training and education elements of the program.
  - f1. Was the success of each training program evaluated?
  - f2. Are posters, regulations, handouts, employee newsletters, and supervisors' support used as reinforcement supplements?
  - f3. Are managers and supervisors directly involved?
  - F4. Is the training content revised periodically?
- g. Is there any measurable disciplinary or enforcement measure?
- h. Is the program evaluation review updated periodically?

## **ATTACHMENTS**

1. Sound Pressure Level Survey Sheet
2. NIH Audio Dosimeter Noise Survey Sheet
3. Copy of Caution Sign for Wearing PPE

### SOUND PRESSURE LEVEL SURVEY

Division of Occupational Health and Safety, OD/ORS

Location: \_\_\_\_\_ I/C/D: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Supervisor: \_\_\_\_\_ Phone: \_\_\_\_\_ Surveyor: \_\_\_\_\_

Instrument(s) Used and #: \_\_\_\_\_

Calibrator: \_\_\_\_\_ Reads: before: \_\_\_\_\_ after: \_\_\_\_\_

Location/Equipment	dBA	dBC	Noise Sources, Exposure Time, Comments

Workers Names: \_\_\_\_\_

Was hearing protection provided and worn? \_\_\_\_\_

Were all important noise sources in operation? \_\_\_\_\_

Other noise sources: \_\_\_\_\_

Is rest of building/room/floor below the 85 dBA monitoring criteria? \_\_\_\_\_

Sign(s) posted: \_\_\_\_\_

ROOM LAYOUT - Show Sources & Measurement Location(s)

### NIH Audio Dosimeter Noise Survey

Location : \_\_\_\_\_  
 Supervisor : \_\_\_\_\_  
 Surveyor : \_\_\_\_\_

CID: \_\_\_\_\_  
 Date: \_\_\_\_\_

Dosimeter number	Employee Name	I. D.	Job Description	Survey date Time on/Off	Ear Protection Type Worn Y/N	CALIBRATION S/N/H#				SURVEY Results				
						Calibrated	Before	Date	After	TIME	DOSE	Freq. & Hr DOSE	EXR	
						91 dB	114 dB	124 dB	91 dB	111 dB	121 dB			

**Option Settings:**  
 1. OSHA setting: 00dB threshold, 90dB criterion level, 5dB doubling, "A" weighting, "Slow" response.  
 2. NIOSH setting: 00dB threshold, 85dB criterion level, 3dB doubling, "A" weighting, "Slow" response.

**CAUTION**

**EAR PROTECTION  
REQUIRED  
WHILE EQUIPMENT  
IS OPERATING**

Appendix A : OMS Audiometric Testing Program

## HEARING CONSERVATION PROGRAM

### I. Purpose

The objectives of the hearing conservation program are:

- A. to promote hearing conservation through proper use of hearing protective devices.
- B. to detect a decline in auditory acuity resulting from work place noise exposures.

### II. Relevant OMS Procedure Manual Sections

- A. Preplacement Medical Evaluation. Chapter III, Section 2.
- B. Occupational Injuries and Illnesses. Chapter III, Section 5.

### III. Attachments

- A. Otologic Evaluation Form - Attachment I
- B. Guidelines for Performing a Manual Audiogram - Attachment II
- C. Audiogram Flow Sheet - Attachment III
- D. Procedure for Individual Counseling and Hearing Protective Devices - Attachment IV
- E. Maintenance of Audiometer and Audiometric Test Booth - Attachment V
- F. Biological Audiometer Calibration Check - Attachment VI

### IV. Definitions

- A. Normal hearing threshold - auditory acuity equal to or less than 25 dB in all frequencies.
- B. Average hearing threshold (AHT) - hearing threshold for each ear at 2000 Hz + 3000 Hz + 4000 Hz divided

by 3.

