

**Office of Environmental Health and Safety
Hearing Conservation Program**

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**Office of Environmental Health and Safety
Hearing Conservation Program**

Section 1.0 Research has established that worker exposure to noise of sufficient intensity and duration can result in hearing damage. Noise-induced hearing loss rarely results from just one exposure. Generally, it will progress unnoticed over a period of years. Initial noise-induced hearing loss occurs at the higher frequencies where speech is found, making communication difficult.

Section 2.0 Policy

It is the policy of The Ohio State University to provide employees with a safe and healthful working environment. This is accomplished by utilizing engineering controls or safeguards that are incorporated into the design of facilities or equipment. When effective engineering controls are not feasible, or when they are being initiated, administrative controls will be used when and where possible, followed by the use of personal protective equipment.

The primary goal of the Hearing Conservation Program is to reduce, and eventually eliminate hearing loss due to workplace noise exposures. The program includes the following elements:

- a) Work environments will be surveyed to identify potentially hazardous noise levels and personnel and risk;
- b) Environments and/or equipment that produce potentially hazardous noise should, wherever it is technologically and economically feasible, be modified to reduce the noise level to acceptable levels;
- c) Where engineering controls are not feasible, administrative controls and/or the use of hearing protective devices will be used;
- d) Periodic hearing testing will be conducted to monitor the effectiveness of the hearing conservation program. Early detection of temporary threshold shifts will allow further protective action to be taken before permanent hearing loss occurs, and;
- e) Education is important to the overall success of a hearing conservation program. The Office of Environmental Health and Safety (OEHS) shall administer a training program that meets the requirements under the Occupational Safety and Health Administration's (OSHA) Occupational Noise Exposure and Hearing Conservation Amendment (29 CFR 1910.95).

OEHS, aware that excessive noise exposure is a potential cause of hearing loss, is establishing a hearing conservation program that is more conservative than that required by OSHA. OEHS has adopted the American Conference of Governmental Industrial Hygienists (ACGIH) noise exposure limits referred to as threshold limit values (TLV):

Duration Per Day (Hours)	Sound Level (dBA)
16	80
8	85
4	90
2	95
1	100
½	105
¼	110

When the sound levels listed above are exceeded, feasible engineering or administrative controls will be instituted. If the controls do not prove successful in reducing the levels to within those listed above, hearing protection will be provided and used to reduce the sound levels to an acceptable level. In addition, OSHA requirements dictate that whenever employee noise exposures equal or exceed an 8-hour time-weighted average (TWA) of 85 dBA, slow response, a continuing effective hearing conservation program shall be incorporated.

Section 3.0 Responsibilities

3.1 The Office of Environmental Health and Safety

- a) Identification of work areas and equipment within The Ohio State University where noise levels equal or exceed 85 dBA;
- b) Identification of university employees, through personal dosimetry, whose noise exposure level equals or exceeds an 8-hour TWA of 85 dBA. Notification of employee exposure measurements shall be provided to Employee Health to be included in the employee's medical files;
- c) Resurvey of work areas and equipment where noise levels exceed 85 dBA every two years. Also, these areas shall be resurveyed whenever changes are made in these areas that might affect noise levels (i.e., new equipment, relocation of existing equipment, etc.);
- d) Training of employees in the need for, proper use and care of hearing protection devices, and;
- e) Identification of noise control measures (including engineering and administrative controls) and recommendations.

3.2 Employee Health

Employee Health is responsible for conducting baseline and annual audiograms for new employees who may be assigned to tasks with potential exposure to elevated levels of noise. Employee Health also schedules and conducts audiograms on an annual basis for employees exposed to sound levels greater than or equal to 85 dBA and notifies OEHS of all employees who have experienced significant changes in hearing (standard threshold shifts) in order that follow-up investigations may be conducted.

3.3 Colleges, Departments, and Administrative Units

It is the responsibility of Colleges, Departments, and Administrative Units to ensure that all of their employees exposed to noise levels equal to or greater than 85 dBA have access to appropriate hearing protective devices in the work area. Supervisors are also responsible for enforcing the proper use of hearing protective devices and engineering and administrative controls in the designated noise hazardous areas.

3.4 Employees

Employees are responsible for wearing and maintaining hearing protective devices as instructed. Employees exposed to excessive levels of noise must also participate in annual training programs and the medical surveillance program, which includes audiometric testing.

