

# Reed College Hearing Conservation Program

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## 1.0 Purpose and Scope

Everyday we experience sound in our environment. Normally these sounds are at safe levels and do not damage our hearing. However, when we are exposed to harmful noise, sounds that are too loud or last a long time, sensitive structures in our inner ear can become damaged, causing noise-induced hearing loss.

Reed College encourages employees to actively participate in protecting themselves against permanent hearing loss or severe impairment of their hearing through the Hearing Conservation Program. The program provides employees with information and procedures to reduce or eliminate workplace-hearing loss.

Reed College uses an Action Level of 82 A-weighted decibels (82 dBA) to provide reasonable assurance that employees affected by noise in the workplace are included in the Hearing Conservation Program. The Hearing Conservation Program applies to all employees exposed to workplace noise at or above 82 dBA averaged over eight working hours [8-hour time-weighted average (TWA)].

## 2.0 Responsibilities of Positions

All employees in the Hearing Conservation Program need to understand the adverse effects of noise and the prevention of noise-induced hearing loss.

### 2.1 Environmental Health and Safety Department (EHS)

- Coordinates annual audiometric testing and employee training as detailed in the training section of this program.
- Arranges to obtain noise measurements for situations where employees might use hearing protection, or if an employee requests them. Measurement locations may include:
  - The hearing zone at the employee's normal work location;
  - Locations next to the noise source(s);
  - The entrance(s) to the work area;
  - Other locations within the area where the employee might spend time working.
  - A rough sketch of the area may be included with the results showing the locations of the noise readings.
- Maintains noise monitoring records for at least three years with the following information:
  - Location of each area tested;
  - Name and job classification of affected employee;
  - Date of monitoring;
  - Examiner's name;
  - Date of sound meter's last acoustic or exhaustive calibration;
  - Type of Hearing Protection Device currently used by employee(s).
- Recommends engineering or administrative controls.



- Provides signs indicating that the work area or equipment use requires hearing protection.

## 2.2 Reed College Administration

- Provides commitment, leadership, and financial resources to support this program.
- Assists in the implementation of hearing loss prevention measures, such as administrative and engineering controls.
- Provides reasonable assurance that all provisions of the program are met.

## 2.3 Supervisors

- Provide employees with proper hearing protection.
- Hold employees accountable for wearing appropriate hearing protection in noisy conditions.
- Set a positive example by wearing protection themselves when necessary.
- Provide reasonable assurance that employees complete annual training and audiometric testing in hearing conservation and understand the results.
- Notify the EHS office of any changes made in processes or equipment after the initial assessments.
- Purchase “quiet equipment” whenever feasible.
- Provide a copy of the hearing conservation program and standard to employees or their representatives.
- Initiate or facilitate administrative controls.
- Encourage employees to use hearing protection when participating in noisy off-duty activities.

## 2.4 Affected Employees

- Participate in baseline audiometric testing, and annual audiometric testing and training.
- Wear hearing protection when exposed to impact noise or to noise greater than 82 dBA averaged over eight working hours.
- Immediately report noisy conditions or changes in sound level or tone of their equipment to their supervisor.
- Assist those who make the measurements and assessments by sharing knowledge about the work environment, the machinery in operation, and specific jobs.
- Recognize and understand the adverse effects of off-duty noise exposures.
- Adhere to administrative controls.

## 2.5 Human Resources

- Have new employees receive their baseline audiogram within six months of the start date of their employment.
- Retain records of all audiometric testing for the duration of employment plus thirty years. These records will include:
  - Name and job classification of the employee;



- Date of the audiogram;
- The examiner's name;
- Date of the last acoustic or exhaustive calibration of the audiometer;
- Employees most recent noise exposure assessment;
- Accurate records of the measurements of the background sound pressure levels in the audiometric test rooms.

