

CITY AND COUNTY OF DENVER

Hearing Conservation Policy		
Occupational Health & Safety Management System 65.6.2	January 1, 2008	Prepared / Revised By:
This policy has been developed and shall be implemented under the authority of Executive Order No. 65 and the Risk Management Office.		Risk Management – Safety Unit

1.0 Introduction

The City and County of Denver has developed the Hearing Conservation Policy to ensure safe practices are designed to protect each employee from exposure to high sound levels while they perform their duties. Although individual susceptibility, personal hobbies, medical conditions and age affect individual hearing loss, it is a priority of the City to protect employees from occupational exposures.

2.0 Scope

All City employees whose potential exposure to sound levels averaging greater than 85 dBA (see Section 10.0 Definition for dBA) for 8 hours per day, 40 hours per week or to periodic sounds that exceed 115 dBA, are required to participate in the Departmental / Agency Hearing Conservation Program.

3.0 Responsibilities

Risk Management shall:

- a) Develop a written Hearing Conservation Policy.
- b) When requested provide technical guidance to department / agencies in the development of individual department Hearing Conservation Programs that meet guidelines of this policy.

Department Heads shall:

- a) When required, ensure a written Hearing Conservation Program is implemented (Attachment One for Sample Program).

Department Supervisor shall:

- a) With assistance from Risk Management determine the noise level at the location.
- b) Where required and with the assistance of the location Safety Representative develop a written Hearing Conservation Program.
- c) Ensure affected employees are current on training requirements per their program on the proper use, care, and limitations of required hearing protection.
- d) Ensure the appropriate and required hearing protection is used.

Affected Employees shall:

- a) Follow the requirements of the department programs.
- b) Attend required training sessions.
- c) Wear hearing protection as required, in accordance with instructions, training and as determined by a noise survey.

4.0 Evaluation of Noise Exposures

Representative exposure assessments shall be performed when there is an indication that an employee's exposure to noise may equal or exceed an 8-hr TWA of 85 dBA. Monitoring shall be repeated whenever it has been brought to the attention of the Department / Agency that a change in the process, equipment or controls has been made that may result in exposures that meet or exceed potentially hazardous levels or when modifications indicate. The methodology of noise monitoring and equipment calibration shall be consistent with current recognized requirements.

4.1. Initial Determination

All work areas producing sound levels in excess of 85 dBA for an 8-hr Time Weighted Average (TWA) shall be identified by reviewing past noise monitoring data, employee complaints and equipment manufacturing data or by performing an initial noise survey.

4.2. Periodic Monitoring

When it has been determined that an area or piece of equipment produces noise levels that exceed a TWA of 85 dBA, periodic monitoring shall be conducted to identify changes in noise output and to evaluate the feasibility of engineering and administrative controls.

4.3. Corrective Actions

When high noise levels are identified, corrective actions shall be made immediately to reduce employee exposures to below a TWA of 90 dBA. Engineering, administrative or personal hearing protection controls shall be implemented.

5.0 Engineering and Administrative Control of Noise

Reasonable efforts shall be made to reduce employee exposure through engineering and administrative controls.

Such controls may include:

- ✓ Selecting less noisy equipment
- ✓ Using noise dampening barriers
- ✓ Increasing the employee's distance from the source of the noise
- ✓ Reducing the time of exposure to the noise through job rotation

6.0 Personal Hearing Protection

When engineering and administrative controls are not possible to effectively minimize exposures to noise the following apply:

- A. Hearing protectors shall be worn by employees exposed to sound levels that meet or exceed an 8-hr TWA of 85 dBA.
- B. Hearing protectors shall provide enough attenuation to reduce sound levels below 85 dBA.
- C. The type of hearing protection shall be approved by the Department / Agency Safety Representative with assistance from Risk Management when requested.
- D. Hearing protectors shall be worn properly, providing a proper fit.

7.0 Training

All employees exposed to noise levels that meet or exceed an 8-hr TWA of 85 dBA shall be trained and then periodically retrained.

The training shall include:

- A. The effects of noise on hearing.
- B. Contributing factors that cause hearing loss.
- C. The purpose of hearing protection.
- D. Advantages and disadvantages of the different types of hearing protection.
- E. The attenuation factors of hearing protection.
- F. How to select hearing protection.
- G. How to properly use hearing protection.
- H. The purpose of audiometric testing and what it means.
- I. Employee responsibilities.
- J. Employer responsibilities.