Section 4.0 Noise Evaluations and Surveillance Procedures

4.1 Identification of Hazardous Noise Areas

OEHS will identify work areas within University facilities where noise levels equal or exceed 85 dBA. Records shall be maintained by OEHS and updated at least every two years to determine if any change in noise levels has occurred. Those areas where the noise levels are below 85 dBA will not be routinely monitored.

Signs will be posted at the entrance to any work area where noise levels exceed 85 dBA, requiring anyone entering the area to wear proper hearing protection. Personnel who work in these areas shall have hearing protection supplied to them; shall be instructed in its proper use; and be required to wear this equipment when in these identified areas. It is the responsibility of the area supervisor to ensure that these precautions are maintained.

4.2 Noise Measurements and Exposure Assessments

In order to effectively control noise, it is necessary that the noise be accurately measured according to standard operating procedures and that the measurements be properly evaluated against accepted criteria. The monitoring of employees' noise exposure is made up of two parts, area and personal monitoring. Area measurements are generally obtained first. If noise levels are at or greater than 85 dBA, personal monitoring using dosimeters shall be performed.

4.21 Area Measurements

In an area survey, measurements of noise levels are recorded using a sound level meter to identify work areas where employees' exposures may be above hazardous levels, and where more thorough exposure monitoring may be needed. Area monitoring is conducted using a calibrated sound level meter set to the A scale, slow response. Within the area of interest, several different locations will be measured. Typical measurements would involve monitoring at the following locations:

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

When the noise levels are below 85 dBA on a time-weighted average (TWA) basis in the area, no further routine monitoring will be required for that area. If any of the noise measurements equal or exceed 85 dBA, records shall be maintained as to the noise levels recorded, where they were taken, and the source(s) of the noise. Also, employees who work in or near these areas shall have their noise exposure determined through personnel monitoring using dosimeters.

4.22 Personal Dosimetry

Calibrated noise dosimeters will be used to determine employee's noise exposure levels. Each employee to be monitored will have a dosimeter placed on him/her for a minimum of two hours with the microphone placed in the hearing zone. Background information will be collected from each employee detailing the job description, unusual job activities, etc., for the time period sampled. For areas where multiple employees perform similar tasks under similar conditions, as related to noise exposure, OEHS shall randomly sample the workers' noise exposure levels. The results shall then be generalized to all employees in the area. Those employees whose noise exposure equals or exceeds 85 dBA on an 8-hour TWA will be referred to Employee Health for inclusion in the Hearing Conservation Program.

4.3 Remonitoring of Hazardous Noise Areas

All areas where noise levels equal or exceed 85 dBA shall be resurveyed at least every two years. Whenever an employee experiences a standard threshold shift, as determined by Employee Health, his/her work area shall be remonitored to identify and eliminate the cause.

4.4 Remonitoring Due to Changes

All areas where noise levels equal or exceed 85 dBA shall be resurveyed whenever a change in production process, equipment, or controls takes place that may have altered the noise exposure levels. Any additional employees exposed to noise levels equal to or greater than 85 dBA on a time-weighted average shall be included in the Hearing Conservation Program. Areas where noise levels have dropped below 85 dBA shall be eliminated from the monitoring program. Employees whose noise exposure levels no longer exceed an 85 dBA time-weighted average may be eliminated from the Hearing Conservation Program.

Section 5.0 Noise Control Methods

The use of engineering and administrative controls should reduce employee noise exposure to levels below the acceptable threshold limit value (TLV), as defined in Section 2.0.

5.1 Engineering Controls

The primary means of reducing or eliminating personnel noise exposure shall be through the application of engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the transmission path that reduces the noise level at the employee's ear.

5.2 Administrative Controls

Administrative controls are defined as changes in the work schedule or operations that reduce noise exposure. If engineering solutions cannot reduce the noise, administrative controls such as increasing the distance between the noise source and the worker or rotation of jobs between workers in the high noise area should be used if possible.

5.3 Personal Protective Equipment

Hearing protective devices (ear plugs, muffs, etc.) shall be the permanent solution only when engineering or administrative controls are considered to be infeasible or cost prohibitive. Hearing protective devices are defined

as any device that can be worn to reduce the level of sound entering the ear. Hearing protective devices shall be worn by all personnel when they must enter or work in an area where the operations generate noise levels greater than 85 dBA, or 120 dB peak sound pressure level or greater.