### 3.0 General Rules

- Reed College uses engineering and administrative controls, when feasible. If these controls do not protect hearing, employees will wear earplugs and/or earmuffs.
- If a noise determination has not occurred, employees will wear hearing protection whenever a conversation between two people separated by three feet or an arm's length cannot converse in a normal tone of voice.
- Supervisors will provide two types of hearing protection devices – earplugs and earmuffs.
- Reed College will pay for audiometric testing and suitable hearing protection. Environmental Health and Safety will pay for testing, supervisors will pay for protection.
- Before baseline audiometric testing, at least 14 hours without exposure to noise is required. Human Resources will notify employees of the testing schedule and inform them that they may do this by using hearing protection.
- If a standard threshold shift (STS) exists, Reed College will notify affected employees in writing and retest immediately. If the retest also indicates an STS, the school will check the fit of hearing protectors, refresh the workers on risks of hearing loss from noise, and schedule them for a 30-day confirmation audiogram.

### 4.0 Training

- New employees will receive training on the use of hearing protection and other required topics at the beginning of their job.
- All affected employees will receive annual training that includes:
  - The effects of noise on hearing
  - The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types
  - The selection, use, and care of hearing protection
  - The purpose of audiometric testing and an explanation of the test procedures
  - The right of the employee, the employee's physician, or the employees designated representative to access exposure measurements and audiometric test results.
  - The location of the copy of the Oregon OSHA Occupational Noise Exposure standard and that employees have free access to it without having to ask.



## 5.0 References

- Oregon Occupational Safety and Health Administration (OR-OSHA). Oregon Administrative Rule (OAR). 29 CFR 1910.95 Occupational Noise Exposure. 5/29/2009.
- Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, "Criteria for a Recommended Standard: Occupational Exposure to Noise." Publication number 98-126. 1998.
- Website <http://www.cdc.gov/niosh/topics/noise/>, CDC Office of Health and Safety Hearing Conservation Program. 2/27/2014.
- American Conference of Governmental Industrial Hygienists (ACGIH). 2015 TVLs and BEIs, Cincinnati, OH, 2015.



## Appendix 1: Occupational Noise Exposure Tables

A-Weighted Sound Level L, decibel	Reed College uses the more stringent ACGIH Reference standard Duration, T		OR-OSHA 1910.95, Table G-16a Reference Duration, T	
80	HOURS	27	HOURS	32.0
81		21		27.9
82		16		24.3
83		13.3		21.1
84		10.7		18.4
85		8		16
86		6.7		13.9
87		5.4		12.1
88		4		10.6
89		3.3		9.2
90		2.7		8.0
91		2		7.0
92		1.6		6.1
93		1.3		5.3
94	1	4.6		
95	MINUTES	50	HOURS	4.0
96		40		3.5
97		30		3.0
98		25		2.6
99		20		2.3
100		15		2.0
101		12.5		1.7
102		10		1.5
103		7.5		1.3
104		6.25		1.1
105		5		1.0
106		3.75		0.87
107		3.2		0.76
108		2.5		0.66
109	1.9	0.57		
110	1.7	0.5		
111	1.3	0.44		
112	0.94	0.38		
113	SECONDS	45	HOURS	0.33
114		36		0.29
115		28.12		0.25
116		22.5		0.22
117		18		0.19
118		14.06		0.16
119		11.3		0.14
120		9		0.125
121		7.03		0.11
122		5.6		0.095



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123	SECONDS	4.5	HOURS	0.082
124		3.52		0.072
125		2.8		0.063
126		2.3		0.054
127		1.76		0.047





## Appendix 2: Definitions

**Action Level** – the sound level of 82 decibels (82 dBA) measured on the A-scale, slow response, or equivalent; a noise dose of fifty percent of the criterion sound level; the basis for implementing an effective hearing conservation program.

**Audiogram** – a chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold level as a function of frequency, most often from 500 to 6000 Hz.

**Baseline Audiogram** – the audiogram against which subsequent audiograms are compared. A 14-hour quiet period must precede the baseline to obtain the best estimate of the person's hearing at that time.