- C. Baseline AHT - the AHT for each ear at the time of enrollment in the surveillance program.
- D. Standard threshold shift (STS)-a change in the baseline AHT of 10 dB or greater in either or both ears.
- E. Lower frequency average hearing level (LAHL) - hearing threshold for either ear at 500 Hz + 1000 Hz + 2000 Hz divided by 3.
- F. Baseline LAHL - the LAHL for each ear at the time of enrollment in the surveillance program.
- G. Higher frequency average hearing level (HAHL) - hearing threshold at 3000 Hz + 4000 Hz + 6000 Hz divided by 3.
- H. Baseline HAHL - the HAHL for each ear at the time of enrollment in the surveillance program.
- I. For the purpose of this program, an audiogram is abnormal if any one of the following is present:
  - 1. any individual hearing threshold in either ear is greater than 25 dB;
  - 2. a difference of greater than 15 dB in the baseline LAHL or 30 dB in the baseline HAHL between the two ears;
  - 3. a difference of greater than 15 dB in the periodic LAHL or 20 dB in the periodic HAHL compared to the baseline test value for the same ear; or
  - 4. a STS.
- J. Revised baseline - a periodic audiogram is designated as a "revised baseline" audiogram if the periodic audiogram shows a STS.
  - 1. Subsequent periodic audiograms are compared to the "revised baseline" audiogram. However, for



purposes of otologic referral the original baseline is used.

V. Eligibility

- A. All NIH employees whose potential noise exposures equal or exceed an 8-hour time-weighted average of 85 dB are eligible for participation in this program.

VI. Identification of Eligible Employees

A. Supervisors - identify work place hazards including noise as part of the preplacement medical evaluation and through their annual review of the manifest of enrolled employees in their sections.

B. Occupational Safety and Health Branch (OSHB) - Safety and Health Consultants identify employees who work in areas of high noise and through their annual review of the list of enrolled employees.

VII. Frequency of Examination

A. The evaluation is performed:

1. during the preplacement medical examination or within 6 months of the employee's first exposure to workplace noise;
2. annually; and
3. upon terminating their employment in a noisy environment.

VIII. The Enrollment Hearing Conservation Evaluation

A. Otologic history

1. An otologic history (Attachment I) is obtained to determine:
  - a. the history of past and current noise exposure;

b. the presence of audiological symptoms (e.g., tinnitus, pain, change in hearing, etc.); and

c. whether predisposing factors for hearing loss are present (e.g., family history of early hearing loss).

B. Otoscopic examination

1. An otologic examination (Attachment I) is performed to detect any abnormality in the external auditory canal or tympanic membrane.

2. If an employee has cerumen impaction, an audiogram will be performed and the employee will be issued a letter stating that a retest should be done within 30 days and after cerumen has been removed.

C. Audiogram

1. The audiogram is performed utilizing a microprocessor audiometer. The test is conducted according to the manufacturer's instructions using the automatic mode.

a. If it is not possible to establish valid hearing thresholds' using the audiometer in the automatic mode, a manual audiogram is performed (Attachment II) by an OMS clinician certified by the Council for Accreditation in Occupational Hearing Conservation (CAOHC).

2. The audiogram is mounted on the Otologic Evaluation Form (Attachment I).

3. The audiogram results with the calculated AHT, LAHL, and H AHL are transcribed onto the Audiogram Flow Sheet (Attachment III) and this baseline recording is highlighted.

4. All abnormal audiograms (see IV.I.) are classified by severity and reviewed by a physician.

D. Employee education

1. The employee is counseled as described in

Attachment IV regarding the effects of noise on hearing, and an educational booklet is provided to the employee by the OMS clinician performing the audiogram.

2. Hearing protective devices and their role in attenuating the level of noise exposure are discussed with the employee as described in Attachment IV.

a. Sizing, applicable education and initial distribution of insertion plugs is performed by an OMS clinician.

b. Sizing, appropriate education and instructions for ordering muff-type protectors is performed by OSHB.

#### IX. Periodic Hearing Conservation Evaluation

A. Enrolled employees are recalled periodically (see VII.). The OMS clinician obtains an interval otologic history, examines the employee, performs an audiogram and the associated calculations (AHT, LAHL, and H AHL). The findings are recorded on Attachment III and compared with the baseline values.

B. If an occupationally related audiometric test abnormality (e.g., an STS or a unilateral change in either the LAHL or H AHL with a logical occupational basis) is present:

1. The employee is verbally notified of the abnormality, usually during the visit. Counseling is provided regarding the effects of noise on hearing and the role of hearing protective devices (Attachment IV). In addition, formal written notification is also provided within 21 days in compliance with OSHA requirements.

