Occupational Noise Exposure

- ***29 CFR 1910.95***

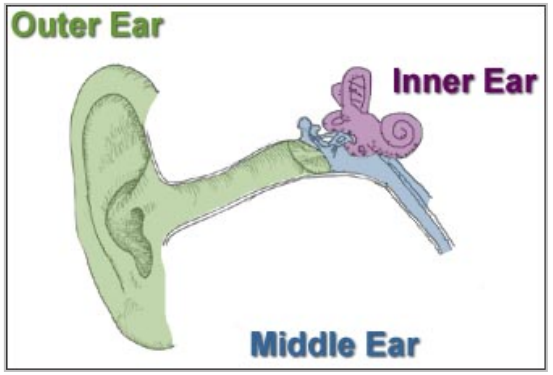
Objectives

29 CFR 1910.95

- Distinguish between sound and noise
- Discuss types of hearing loss
- Become familiar with types of noise measuring equipment
- Understand the requirements of 29 CFR 1910.95

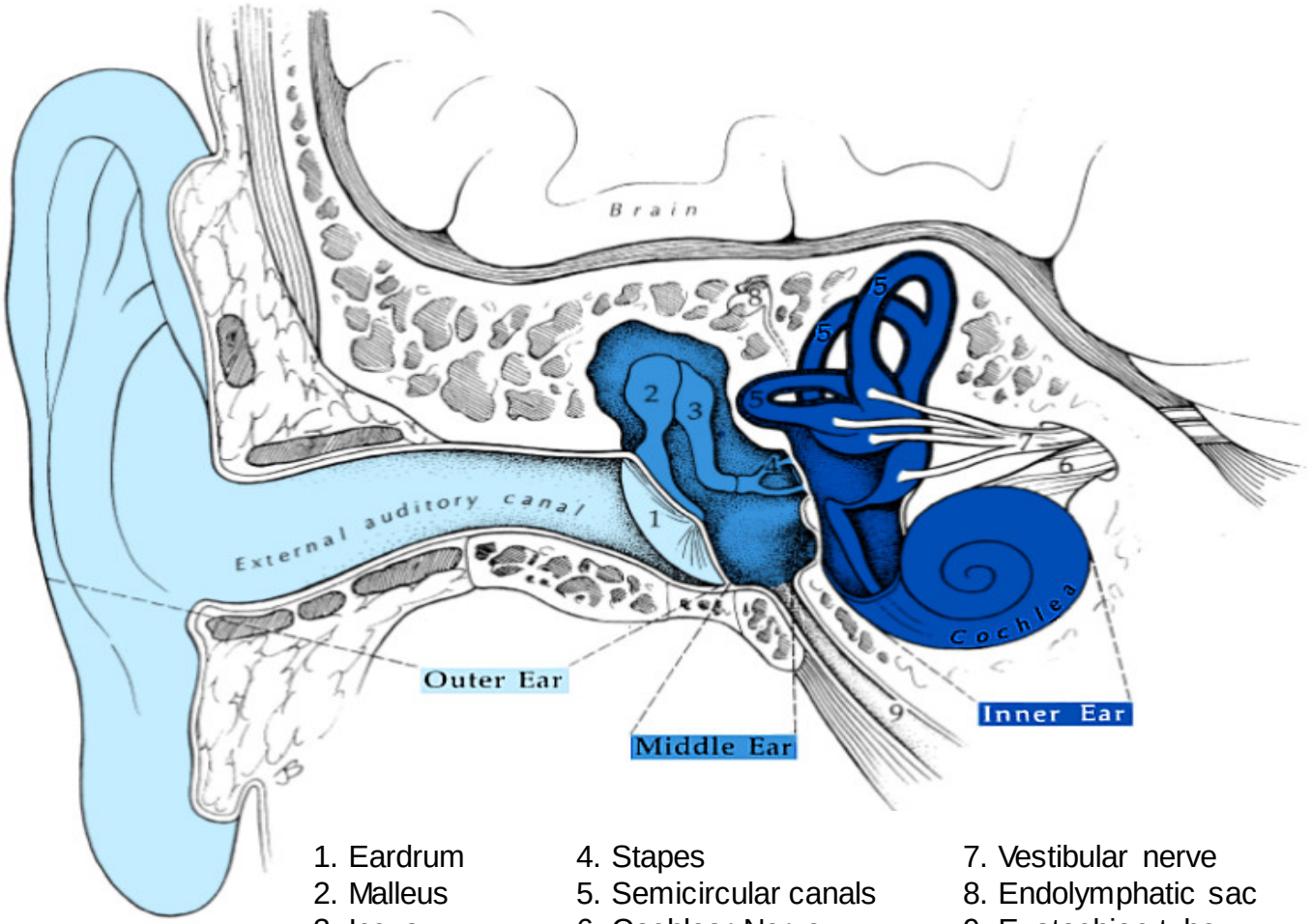
Sound Versus Noise

- Sound is a pressure change detectable by the human ear.
  - The pitch ranges between 20 to 20,000 Hz.
  - The volume ranges between 0 to 140 dB.



- Noise is a type of sound.
  - It carries no information.
  - It is random.
  - It is generally described as undesirable or unwanted sound.

An Ear's Anatomy



1. Eardrum
2. Malleus
3. Incus
4. Stapes
5. Semicircular canals
6. Cochlear Nerve
7. Vestibular nerve
8. Endolymphatic sac
9. Eustachian tube

Types of Hearing Loss

- Middle ear hearing loss results from lack of conduction.
  - Impacted wax
  - Broken ear drum
- Inner ear hearing loss results from lack of neural connections.