8.0 Recordkeeping

The Department / Agency shall keep all employee records with regards to exposure, noise survey measurements and audiometric testing.

9.0 Medical Evaluation of Hearing

The Department / Agency shall use a qualified audiologist to perform annual audiograms on all employees who are in the Hearing Conservation Program. All audiograms will be consistent with the Occupational Health and Safety Standard, CFR 1910.95 as described by the following:

- A. Audiograms:
 - 1. All employees identified by the Department / Agency as being potentially exposed to average noise levels in excess of 85 decibels or to periodic sounds that exceed 115 dBA shall be scheduled for annual audiograms.
 - 2. Employee audiograms shall be interpreted by a licensed or certified audiologist, otolaryngologist, or other qualified person.
 - 3. Results of employee audiograms with individual employee recommendations shall be maintained by the Department / Agency.

B. Recommended Action:

The licensed audiologist, otolaryngologist, or other qualified person may make various recommendations with respect to the results of the employee's audiogram. These recommendations and subsequent actions could include, but are not limited to:

1. Normal Audiogram:
 - No further action required
2. Improvement in Audiogram:
 - New audiogram is judged more representative and, therefore, adopted as new baseline audiogram.
3. Possible Invalid Audiogram:
 - Employee will be retested.
4. Invalid Audiogram:
 - Employee will be retested.
5. Specific Employee Recommendations:
 - Will be handled on an individual basis.
6. Standard Threshold Shift:
 - An employee with a standard threshold shift (STS) relative to the baseline audiogram, of an average of 10 decibels or more at 2,000, 3,000, and 4,000 Hertz in either ear.
 - In determining whether an STS has occurred, allowances may be made by the consulting audiologist for the contribution of aging.
 - If the comparison of the annual audiogram to the baseline audiogram indicates an STS has occurred, the employee will be informed of this fact in writing, within 21 days of the determination.
 - A physician or audiologist will evaluate the employee and determine if the STS is work-related or aggravated by occupational noise exposures.
 - If the physician determines the STS if not work related or aggravated by occupational noise exposure, the employee will be referred to his or her family physician.
 - If the physician determines STS may be work related, the physician may refer the employee for an audiological or otological.
 - The Department / Agency shall retrain and refit the employee with appropriate hearing protection and require its use.
 - Change in job responsibilities or administrative controls may be necessary to reduce exposure.

10.0 Definitions

Administrative Control: Any procedure that limits daily noise exposure by control of the work schedule.

Audiogram: A record of an individual's sensitivity for pure tones in each ear at each of the following frequencies: 500, 1,000, 2,000, 3,000, 4,000 and 6,000 Hz. (Note: information at 8,000 Hz is desirable but not always available with automatic audiometric equipment).

Baseline Audiogram: The audiogram against which future audiograms are compared.

dBA: The sound pressure level reading in decibels made on the A-weighted network of a sound level meter at slow response.

dBA – Ceiling (C): The sound level that shall not be exceeded during any part of the working exposure.

Criterion Level: The decibel level that will yield 100 percent dose, or an EER of 1.0 in 8 hours.

Decibel (dB): Unit of measurement of sound level (can be power or pressure depending on the reference level).

Doubling Rate or Exchange Rate: The number of added decibels required to double the dose or the EER in a given amount of time.

Engineering Control: Any procedure other than administrative control or personal protection (earplugs, ear muffs) that reduces the sound level either at the source of the noise or in the hearing zone of the employee.

Equivalent Exposure Ratio (EER): Unit of measurement of the combined ratios of exposure time to permissible exposure time for an 8-hour weekday.

Hertz (Hz): Unit of measurement of frequency, numerically equal to cycles per second.

Impact or Impulsive Noise: Variation in noise levels that involve noise peaks at intervals greater than one (1) second.

Noise Dose (D): The cumulative noise exposure of an employee during a workday, expressed in percent exposure.

Noise Dosimeter: An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.

Noise Exposure: The combination of exposure to a single noise level or any combination of noise levels and the duration of exposure.

Standard Threshold Shift: A change of hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3,000, and 4,000 Hz in either ear.

Sound Level Meter: An instrument for the measurement of sound level.

Sound Power Level: Ten times the logarithm to the base 10 of the ratio of a given power to a reference sound power: The reference power commonly used is 1.0×10^{-12} watts.

Sound Pressure Level: Twenty times the logarithm to the base 10 of the ratio of a sound to the reference sound pressure. Unless otherwise specified, the effective (rms) pressure is to be understood. The reference sound pressure commonly used is 20mN/m^2 .