2. The supervisor is notified by letter that:

a. per routine, employees are required to wear hearing protective devices in areas of noise 85dB or greater;

b. this employee's interval hearing exam was

abnormal and will be retested within 30 days;  
and

c. if the abnormal finding persists, the hearing loss will be documented in accordance with the Federal Employee's Compensation Act and an OSHB Safety and Health Consultant will be asked to investigate the worksite practices and procedures.

3. A repeat audiogram is performed within 30 days, following a mandatory 40-hour quiet period (without exposure to excessive work place and non-occupational or recreational noise), to determine if the audiometric abnormality persists.

a. If the audiometric abnormality is not present on repeat testing no further action is indicated and the employee is returned to the routine testing cycle.

b. If audiometric abnormality persists on repeat testing:

(1) the appropriate OSHB Safety and Health Consultant is notified in writing of the findings and a worksite evaluation is requested;

(2) a noise induced hearing loss is reported utilizing the OMS Accident Reporting System and a Federal Report of Occupational Illness form (CA-2) is issued to the employee (see OMS Compensation Procedures);

(3) the periodic audiogram is designated "revised baseline" and recorded as such on the audiogram flow sheet (Attachment III);  
and

(4) the employee is referred for further medical evaluation (see Section X below).

C. Reminder/recall letters are sent to those employees who do not keep scheduled appointments.

X. Medical Referral for Further Evaluation

A. An employee with significant otologic complaints or findings on physical exam is referred immediately for further diagnostic evaluation and treatment.

1. An employee with a medical complaint suspected to be a result of noise or noise protection device exposure (e.g., persistent tinnitus or feeling of fullness or discomfort in one or both ears not due to cerumen accumulation) and not previously documented to be secondary to exposure to excessive noise is referred to an otolaryngologist for further evaluation.

2. An employee with a subjective complaint or objective otologic finding not believed to be noise related (e.g., otalgia, dizziness, drainage from either ear, cerumen accumulation, or foreign body impaction) is referred to his/her personal physician for further evaluation.

B. An employee with an abnormal audiogram (IV.I.), unusual hearing loss curve, fluctuating or rapidly progressive hearing loss is referred to an otolaryngologist for appropriate evaluation following confirmation of the test findings. The repeat audiogram is performed within 30 days following a mandatory 40-hour quiet period.

C. Employees referred for further evaluation secondary to a work-related finding are provided:

1. Release of Medical Information form to sign;
2. a letter for otologic referral;
3. their baseline and most recent audiograms;
4. their audiogram flow sheet;
5. records of audiometer and audiometric test booth calibrations (Attachments V and VII); and
6. Authorization of Release of Information form to obtain a copy of the resulting consultation report.

D. The consultation report is incorporated into the employee's OMS medical record once it is reviewed by an OMS physician.

1. If the consulting physician concludes that the findings are work related, the OMS physician reviews the record to confirm that:

- a. the employee received appropriate counseling and was issued the applicable Federal Workers' Compensation forms;
- b. an OSHB Safety and Health Consultant has investigated the occurrence; and
- c. the supervisor is aware of his/her responsibilities (through written communication between OMS and the supervisor).

#### XI. Program Evaluation

A. Participation in the surveillance program is summarized annually both for the entire program and for specific worksites. The following information is reviewed and submitted to OSHB and supervisors:

1. number of employees enrolled in the prior year;
2. number (percent) of eligible employees who elected to participate in the program;
3. number of employees who did not keep original appointments (i.e. "no shows");
4. number of new enrollees identified;
5. number of employees scheduled for retesting and percent of retests completed;
6. number (percent) of participants with new findings on physical exam suggestive of an occupational hearing loss including number of employees:

- a. demonstrating STS,
  - b. referred to an otolaryngologist for further evaluation, and
  - c. issued a Federal Report of Occupational Illness claim form.
7. and the number of cases referred to OSHB for further work place evaluation and a summary of their conclusions.
- B. The Hearing Conservation Program is reviewed and revised by the OMS medical director and program coordinators at least annually.
- 1. The evaluation is based upon a review of relevant medical literature, the findings as summarized in the annual reports and observations of program participants, safety consultants, and OMS clinicians.