  - Naturally due to aging
  - Loud noises
  - Disease

Occupational Hearing Loss

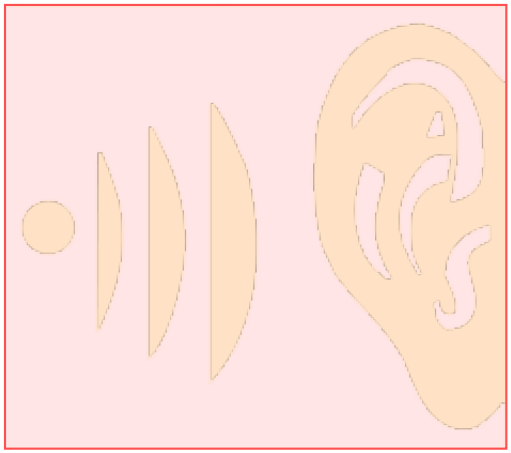
- Noise-Induced Hearing Loss or Noise-Induced Permanent Threshold Shift (NIPTS)
  - Permanent sensor neural condition
  - Cannot be treated or corrected medically
  - Initially effects high frequencies
    - » Industrial trough
    - » Speech recognition
  - Progresses to lower frequencies

Threshold Shifts

- Temporary Threshold Shifts (TTS)
  - Hearing returns to normal after noise exposure
- Permanent Threshold Shifts (PTS)
  - Repeated noise exposure without a return to normal
- Standard Threshold Shifts (STS)
  - $\geq$ 10 dB average loss in 2000, 3000, or 4000 Hz in either ear

Non-Auditory Effects of Noise

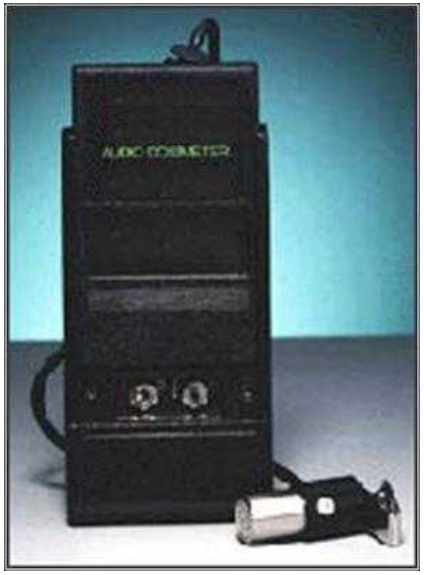
- Effects cardiovascular system
- Effects the nervous system
- Interferes with speech and concentration
- Causes annoyance, stress, and fatigue
- Reduces work efficiency
- Lowers morale
- Masks warning sounds