Time-Weighted-Average Sound Level (TWA): That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

Hearing Conservation Program

(Department/Agency Name)

I. OBJECTIVE

The objective of the (DEPARTMENT/AGENCY NAME) Hearing Conservation Program is to minimize occupational hearing loss by providing hearing protection, training, and annual hearing tests to all persons working in areas or with equipment that have noise levels equal to or exceeding an eight-hour time-weighted average (TWA) sound limit of 85 dBA (decibels measured on the A scale of a sound level meter). A copy of this program will be maintained by all affected departments.

II. ASSIGNMENT OF RESPONSIBILITY

A. Management

1. Use engineering and administrative controls to limit employee exposure.
2. Provide adequate hearing protection for affected employees.
3. Post signs and warnings in all high noise areas.
4. Conduct noise surveys annually or when new equipment is needed.
5. Conduct baseline hearing test for all affected employees
6. Conduct annual hearing test for all affected employees.
7. Conduct hearing conservation training for all new affected employees.
8. Conduct annual hearing conservation training for all employees.

B. Employees

1. Use company-issue approved hearing protection in designated high noise areas.
2. Request new hearing protection when needed.
3. Exercise proper care of issued hearing protection.

III. PROCEDURES

A. Noise Monitoring

1. Monitoring for noise exposure levels will be conducted by (Responsible Person(s)). It is the responsibility of the individual departments to notify (Responsible Person(s)) when there is a possible need for monitoring. Monitoring will be performed with the use of sound level meters and personal dosimeters at the discretion of (Responsible Person(s)).
2. Monitoring will also be conducted whenever there is a change in equipment, process or controls that affect the noise levels. This includes the addition or removal of machinery, alteration in building structure, or substitution of new equipment in place of that previously used. The responsible supervisor must inform (Responsible Person(s)) when these types of changes are instituted.

B. Employee Training

1. Affected employees will be required to attend training concerning the proper usage and wearing of hearing protection. The training will be conducted by **(Responsible Person(s))**, or a designated representative, within a month of hire and annually thereafter.
2. Training shall consist of the following components:
 - a. How noise affects hearing and hearing loss;
 - b. Explanation of audiometric testing;
 - c. Rules and procedures;
 - d. Locations within company property where hearing protection is required; and
 - e. How to use and care for hearing protectors.
3. Training records will be maintained by **(Responsible Person(s))**. (see Attachment A).

C. Hearing Protection

Management, supervisors, and employees shall properly wear the prescribed hearing protection while working or traveling through any area that is designated as a high noise area.

1. Hearing protection will be provided at no cost to employees who perform tasks designated as having a high noise exposure and replaced as necessary. It is the supervisor's responsibility to require employees to wear hearing protection when noise levels reach or exceed 85 dBA. Those employees will have the opportunity to choose from at least two different types of hearing protection.
2. Personal stereo headsets, or "Walkmen," are not approved for hearing protection.
3. Signage is required in areas that necessitate hearing protection. It is the responsibility of **(Responsible Person(s))** to provide signage to the appropriate areas.
4. Preformed earplugs and earmuffs shall be washed periodically and stored in a clean area. Foam inserts shall be discarded after each use. Hands shall be washed before handling preformed earplugs and foam inserts to prevent contaminants from being placed in the ear.
5. **(Responsible Person(s))** will keep a log of the areas or job tasks designated as requiring hearing protection, as well as the personnel affected by this Hearing Conservation Program (see Attachment B).

D. Audiograms/Hearing Tests

1. Employees subject to the Hearing Conservation Program who have time-weighted average (TWA) noise exposures of 85 dBA or greater for an eight (8) hour work shift will be required to have both a baseline and annual audiogram. The audiograms will be provided by the **Department/Agency Name** and conducted by **Responsible Company** with no cost to the employee.

2. The baseline audiogram will be given to an employee within one (1) month of employment with *Department/Agency Name* and before any exposure to high noise levels. Annual audiograms will be performed within one year from the date of the previous audiogram. It is the responsibility of the individual and *(Responsible Person(s))* to schedule the annual audiogram.

3. If an annual audiogram shows that an employee has suffered a standard threshold shift, the employee will be retested within thirty (30) days of the annual audiogram. If the retest confirms the occurrence of a standard threshold shift, the employee will be notified in writing within twenty-one (21) days of the confirmation. Employees who do experience a standard threshold shift will be refitted with hearing protection and provided more training on the effects of noise.