## XII. References

- A. U.S. Dept of Labor, Occupational Safety and Health Administration 1983. Occupational noise exposure hearing conservation amendment. Federal Register 48, 9738-9785.
- B. U.S. Dept of Labor, Occupational Safety and Health Administration 1983. Occupational noise exposure hearing conservation technical amendments to CFR. Federal Register. 54 (108): June 7, 1989, p 24333.
- C. U.S. Dept of Labor, Occupational Safety and Health Administration. Occupational noise exposure. 29 CFR ch XVII (7-1-85 Edition), pp 179-190.
- D. Noise and Hearing Loss-Consensus Conference. JAMA, 263 (23): June 20, 1990, pp 3185-3190.
- E. Sataloff, RT and Sataloff, J. Occupational Hearing Loss. Second edition, Marcel Dekker, Inc: New York, 1993.

Otologic Evaluation Form

Attachment I

Audiometric Test Results

Noise Exposure History

A. Previous employment (last 3 jobs)

Position Measures	Employer	Duration & Safety
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B. History of exposure to loud noise in the military?

C. Hobbies that expose you to loud noise?

D. Recent exposure - only noise loud enough to require shouting in order to hold a conversation is of interest in the following questions.

Hours per work day of loud CONSTANT noise?

Hours per work day of loud INTERMITTENT noise?

Minutes per work day of loud IMPULSE noise?

E. When in high noise areas, how often do you wear hearing protective devices (HPD)? never, rarely, sometimes, often, always.

F. What type of HPD do you use? Foam plug Rubber plug  
Muff

Medical History (baseline and/or since last exam)

Comments

F. Head injury with unconsciousness?	Y	N		
Perforated eardrum?			Y	N
Tinnitus or buzzing in either ear?	Y	N		
Either ear "blocked"?	Y	N		
Hearing Loss in family (before age 50)?	Y	N		

Otologic Exam



- G. Perforation of TM                      Neither    L    R  
 Drainage from ear                      Neither    L    R  
 Cerumen impaction                      Neither    L    R
- H. Plugs issued: 1 or 2 pair                      Size: XS    S    M    L  
 XL

Technician  
 PA/Physician

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Social Security No: \_\_\_\_\_

Attachment

II

Guidelines for Performing a Manual Audiogram

XIII. Background

- A. The audiogram must be performed by a certified otologic technician or physician and in accordance with the manufacturer's guidelines.

XIV. Performing the Audiogram

- A. The examiner explains the test procedure to examinee.
- B. The examinee is placed in the audiometric test booth and the earphones are placed on the examinee by the examiner.
- C. The examiner establishes the hearing thresholds by:
1. selecting a frequency and present the tone at 10dB;
  2. increasing the tone by 5dB increments until the subject responds;

3. reduce the level by 10dB increments until the subject no longer responds;
4. continue testing the frequency in this manner until the subject responds at one level at least 50% of the time (e.g., 2 out of 3 tries, 2 out of 4 tries, 3 out 5 tries etc.);
5. repeat the process with each frequency (in no particular order) for that ear; then
6. repeat the process for the other ear.

XV. Analyzing the audiogram

- A. The difference between 1kHz and 1kHz retest must be equal to or less than 5dB
- B. All test frequencies must be valid; i.e., any test frequency identified with audiometer error message NR (no response), NC (no consistent response) or IV (invalid) must be repeated until a numerical response is recorded.

Attachment III NATIONAL INSTITUTES OF HEALTH  
 OCCUPATIONAL MEDICAL SERVICE  
 HEARING CONSERVATION PROGRAM  
 Audiogram Flow Sheet

Name

SSN

JOB

Audiometer #TA 20-20080

DATE	LEFT EAR	(PARAMETERS)
RIGHT EAR	(PARAMETERS)	
TEST		
SIG		
CAL		
DATE		

DISP./

REFER.

500 1000 2000 3000 4000 6000 8000 AHT LAHL H AHL 500  
1000 2000 3000 4000 6000 8000 AHT LAHL H AHL

AHT = Average hearing threshold

ADDITIONAL COMMENTS (DATED)

$(2K + 3K + 4K)/3$

\* =

baseline

LAHL = Lower frequency average hearing level

$(0.5K + 1K + 2K)/3$

HAHL = Higher frequency average hearing level

$(3K + 4K + 6K)/3$

STS = Standard Threshold Shift

(a change in AHT of 10dB or more in

either ear relative to the baseline audiogram)

Attachment

IV

Procedure for Individual Counseling and  
Available Hearing Protective Devices

XVI. The objectives of counseling are:

A. to inform the employee of the effects of noise on  
hearing;

B. to describe the role of hearing protective devices  
in the prevention of hearing loss; and

C. to enhance employee awareness of his/her personal hearing status.

XVII. Counseling

A. Review audiogram with patient

1. Describe a normal audiogram to the patient, the hearing threshold at any frequency should be less than or equal to 25dB.