Noise Measuring Equipment

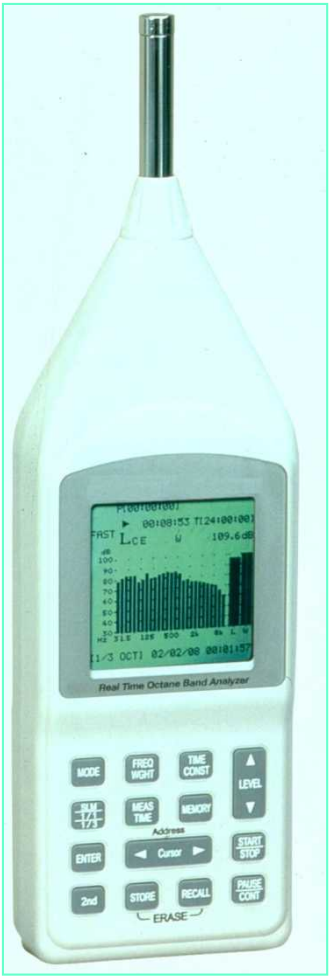
- Sound level meters
  - Basic instrument to measure sound pressure variations in air

- Noise dosimeter
  - Combines sound pressure and time for employee exposure monitoring



Noise Measuring Equipment

- Octave band analyzer
  - Diagnostic tool to help find appropriate engineering controls to reduce noise levels



Noise Limit

1910.95(b)

- No employee shall be exposed above the permissible exposure level (PEL).
- PEL = 90 dBA for a 8-hour time-weighted average (TWA)
- Feasible administrative or engineering controls are required.
- Hearing protection is required to protect the employee to the PEL.

Noise Action Limit

1910.95(c)-(o)

- Action Level (AL) = 85 dBA for a 8-hour TWA
  - Determined without regard to hearing protector attenuation
- Hearing Conservation Program (HCP) required
- Hearing protection devices must be available

Monitoring

1910.95(d)

- Strategy to identify all employees who could be exposed above AL (85 dBA)
- Conduct representative sampling
  - Each job classification
  - All shifts
- Repeat monitoring when:
  - Additional employees are exposed
  - Hearing protectors are inadequate

Notification

1910.95(e)

- The employer shall notify each employee exposed at or above 85 dBA of the monitoring results.

Audiometric Testing

1910.95(g)

