

TDI

Safety @ Work
Division of Workers' Compensation

Hearing Conservation



**Workplace
Program**



DISCLAIMER

This Workplace Program is a guide to help employers comply with the Occupational Safety and Health Administration's (OSHA) requirements for hearing conservation in [29 Code of Federal Regulations \(CFR\) 1910.95](#). It is not meant to supersede OSHA requirements. Employers should review the OSHA standard for each specific worksite and customize a Hearing Conservation Program accordingly.

This Hearing Conservation Workplace Program is provided as a public service by the Texas Department of Insurance, Division of Workers' Compensation (DWC)-Workplace Safety and the Texas Occupational Safety and Health Consultation (OSHCON) Program. The information in this document was produced by staff subject specialists, government entities, and other authoritative sources. Information contained in this publication is considered accurate at the time of publication. For free DWC workplace safety [publications](#) or [streaming videos](#) on this and other topics, visit www.txsafetyatwork.com, call 1-800-252- 7031, option 2, or email resourcecenter@tdi.texas.gov.

INTRODUCTION



The Centers for Disease Control and Prevention estimates that 22 million employees in the United States are exposed to potentially damaging noise at work each year.¹ Fortunately, noise-related hearing loss is preventable. This publication provides employers with basic information about noise, its effects on hearing, and ways to prevent job-related hearing loss.

The Occupational Safety and Health Administration (OSHA) provides rules that govern all aspects of a Hearing Conservation Program for General Industry ([29 Code of Federal Regulations \(CFR\) 1910.95](#)) and the Construction Industry ([29 CFR 1926.52](#)). These regulations state that each employer must create and maintain a written Hearing

Conservation Program that includes noise evaluations, audiometric testing, noise controls, recordkeeping, and education whenever employee noise exposures equal or exceed an eight-hour time-weighted average (TWA) sound level of 85 decibels (dBA) measured on the A scale (slow response) or, equivalently, a dose of 50%.

The Texas Department of Insurance, Division of Workers' Compensation (DWC) offers safety training instruction and free, confidential onsite or virtual occupational safety and health consultation to help companies create, maintain, and comply with OSHA regulations for hearing conservation. For more information, contact SafetyTraining@tdi.texas.gov or 1-800-252-7031, option 2.

¹ Occupational Safety and Health Administration. "Occupational Noise Exposure. Website. <https://www.osha.gov/noise#:~:text=The%20Center%20for%20Disease%20Control,noise%20at%20work%20each%20year>. Accessed October 11, 2022.

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NOISE AND ITS EFFECTS

Noise is defined as any undesirable sound, even a meaningful one. Undesirable noise disrupts communication or interferes with other day-to-day activities. Exposure to high levels of noise causes hearing loss and may cause other harmful health effects as well. The extent of damage depends primarily on:

- **Intensity Levels**
At the same intensity, higher-frequency noises are more harmful than lower-frequency noises.
- **Location and Distance**
Noise in an open space is less dangerous than in an enclosed space.
- **Time and Duration**
The length of time a worker is exposed to a sound plays a direct role in potential hearing loss.

Noise-induced hearing loss is caused by nerve damage. It can be temporary or permanent. Temporary hearing loss results from short-term exposures to noise, with normal hearing returning after a period of rest. Permanent damage is usually caused by exposure to high noise levels over time.

In its early stages, hearing loss occurs at a frequency range that most employees do not detect. The employee may experience [tinnitus](#), a hearing loss that causes a ringing, buzzing, or clicking noise in one or both ears. If noise-induced hearing loss continues, it involves higher and lower frequencies over time. The hearing loss eventually progresses



until it impairs a worker's ability to receive and understand voice communications.

Prevention requires that noise control measures begin when an employee starts working in a high-noise environment. These measures must continue as long as the employee is exposed to the noise hazard. The success of a Hearing Conservation Program requires not simply controlling hazardous noise, but also requiring workers to receive training on noise exposure and its potential hazards.