2. Show present examination and compare it with the patient's baseline.

B. Effects of noise on hearing ability

1. Discuss the fact that individuals exposed to loud noise at the worksite without hearing protection progressively lose hearing.

2. Describe to the patient that hearing loss is irreversible, but with the use of protective devices further damage can be avoided.

3. Explain that without protection the auditory system is over loaded and it is difficult to differentiate speech from background noise. Protective devices will block background noise enabling the employee to hear normal speech tones.

C. Noise induced hearing loss

1. Inform the employee that noise induced hearing loss is a slow, insidious process. It is not usually associated with pain, bleeding, or a sensation of pressure.

2. Acute symptoms - ringing after noise exposure and pain with excessive noise.

3. Chronic symptoms - constant ringing/roaring; difficulty understanding speech with background noise; in severe cases, difficulty understanding speech without background noise; difficulty hearing high-pitched noises.

D. Prevention of harmful effects of noise

1. Reiterate that using protective devices will prevent further loss.
2. Explain reference pictures and graphs that show the difference between noise induced hearing loss and age induced loss.
3. Show pictures describing noise levels in daily life and how harmful levels may be avoided.
4. Encourage use of protective devices at home, during recreation, and at the worksite.

XVIII. Hearing Protective Devices

- A. Types of protection available
  1. Foam plugs
  2. Rubber plugs
  3. Earmuffs
- B. Availability of protective devices
  1. Foam plugs - at worksite
  2. Rubber plugs - at OMS without an appointment
  3. Earmuffs - contact supervisor or the OSHB consultant for the worker's IC.
- C. When to use hearing protection
  1. Use hearing protection on the job whenever in an area posted as "high noise area" by OSHB.
  2. Encourage use of protective devices during non-occupational events (e.g., hunting, lawn mowing, etc.),
- D. Fit employee with hearing protection
  1. Foam plugs - squeeze and insert into ear canal; these plugs may be reused once or twice.
  2. Rubber plugs - measure ears with earscope

device; demonstrate insertion to the employee:

- a. lift top of external ear,
  - b. insert plug into canal with flap against posterior side of outer ear, and
  - c. may be washed and reused.
3. The type of protection device is the employee's choice; if an individual likes the item and feels comfortable with it, then he/she is more likely to use it.
4. Employees are instructed to examine hearing protection devices regularly for wear and defects and to replace immediately if needed.

#### Attachment V

#### Maintenance of Audiometer and Audiometric Test Booth

#### I. Audiometer

##### A. Biological (Bio-Acoustic Simulator) Check

1. Objective: to detect any evidence of unwanted or distorted sounds in the output of the audiometer.
2. Frequency: once daily, at beginning of day
3. Methodology: perform an audiometric test on the Bio-Acoustic Simulator. In addition, the earphones should be placed on an individual at the time of the biological check to determine if there are any abnormal sounds heard.
4. Tolerances
  - a. No unwanted or distorted sounds
  - b. Audiogram results
    - i. deviations less than 10dB allowable
    - ii. deviations equal to or greater than 10dB require acoustic calibration of audiometer by the manufacturer. Audiometer is not to be used unless biological tolerances have been met.

B. Acoustic calibration

1. Objective: to check the sound pressure output and linearity of the audiometer.
2. Frequency: yearly or when audiometer fails to meet the tolerances of a biological check.
3. Methodology: to be performed in accordance with 29 CFR ch XVII by manufacturer of audiometer.
4. Tolerances: deviations equal to or greater than 15dB at any test frequency require exhaustive calibration.

C. Exhaustive calibration

1. Frequency: every two years or when the audiometer fails to meet the tolerances of an acoustic calibration.
2. Methodology: to be performed in accordance with 29 CFR ch XVII by manufacturer of audiometer or authorized vendor.

D. Documentation: results of all biological checks and calibrations are kept on file attached to the sound booth and audiometer (Attachment VI).