5.31 Types of Hearing Protective Devices

- a) Earplugs – A device designed to provide an airtight seal with the ear canal when inserted properly. There are three types of insert earplugs:
 - 1) Premolded Earplugs – Pliable devices of fixed proportions that come in various sizes;
 - 2) Formable Earplugs – Come in one size and after being compressed and inserted, expand to form a seal in the ear canal, and;
 - 3) Custom Molded Earplugs – Earplugs that are made to fit the exact size and shape of the individual’s ear canal. Individuals needing custom earplugs will be referred to an audiologist.
- b) Earmuffs – Devices worn around the ear to reduce the level of noise that reaches the ear. Their effectiveness depends on an airtight seal between the cushion and the head.

5.32 Selection of Hearing Protective Devices

OEHS will recommend various types of hearing protective devices that can be worn. Supervisors and employees will choose from the available options. In all cases, the chosen hearing protectors shall have a Noise Reduction Ration (NRR) high enough to reduce the noise at the eardrum to below 85 dBA.

5.33 Maintenance of Hearing Protective Devices

- a) Reusable earplugs should be washed in lukewarm water using hand soap, rinsed in clean water, and dried thoroughly before use. Wet or damp earplugs should not be placed in their containers. Cleaning should be done as needed.
- b) Earmuff cushions should be kept clean. The plastic or foam cushions may be cleaned in the same way as earplugs, but the inside of the muff should not get wet. When not in use, earmuffs should be place in open air to allow moisture that may have been absorbed into the cups to evaporate.

Section 6.0 Medical Surveillance

Upon identification of employees whose 8-hour TWA equals or exceeds 85 dBA, OEHS will recommend to Employee Health and the employee's supervisor, in writing, of the need to enroll certain employee(s) in the Hearing Conservation Medical Surveillance Program. Information supplied to Employee Health will include the employee's name and his/her noise exposure level. It will be the responsibility of the supervisor to enroll his/her employee(s) in the Hearing Conservation Medical Surveillance Program.

In work locations where either through administrative or engineering controls, noise levels are found to have fallen such that the employee's 8-hour TWA is below 85 dBA, OEHS shall notify Employee Health and the employee's supervisor, by writing, that the employees working in that area are no longer required to be enrolled in the Hearing Conservation program. The final decision as to an employee's enrollment status will be the responsibility of the Employee Health Physician.

Any personnel experiencing difficulty in wearing assigned hearing protection (i.e., irritation of the ear canals, pain) will be advised to immediately report this to his/her supervisor and make arrangements to go to Employee Health for evaluation as soon as possible.

6.1 Audiometric Testing

Employee Health has the responsibility for administering the Audiometric Testing Program portion of The Ohio State University's Hearing Conservation Program. The object of the audiometric testing program is to ensure that employees are not losing their hearing by comparing the baseline audiogram to each annual audiogram. Audiometric testing will be provided to all employees with noise exposure levels of 85 dBA or greater. Annual retesting will be performed for all personnel enrolled in the Hearing Conservation Program.

Section 7.0 Training

The Training and Education Program will be presented to employees in the Hearing Conservation Program on an annual basis. At a minimum, the training program will cover the following topics:

- The effects of noise on hearing;
- The purpose, advantages and disadvantages, and attenuation of various types of hearing protectors;
- Instructions on selection, fitting, use, and care of hearing protectors, and;
- The purpose of audiometric testing and an explanation of the test procedures.

Employees will be provided with copies of the OSHA Noise Standard (29 CFR 1910.95) upon request. Information provided in Appendix D of this document may be used.

Section 8.0 Program Evaluation

8.1 Purpose

Periodic program evaluation will be conducted to assess compliance with federal and state regulations and OEHS Program requirements. Both the monitoring and audiometric testing proportions of The Ohio State University Hearing Conservation Program will be reviewed annually to assure its quality and effectiveness.

8.2 Evaluation Areas

An evaluation of the program will be conducted on an annual basis. The items to be included for consideration will be as follows:

- Feedback from supervisors
- Standard Operating Procedures
- Training records and course content
- Maintenance of Hearing Protection Devices
- Field audits of Hearing Protection Device usage
- Review of recorded threshold shifts on OSHA Log

The findings of the Hearing Conservation Program evaluation will be documented and will list plans to correct faults in the program.