The Decibel Chart on the next page provides a frequency scale in dBA (weighted to the way the human ear hears noise) to determine how loud sounds are and if they are safe or harmful to human hearing. The range of sounds spans from 0 dBA (the quietest sound) to 155 dBA (the threshold of pain). Sustained exposure to dBA above the upper levels may cause vibration in the cranial bones, blurred vision, and even weakening of the body's muscular structure. Frequencies of 500 to 2,000 hertz (Hz) are most critical to noise-induced hearing loss. However, it is important to note that noise does not have to cause pain or discomfort to cause permanent hearing loss.

² Occupational Safety and Health Administration. "Hearing Conservation," PDF. 2002 (Revised). <https://www.osha.gov/sites/default/files/publications/osh3074.pdf>. Accessed October 11, 2022.

DECIBEL CHART

	dBA	Source
Extreme danger (painful)	155	Rifle blast; close-up jet engine; nearby siren
	140	Shotgun blast (to shooter); drag strip (near starting line); nearby jet engine
	120	Jet airport; some electronic music; rockdrill
Probable permanent hearing loss	115-125	Drop hammers; chipping hammers
	110-115	Planers; routers; sheet metal speed hammers
	90-100	Subway; weaving mill; papermaking machine
	90-95	Screw machines; punch press; riveter; cut-off saw
Possible damage	80-95	Spinners; looms, lathes
	80	Heavy traffic; plate mill
	65-75	Loud conversation in a crowded room
	70	Busy street
	60	Normal speech
	50	Average office
	45-50	Low conversation
	20-30	Quiet city apartment; whisper; comfortable sleeping limit
	15	Average threshold of acuity; leaf rustling
	0	Threshold of acute hearing (0 dBA is 0.0002 dyne per sq cm)

Areas of Possible Hazardous Noise Exposure



- **carpenter and woodworking shops;**
- **structural repair shops;**
- **machine shops;**
- **aircraft ground equipment operations;**
- **metals processing shops;**
- **firing ranges;**
- **printing machine shops;**
- **vehicle maintenance areas;**
- **aircraft maintenance training areas;**
- **power generation plants;**
- **taxiway and flightline vicinities;**
- **music venues and areas with sound amplifiers;**
- **gas-powered lawn maintenance equipment areas;**
- **job sites with heavy construction equipment such as bulldozers, cranes, and earth movers;**
- **bottling plants; and**
- **any area where pneumatic equipment, pumps, electric generators, internal combustion engines, or other motor-driven equipment operate.**

DETERMINE IF A PROGRAM IS REQUIRED

Employers must **first determine whether noise is a potential problem** in the workplace. A walk-through of the work area is recommended.

Signs of potentially hazardous noise levels include:

- noise louder than busy city traffic;
- employees raising their voices to talk to someone three feet or less away;
- workers with difficulty communicating in a crowded

situation where other sounds or many voices occur together; or

- workers who complain of a ringing or humming noise when they leave work.

If these or other signs are present, **the second step is to determine the noise exposure level.**

Conducting a [job hazard analysis](#) (JHA) provides an opportunity to evaluate noise at its source – the area where the machinery and work activities are performed -- to determine if a Hearing Conservation Program is needed. OSHA does not specifically require employers to develop JHAs but encourages their use as a way to prevent hazards before they occur.

A job hazard analysis (JHA) is an important tool that focuses on job tasks as a way to identify and reduce hazards in the workplace. It focuses on the relationship between the worker, the task, the tools, and the work environment.

Whether using a JHA or opting solely to collect individual employee noise exposure levels, a sound meter such as a dosimeter should be used. **If the noise level is at or above 85 dBA averaged over eight working hours, or an eight-hour TWA, the employer must create a written Hearing Conservation Program.**

Steps for Creating an Effective Hearing Conservation Program

1

Designate a program administrator

The purpose of a program administrator is to ensure that there is a person who is responsible for the effectiveness of the program. The program administrator is expected to manage all aspects of the program including policies, procedures, noise monitoring, audiometric testing, training, noise controls, recordkeeping, and program reviews. The program administrator will not perform all of these functions, but he or she will be responsible for ensuring that they are completed correctly and on schedule.