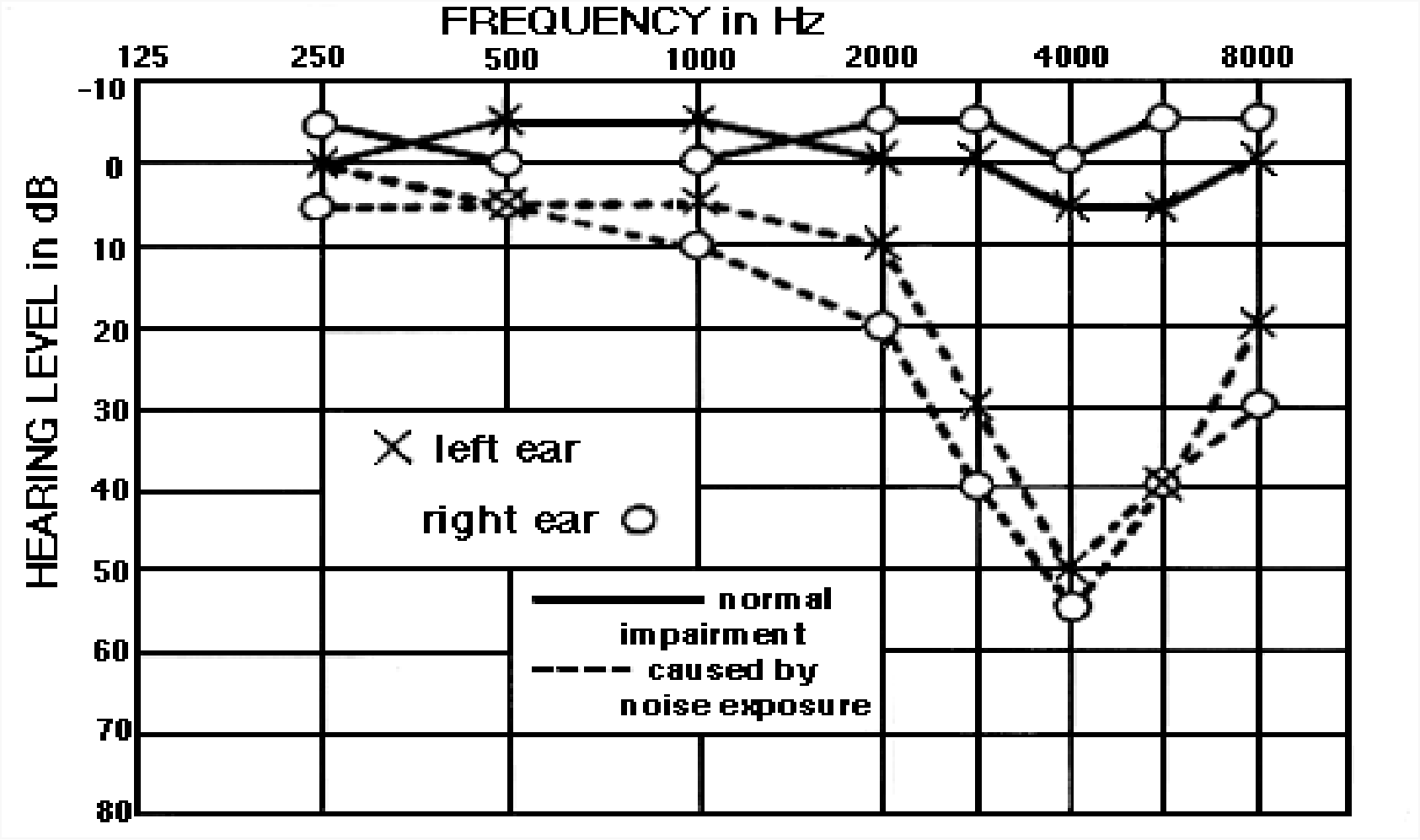
- A qualified person performs the hearing test, usually an audiologist.
- The audiometers are calibrated to determine your threshold of hearing and changes (threshold shifts).
  - Must meet strict specified criteria
- A qualified person interprets the results of the hearing test.

Audiometric Testing

1910.95(g)

- Provided at no cost to the employee
  - Within 6 months of first exposure
    - » For mobile test van, within 12 months
- Provided annually and analyzed
  - Allowance for aging
  - STS notification