II. Audiometric Test Booth

- A. Objective: to ensure that background sound pressure levels meet the requirements set forth 29 CFR ch XVII.
- B. Frequency: yearly (arranged by OMS).
- C. Methodology: to be performed in accordance with 29 CFR ch XVII by manufacturer or authorized vendor.

Attachment V

Appendix B : Synopsis of Regulation, OSHA,  
1910.95, Occupational Noise Exposure Std.



910.95(a)

Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table G-16 when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows:

FIGURE G-9 - Equivalent A-Weighted Sound Level

Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on this graph and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from Table 1.G-16.

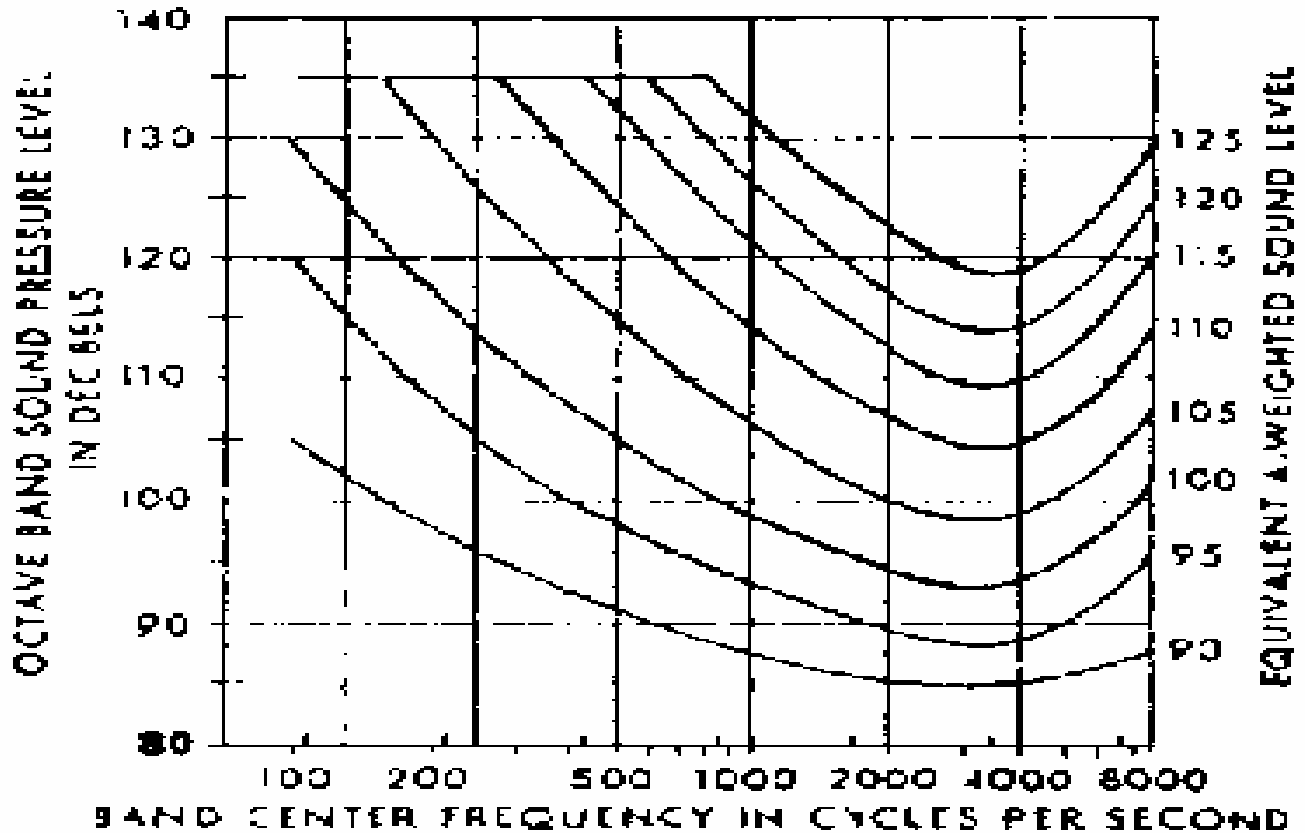


FIGURE G-9

1910.95(b)

1910.95(b)(1)

When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective

equipment shall be provided and used to reduce sound levels within the levels of the table.