2

List all identified noise hazards

The key to any successful Hearing Conservation Program is finding all the noise hazards that are above 85 dBA and putting them in writing. Hopefully, most of the workplace's noise hazards were identified during the JHA or while taking noise exposure level readings around the work areas. However, additional hazards may be found through continuous machine noise monitoring and equipment specification sheets. Always document all readings that are taken, not just the ones that are at or above 85 dBA. This will provide documentation that the whole site was evaluated.

3

Document quantified employee noise exposure levels.

It is important to measure (quantify) the sound level exposures for all employees who come in contact with noise, if only for a few minutes. Employees with short noise exposures may be exposed to noise in other work areas as well, causing their accumulated average exposure to exceed 85 dBA.

One way to accurately measure the accumulated average exposure is to have each employee wear a dosimeter that records all noise he or she is exposed to during a shift. If a JHA was not done previously, conduct one now to determine if the noise sources are involved in the employee's job duties.

The employee's exposure to the noise hazard helps determine the best way to protect the employee from the noise. For instance, if the employee walks by a piece of equipment regularly and that equipment is not operated by the employee, then that piece of equipment may be isolated in a soundproof structure to eliminate the hazard. Once all of the measurements have been taken, compare the measurements to the following table to determine if they are within permissible exposure limits. **If noise is found to average more than 90 dBA, hazard controls must be used.** (For permissible noise exposures see Appendix B.)

4

Perform audiometric testing (medical hearing evaluations) on all individuals who are potentially exposed to hazardous noise levels.

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

The employer must establish and maintain an audiometric testing program on all employees who are potentially exposed to noise hazards. The important elements of the program include baseline audiograms, annual audiograms, training, and follow-up procedures.

Employers must make audiometric testing available at no cost to all employees who are exposed to a noise level of 85 dBA or above, measured as an 8-hour TWA.



An audiogram is a graph that shows the softest sounds a person can hear at different pitches or frequencies.

Without a baseline measurement, it is impossible to determine if any hearing loss has happened to employees. Employers are required to complete a baseline evaluation before the employee starts the job. If this does not happen, the

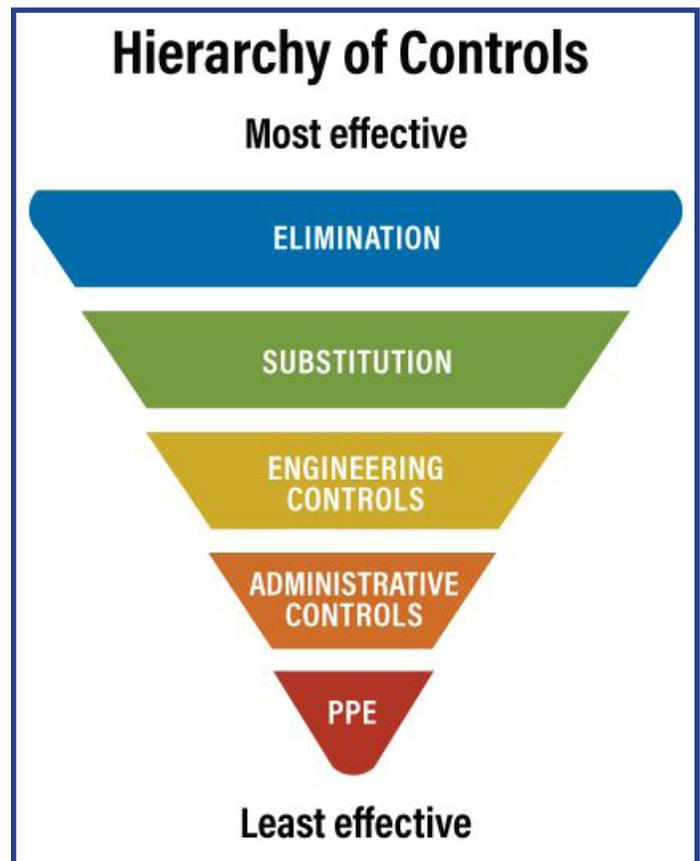
employee must wear hearing protection until the evaluation takes place. This is only permitted when the company uses a traveling testing service that cannot complete it in time for the employee to start work. If this situation happens, the employee must be tested within six months. After a baseline evaluation is obtained, the employees need to be tested annually. The annual test results must be compared to the baseline evaluation to determine if any hearing loss has occurred.