Section 9.0 Standard Operating Procedures

An important element of the Hearing Conservation Program is the development of detailed standard operating procedures (SOPs). The SOPs outline the steps necessary to perform a noise assessment that meets the goals of the Hearing Conservation Program.

9.1 Area Monitoring

Refer to Appendix B

9.2 Personal Dosimetry

Refer to Appendix C

Section 10.0 Record Keeping

The Ohio State University Hearing Conservation Program will include the following records:

- Medical Evaluation and Audiograms – Located at Employee Health
- Training Records – Located at OEHS
- Standard Operating Procedures – Located at OEHS
- Hazard Evaluations (work area noise surveys, personnel monitoring) – Located at OEHS
- Equipment Calibration and Maintenance – Located at OEHS and Employee Health
- Program Evaluations - Located at OEHS

All non-medical records (ex., work area and equipment surveys) will be maintained for a period of at least five years. Results of hearing tests and medical evaluations performed for hearing conservation purposes as well as noise exposure documentation shall be recorded and shall be a permanent part of an employee's health record. All personnel who routinely work in designated hazardous noise areas shall be identified and a current roster shall be maintained by OEHS.

Appendix A

References

ACGIH, Threshold Limit Values and Biological Exposure Indices, Physical Agents, Noise, current edition.

Berger, E.H., et. al., Ed., Noise & Hearing Conservation Manual, 4th ed., Akron, OH: American Industrial Hygiene Association, 1986.

NIOSH, A Practical Guide to Effective Hearing Conservation Programs in the Workplace, September 1990.

OSHA, General Industry Standard, 29 CFR 1910.95, "Occupational Noise Exposure"

Appendix B

Office of Environmental Health and Safety

STANDARD OPERATING PROCEDURE

DATE ISSUED: September 1, 1992
DATE LAST REVIEWED: January 1, 1999
DATE REVISED: January 1, 1999
SUBJECT: Area Noise Monitoring

I. PURPOSE

The location and magnitude of a noise problem can be determined by conducting a general noise survey and a frequency (octave band) analysis. Subsequent monitoring may be conducted to assess an individual's personal exposure (personal dosimetry), as well as the effectiveness of control measures.

II. PROCEDURE

General Noise Survey

1. Calibrate sound level meters (SLM's) and related equipment (i.e. frequency analyzer, impact meter) before and after each survey to ensure that the instruments are working properly. The manufacturer's directions should be followed when these instruments are calibrated. The calibration results should be recorded on the basic sound-level survey form (attached).
2. Conduct a walk-around inspection of the site to be surveyed to determine potential noise sources, work-site locations, and possible measurement points. If possible, make a simple sketch of the important features as previously described.
3. Use the microphone extension whenever possible to minimize the acoustic effects caused by the body. Measurements should be taken with the instrument in the slow response mode, A scale, and recorded as decibels (dB).
4. Take noise measurements at a hearing-zone height or within a two-foot diameter area surrounding an employee's head, if at an occupied workspace. It may be necessary to obtain measurements on either side of an employee to determine the highest noise level. Noise or sound level measurements should be recorded on the basic sound-level survey form.
5. Direct the microphone toward the noise source unless reverberant conditions exist. As a precaution, do not place one's body between the noise source and the microphone.
6. In drafty or outdoor environments, use a windscreen on the microphone to muffle the noise that would be produced as air passes over the microphone.
7. Make note of the environmental conditions (i.e. temperature, humidity, corrosive atmospheres, wind, electrical and magnetic fields, etc.) that may adversely effect measurements and record on the basic sound-level survey form.
8. If possible, conduct background measurements, without the noise source(s), for comparison purposes.
9. Prior to noise measurements, past reports should be checked for historical background on the noise environments.

Frequency Analysis

1. Conduct a frequency or octave band analysis at surveyed noise locations above 85 dB. This is necessary to characterize the noise for engineering controls and/or PPE selection purposes.
2. Take noise measurements in the same manner as described in the general noise-survey section.
3. Measure the noise or decibel (dB) level at full octave bands with settings appropriate with the equipment being used (manufacturers recommendations). Record results on the basic sound-level survey form.
4. Set the weighting switch to LIN (linear) if you wish to know the overall non-weighted noise levels. The readings will be an all-pass flat response, which is the noise sum of all bands measured. These measurements are useful when determining the need and effectiveness of engineering controls.