1910.95(b)(2)

If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1)

Duration per day, hours	Sound level dBA slow response
8.....	90
6.....	92
4.....	95
3.....	97
2.....	100
1 1/2 .....	102
1.....	105
1/2 .....	110
1/4 or less.....	115

Footnote(1) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:  $C(1)/T(1) + C(2)/T(2) + \dots + C(n)/T(n)$  exceeds unity, then, the mixed exposure should be considered to exceed the limit value.  $C_n$  indicates the total time of exposure at a specified noise level, and  $T_n$  indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

..1910.95(c)

(c)

"Hearing conservation program."

1910.95(c)(1)

The employer shall administer a continuing, effective hearing

conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

(c)(2)

For purposes of paragraphs (c) through (n) of this section, an 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.

(d)

"Monitoring."

(d)(1)

When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.

(d)(1)(i)

The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

(d)(1)(ii)

Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.

..1910.95(d)(2)

(d)(2)

(d)(2)(i)

All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise

measurements.

1910.95(d)(2)(ii)

Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

(d)(3)

Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

(d)(3)(i)

Additional employees may be exposed at or above the action level; or

(d)(3)(ii)

The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

1910.95(e)

"Employee notification." The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

1910.95(f)

"Observation of monitoring." The employer shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.

..1910.95(g)

(g)

"Audiometric testing program."

(g)(1)

The employer shall establish and maintain an audiometric testing program as provided in this paragraph by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.

(g)(2)

The program shall be provided at no cost to employees.

(g)(3)

Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of

Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

(g)(4)

All audiograms obtained pursuant to this section shall meet the requirements of Appendix C: "Audiometric Measuring Instruments."

(g)(5)

"Baseline audiogram."

(g)(5)(i)

Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

..1910.95(g)(5)(ii)

(g)(5)(ii)

"Mobile test van exception." Where mobile test vans are used to meet the audiometric testing obligation, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

(g)(5)(iii)

Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

(g)(5)(iv)

The employer shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

(g)(6)

"Annual audiogram." At least annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

(g)(7)

"Evaluation of audiogram."

(g)(7)(i)

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift as defined in paragraph (g)(10) of this section has occurred. This comparison may be done by a technician.

..1910.95(g)(7)(ii)

(g)(7)(ii)

If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

(g)(7)(iii)

The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:

(g)(7)(iii)(A)

A copy of the requirements for hearing conservation as set forth in paragraphs (c) through (n) of this section;

1910.95(g)(7)(iii)(B)

The baseline audiogram and most recent audiogram of the employee to be evaluated;

(g)(7)(iii)(C)

Measurements of background sound pressure levels in the audiometric test room as required in Appendix D: Audiometric Test Rooms.

(g)(7)(iii)(D)

Records of audiometer calibrations required by paragraph (h)(5) of this section.

..1910.95(g)(8)

(g)(8)

"Follow-up procedures."

(g)(8)(i)

If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift as defined in paragraph (g)(10) of this section has occurred, the employee shall be informed of this fact in writing, within 21 days of the determination.

(g)(8)(ii)

Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:

(g)(8)(ii)(A)

Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

(g)(8)(ii)(B)

Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

(g)(8)(ii)(C)

The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

(g)(8)(ii)(D)

The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.



..1910.95(g)(8)(iii)

(g)(8)(iii)

If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the employer:

(g)(8)(iii)(A)

Shall inform the employee of the new audiometric interpretation; and

(g)(8)(iii)(B)

May discontinue the required use of hearing protectors for that employee.

1910.95(g)(9)

"Revised baseline." An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

(g)(9)(i)

The standard threshold shift revealed by the audiogram is persistent; or

(g)(9)(ii)

The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

(g)(10)

"Standard threshold shift."

(g)(10)(i)

As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

..1910.95(g)(10)(ii)

(g)(10)(ii)

In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F: "Calculation and Application of Age Correction to Audiograms."

1910.95(h)

"Audiometric test requirements."

(h)(1)

Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

(h)(2)

Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969, which is incorporated by reference as specified in Sec. 1910.6.

(h)(3)

Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in Appendix C: "Audiometric Measuring Instruments."

1910.95(h)(4)

Audiometric examinations shall be administered in a room meeting the requirements listed in Appendix D: "Audiometric Test Rooms."