5

Select appropriate hearing conservation control measures.

There are three types of control measures used to abate (decrease) hazards. These controls are:

- **Engineering Controls**
Engineering controls either isolate or eliminate the noise hazard. These controls may include equipment replacement, equipment isolation, or adding sound-absorbing materials.
- **Administrative Controls**
Administrative controls involve changes to policies and procedures to protect employees. Administrative controls include employee rotation, changing maintenance schedules, and defining permissible noise limits for new equipment.
- **Personal Protective Equipment (PPE)**
PPE is considered a control of last resort. PPE does nothing to limit the noise or the employee's exposure to it. PPE includes earplugs, canal caps, and earmuffs.



6

Issue PPE.

Even though PPE is considered a last resort for noise hazard abatement, it can add to the effectiveness of other controls. When it is impossible or impractical to eliminate or control the noise, such as jet aircraft or jackhammers, PPE must be issued to protect noise-exposed workers. It must also be issued to individuals who work regularly in any other areas where PPE is required.

Employers must provide a selection of at least one variety of earplugs and one variety of earmuffs. In some instances, earmuffs may be preferred. However, earmuffs are not recommended if glasses are worn since they prevent an effective seal.

Employees should decide, with the help of a person trained to fit hearing protectors, which size and type of protector is most suitable for the working environment. The PPE selected should be comfortable to wear and offer sufficient protection to prevent hearing loss. For workers who do not regularly need PPE, provide disposable earplugs.

Hearing protection devices are mandatory to wear when:

- workers are exposed to 90 dBA or above for an 8-hour TWA;
- workers have a standard threshold shift; and
- workers are exposed to 85 dBA or above for more than six months until they receive their first audiogram.

7 *Perform initial and annual training.*

All employees need to be trained on the importance of hearing conservation, the company's hearing conservation policies and procedures, and how to properly wear and maintain PPE. This training needs to be performed initially, annually, and when changes to policies and procedures occur.

8 *Review and update the program annually.*

Schedule the Hearing Conservation Program review after the annual audiometric testing. This way, the new evaluations can help determine the overall effectiveness of the program. If the testing indicates that employees are suffering from hearing loss, then program changes must be made and communicated to employees to prevent further damage.

9 *Keep exposure and testing records.*

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

Employers are also required to record work-related hearing loss cases when an employee's hearing test shows a marked decrease in overall hearing. Employers can adjust for age-related hearing loss. Seek the advice of a physician or licensed healthcare professional to determine if the loss is work-related and perform additional hearing tests to verify the loss.

The Role of Managers and Supervisors



Managers and supervisors need to stress the importance of hearing conservation with employees. The most effective motivational method is by example. For instance, when a manager walks through a cabinetmaking shop, even though he or she may not be there long enough to experience hearing damage, the manager must wear the required hearing protection and other PPE correctly.

Managers and supervisors should ensure that:

- employees are wearing hearing protection devices when exposed to potentially hazardous noise;
- workers accept and use personal hearing protection;
- noise safety regulations and directives are followed;
- workers receive referrals to medical assistance when necessary;
- routine PPE equipment inspections are provided;
- records are maintained to show the type of hearing protection issued to a worker;
- hearing protection is provided and compatible with the work or task the employee must perform;
- records are maintained on baseline

audiograms for each worker exposed to hazardous noise;

- audiograms are performed annually for each worker in the hearing conservation program; and
- unprotected workers are kept out of areas designated as hazardous noise areas.