Report

When field investigations are performed, a written communication complete with analytical results; interpretation of these results; and recommendations for corrective measures will be sent to the dean or director of the department as well as the initiator of the complaint.

III. HAZARD ANALYSIS

The appropriate personal protective equipment (PPE) should be worn when conducting noise measurements. This will generally consist of safety glasses and hearing protection (i.e. ear muffs and/or earplugs). It is important that all PPE is comfortable and fitted properly for maximum protection.

IV. QUALITY ASSURANCE

The quality of the general noise survey and frequency analysis can be assured by adherence to the following:

1. Servicing, maintenance, and calibration of sound level meters and frequency analyzers;
2. Training of individuals conducting surveys;
3. Provision of appropriate personal protective equipment (i.e. eye wear, ear muffs and/or earplugs);
4. Noise monitoring requests have been responded to within five working days. Noise monitoring reports have been forwarded to involved parties within two weeks of a field visit; and;
5. Employees meeting the requirements for the Universities Hearing Conservation Program (HCP) have been notified within appropriate time constraints.

Appendix C

Office of Environmental Health and Safety

STANDARD OPERATING PROCEDURE

DATE ISSUED: September 1, 1992
DATE LAST REVIEWED: January 1, 1999
DATE REVISED: January 1, 1999
SUBJECT: Noise Monitoring – Personal Dosimetry

I. PURPOSE

Personal dosimetry is performed to document an individual's actual noise exposure following preliminary area noise monitoring.

II. PROCEDURE

1. Calibrate personal noise dosimeters before and after each survey to ensure the instruments are working properly. The manufacturer's calibration instructions should be followed.
2. Measure employee exposure levels in high noise areas. Persons should be selected with the highest expected exposure for each job classification.
3. Inform the individual that the dosimeter should not interfere with normal duties and the person should continue to work in a routine manner.
4. Instruct the individual being monitored not to remove the dosimeter unless necessary and not to cover the microphone with a coat or outer garment. Inform the employee when and where the dosimeter will be removed.
5. Emphasize the purpose of the dosimeter to the individual and explain it is not a tape recording device.
6. Position the dosimeter in the shirt pocket or attach at the waist. The microphone should be clipped to the individual's shirt collar at the top of the shoulder. The microphone should be positioned in a vertical direction. Placement of ear clips should be according to the manufacturer's instructions.
7. Position and secure the microphone cable to avoid snagging or any inconvenience to the individual.
8. Check the dosimeter occasionally to ensure the microphone is oriented properly.
9. Observe the individuals work activities and record pertinent information.
10. Make note of the environmental conditions (i.e. temperature, humidity, corrosive atmospheres, wind, electrical and magnetic fields, etc.) that may adversely effect measurements.

III. HAZARD ANALYSIS

The appropriate personal protective equipment (PPE) should be worn when conducting noise measurements. This will generally consist of safety glasses and hearing protection (i.e. ear muffs and/or earplugs). It is important that all PPE is comfortable and fitted properly for maximum protection.

IV. QUALITY ASSURANCE

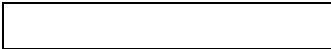
The quality of the personal-dosimetry noise survey can be assured by adherence to the following:

1. Servicing, maintenance, and calibration of dosimeters per manufacturers requirements;
1. Training of individuals conducting surveys;
2. Provision for use of appropriate personal protective equipment (i.e. eye wear, ear muffs and/or earplugs; and
3. Compliance with the appropriate OSHA regulations.
4. Requests for monitoring have been responded to within five working days. Reports showing dosimetry results have been forwarded to involved parties within two weeks of a field visit.
5. Employees meeting the requirements for the Universities Hearing Conservation Program (HCP) have been notified.

Appendix D

[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.95
 - **Standard Title:** Occupational noise exposure.
 - **SubPart Number:** G
 - **SubPart Title:** Occupational Health and Environmental Control
-



(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

(For Figure G-9, [Click Here](#))

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.

(b)

(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.

(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."

(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.

(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.

(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.

(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;

(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.

(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."

(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."

(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.

(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.

(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.

(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.

(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.

(l)

"Access to information and training materials."

(l)(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.

(l)(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.

(l)(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.

(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]