..1910.95(h)(5)

(h)(5)

"Audiometer calibration."

(h)(5)(i)

The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's

output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.

(h)(5)(ii)

Audiometer calibration shall be checked acoustically at least annually in accordance with Appendix E: "Acoustic Calibration of Audiometers." Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.

(h)(5)(iii)

An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3.; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

1910.95(i)

"Hearing protectors."

(i)(1)

Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

(i)(2)

Employers shall ensure that hearing protectors are worn:

(i)(2)(i)

By an employee who is required by paragraph (b)(1) of this section to wear personal protective equipment; and

..1910.95(i)(2)(ii)

(i)(2)(ii)

By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:

(i)(2)(ii)(A)

Has not yet had a baseline audiogram established pursuant to paragraph(g)(5)(ii); or

(i)(2)(ii)(B)

Has experienced a standard threshold shift.

(i)(3)

Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer.

(i)(4)

The employer shall provide training in the use and care of all hearing protectors provided to employees.

(i)(5)

The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

1910.95(j)

"Hearing protector attenuation."

(j)(1)

The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The employer shall use one of the evaluation methods described in Appendix B: "Methods for Estimating the Adequacy of Hearing Protection Attenuation."

..1910.95(j)(2)

(j)(2)

Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels as required by paragraph(b)of this section.

(j)(3)

For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.

1910.95(j)(4)

The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

1910.95(k)

"Training program."

(k)(1)

The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.

(k)(2)

The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

(k)(3)

The employer shall ensure that each employee is informed of the following:

..1910.95(k)(3)(i)

(k)(3)(i)

The effects of noise on hearing;

(k)(3)(ii)

The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care;and

(k)(3)(iii)

The purpose of audiometric testing, and an explanation of the test procedures.

1910.95(1)

"Access to information and training materials."

(1)(1)

The employer shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

1910.95(1)(2)

The employer shall provide to affected employees any informational materials pertaining to the standard that are supplied to the employer by the Assistant Secretary.

(1)(3)

The employer shall provide, upon request, all materials related to the employer's training and education program pertaining to this standard to the Assistant Secretary and the Director.

..1910.95(m)

(m)

"Recordkeeping" -

(m)(1)

"Exposure measurements." The employer shall maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.

(m)(2)

"Audiometric tests."

(m)(2)(i)

The employer shall retain all employee audiometric test records obtained pursuant to paragraph (g) of this section:

(m)(2)(ii)

This record shall include:

(m)(2)(ii)(A)

Name and job classification of the employee;

(m)(2)(ii)(B)

Date of the audiogram;

(m)(2)(ii)(C)

The examiner's name;

(m)(2)(ii)(D)

Date of the last acoustic or exhaustive calibration of the audiometer; and

(m)(2)(ii)(E)

Employee's most recent noise exposure assessment.

(m)(2)(ii)(F)

The employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

(m)(3)

"Record retention." The employer shall retain records required in this paragraph(m)for at least the following periods.

..1910.95(m)(3)(i)

(m)(3)(i)

Noise exposure measurement records shall be retained for two years.

(m)(3)(ii)

Audiometric test records shall be retained for the duration of the affected employee's employment.

(m)(4)

"Access to records." All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20(a)-(e)and (g)-

(m)(4)(i)

apply to access to records under this section.

(m)(5)

"Transfer of records." If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the

successor employer shall retain them for the remainder of the period prescribed in paragraph (m)(3) of this section.

(n)

"Appendices."

(n)(1)

Appendices A, B, C, D, and E to this section are incorporated as part of this section and the contents of these appendices are mandatory.

..1910.95(n)(2)

(n)(2)

Appendices F and G to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

(o)

"Exemptions." Paragraphs (c) through (n) of this section shall not apply to employers engaged in oil and gas well drilling and servicing operations.

1910.95(p)

"Startup date." Baseline audiograms required by paragraph (g) of this section shall be completed by March 1, 1984.

[39 FR 23502, June 27, 1974, as amended at 46 FR 4161, Jan. 16, 1981; 46 FR 62845, Dec. 29, 1981; 48 FR 9776, Mar. 8, 1983; 48 FR 29687, June 28, 1983; 54 FR 24333, June 7, 1989; 61 FR 5507, Feb. 13, 1996; 61 FR 9227, March 7, 1996]