Employers should also keep a list of the:

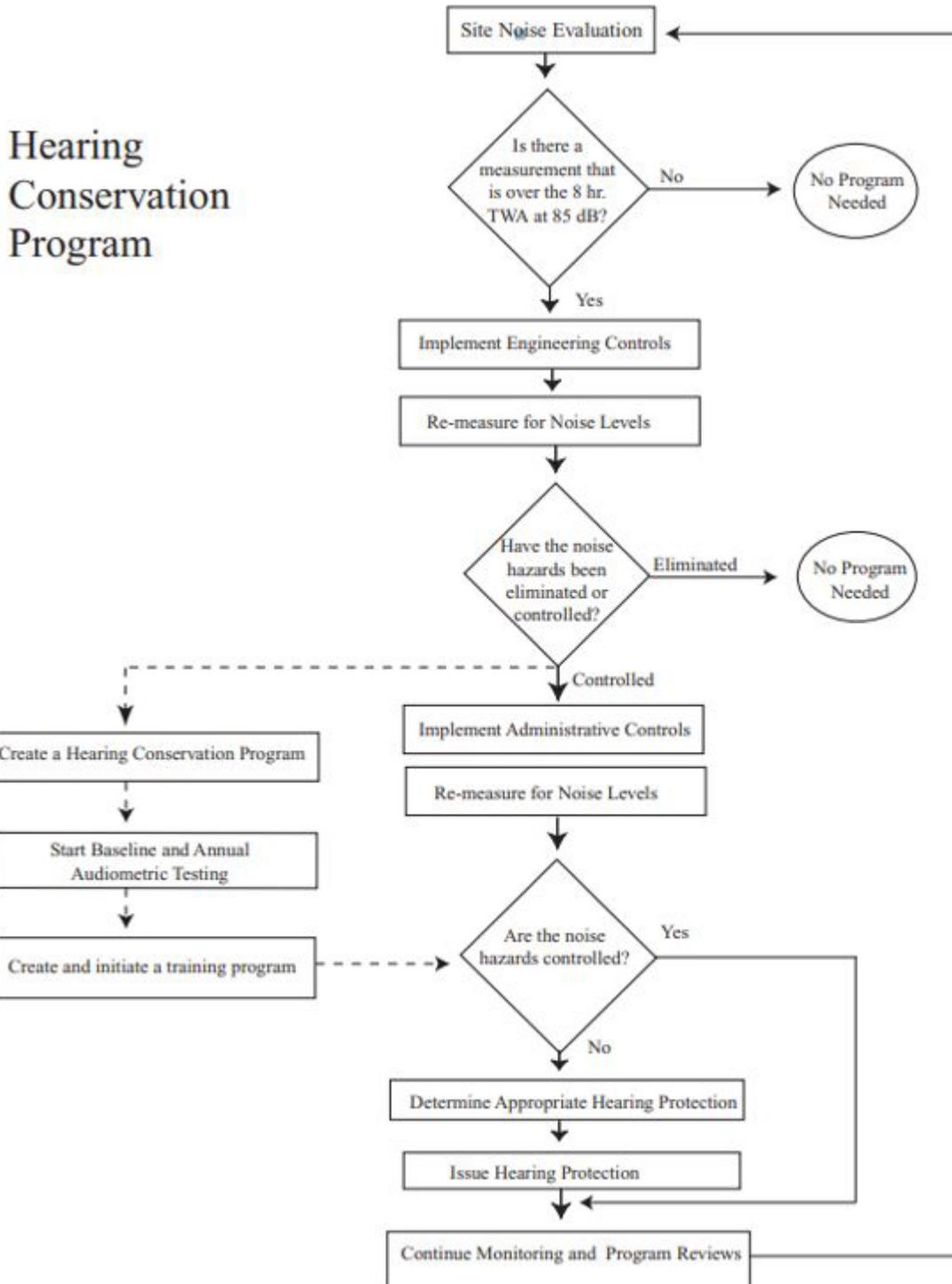
- types of operations that require hearing protection;
- types of approved hearing protection for each worker; and
- locations where hearing protection must be worn.