**Criterion Sound Level** – a sound level of 85 decibels; will result in a maximum dose of 100%.

**dBA** – the sound level in decibels read on the “A” scale of a sound-level meter. The “A” scale discriminates against very low frequencies (as does the human ear) and is therefore better for measuring general sound levels.

**Decibel (dB)** – a unit used to express the intensity of sound. The decibel scale is a logarithmic scale in which:

- 0 dB approximates the threshold of hearing in the mid-frequencies for young adults.
- The threshold of discomfort is between 85 and 95 dB SPL.
- The threshold for pain is between 120 and 140 dB SPL.

**Exchange Rate** – the relationship between intensity and dose. Reed College uses the more conservative exchange rate of 3 dB as recommended by ACGIH and NIOSH.

**Hearing Conservation Program** – required by Oregon OSHA for workplaces where employees are exposed to noise levels at or above 85 decibels averaged over an eight-hour period. Program elements include exposure monitoring, audiometric testing, hearing protector use, employee training, access to information, and recordkeeping.

**Hertz (Hz)** – the unit of measurement of frequency, numerically equal to cycles per second.

**Intermittent Noise** – broadband sound-pressure level that occurs several times during a normal workday with intervals greater than 1 second.

**Impact-type Noise** – sharp bursts of sound; should not exceed 140 dB peak sound pressure level. The PEL for impulsive or impact noise is based on number of impacts.

**Noise Dose** – the ratio, expressed as a percentage, of (1) the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time averaged, squared



A-weighted sound pressure and (2) the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (85 dB).

**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-induced Hearing Loss** – the result of exposure to sound of sufficient intensity and duration to cause a decrease in hearing ability.

**Noise Reduction Rating (NRR)** – a number rating system that attempts to describe a hearing protector based on the amount of overall noise level reduction. The NRR theoretically provides an estimate of the protection that should be met or exceeded by 98% of the wearers of a given device. The highest earplug protection made is 33 NRR.

**Occupational Acoustic Trauma (OAT)** – a sudden change in hearing because of a single exposure to a sudden burst of sound, such as an explosive blast. A physician can clinically make the diagnosis of noise-induced hearing loss and should include a study of the noise exposure history.

**Occupational Hearing Loss** – the National Safety Council defines this as a hearing impairment of one or both ears, partial or complete, that results from one's employment. It includes acoustic trauma as well as noise-induced hearing loss.

**Permissible Exposure Limit** – OSHA sets these regulatory limits to denote the exposure, which when reached or exceeded, may be hazardous.

**Pitch** – the property of a sound determined by the frequency of the waves that produce it; the high-ness or lowness of sound.

**Representative exposure** – the measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

**Sound level meter** – an instrument that uses a microphone, amplifier, and output meter to measure sound levels.

**SPL (Sound Pressure Level)** – a measure of the ratio of the pressure of a sound wave relative to a reference sound pressure. Sound pressure level in decibels is typically referenced to 20  $\mu\text{Pa}$ .

**Standard threshold shift (STS)** – OSHA uses this term to describe an average shift hearing ability in either ear of 10 dB or more at 2,000, 3,000, and 4,000 Hz. NIOSH uses the term significant threshold shift to indicate a change of 15 dB or more at any frequency, 500 through 6000 Hz, from the baseline level in either ear, as determined by two consecutive tests.



**Temporary threshold shift** – a temporary impairment of hearing ability.

**TLV (Threshold Limit Value)** – a guideline used by the American Conference of Governmental Industrial Hygienists (ACGIH) to denote the exposure, which when reached or exceeded, may be hazardous. For noise, the TLV is 85 dBA with an exchange rate is 3 dB.

**TWA (Time Weighted Average)** – a value expressed in dBA; the sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

**Work-practice control** – a type of administrative control; emphasizes safe work practices and procedures.