Summary

Hearing loss is an irreversible condition that can be prevented. Hearing Conservation Programs can prevent hearing loss and save businesses money. For any hearing conservation to succeed, the company must locate all noise hazards, designate a program administrator, implement controls for those hazards, monitor the hearing of the employees, train the employees, and keep records. Also, the program's policies and procedures need to be written and reviewed annually.

APPENDIX A:

Hearing Conservation Program Flow Chart



APPENDIX B:

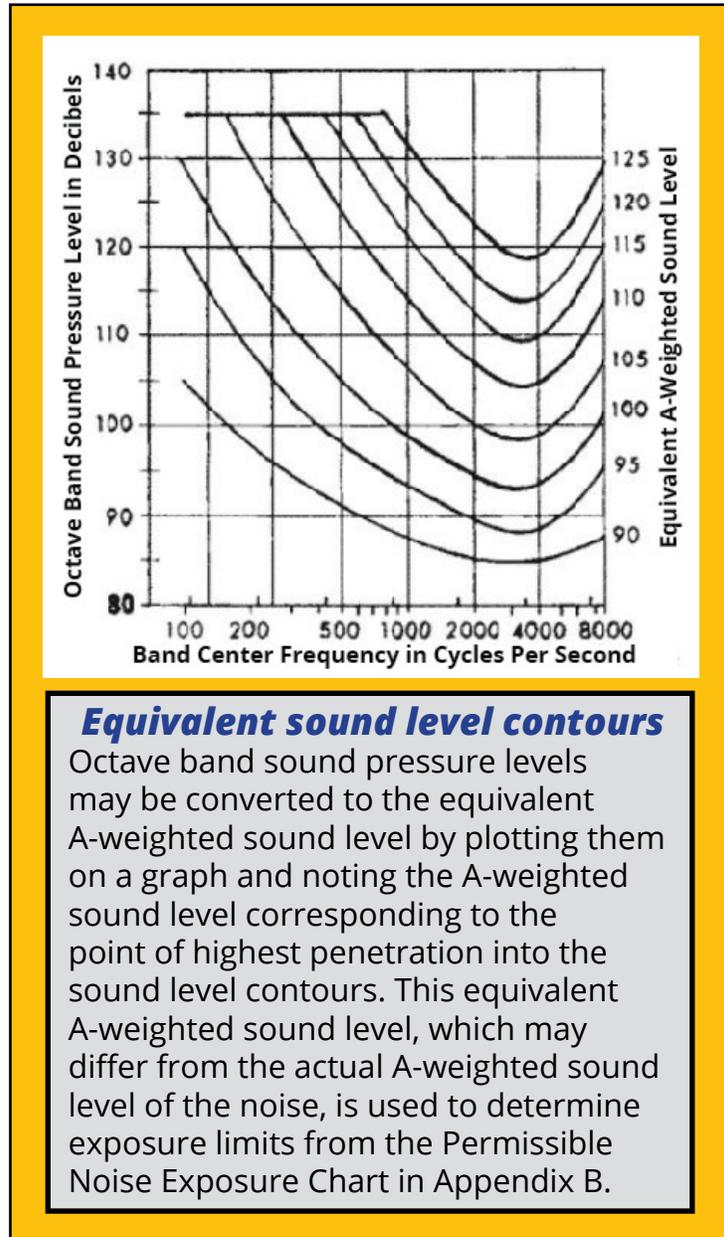
Permissible Noise Exposure Chart

Permissible Noise Exposure	
Duration per day	Sound level dBA
8 hours	90
6 hours	92
4 hours	95
3 hours	97
2 hours	100
1.5 hours	102
1 hour	105
30 minutes	110
15 minutes or less	115

APPENDIX C:

Sound Level Contour Graph

Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Appendix B 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:



APPENDIX D:

Hearing Conservation Training Log

Hearing Conservation Training Record

Date: _____

The following employees have attended training on the Hearing Conservation Workplace Program:

	Name	Employee #	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

I attest that the individuals above attended the entire training session.

Training conducted by: _____

Title: _____

Important: Retain for 3 years per OSHA



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1-800-252-7031, Option 2

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