Example of Audiogram

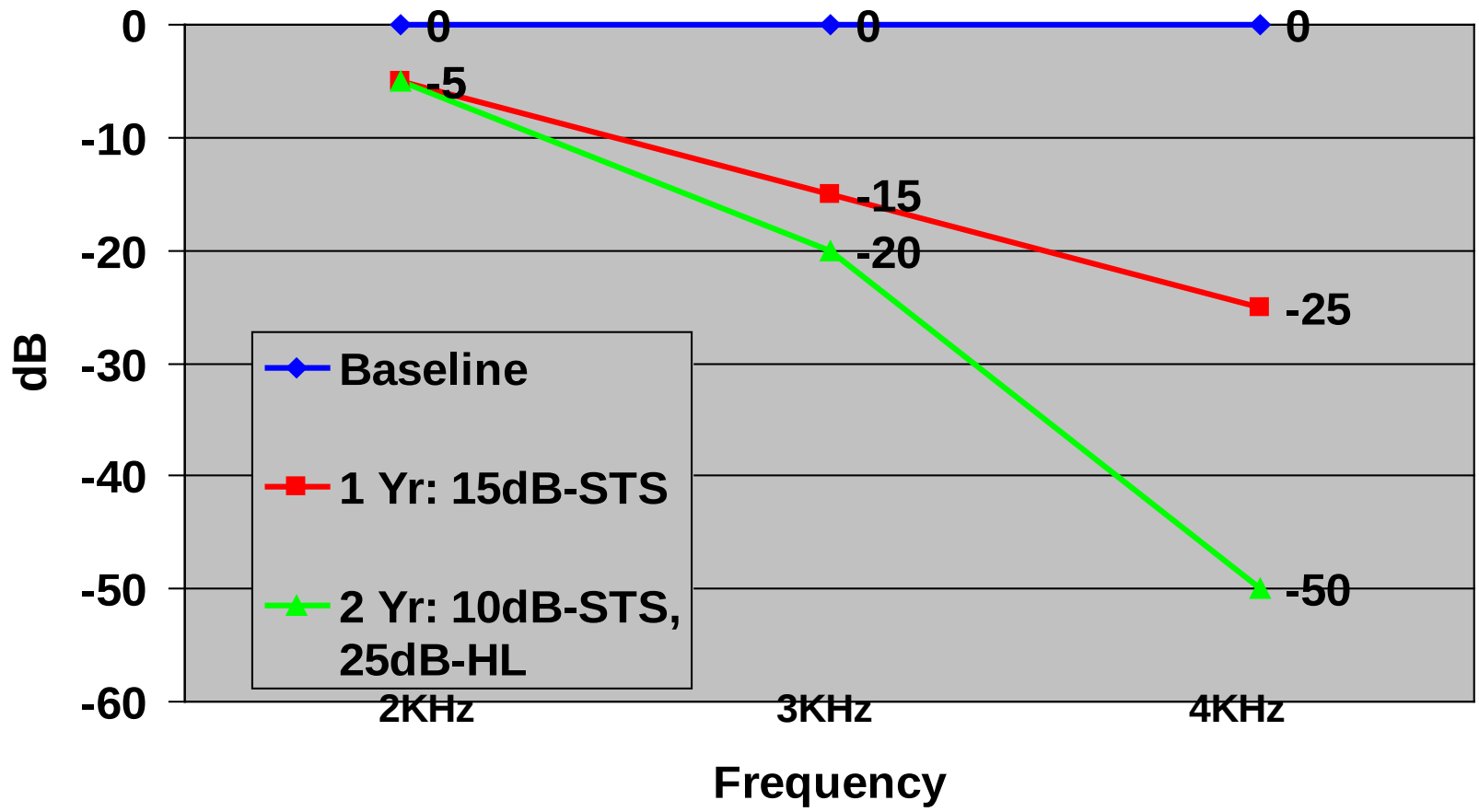


STS Notifications

1910.95(g)

- Recall standard threshold shift definition
  - ≥ 10 dB avg. loss 2–4 kHz
- The employer may retest within 30 days to verify the STS.
- An audiologist shall determine need for further evaluation.
- The employer shall notify the employee of the STS *in writing within 21 days.*

Audiogram with 2 STS, 1 PHL



STS Requirements

1910.95(g)

- If STS is work-related:
  - Employee is fitted for hearing protection and trained
  - Refitted and retrained if already wearing hearing protection
  - Referred for audiological or otological exam, if necessary and appropriate

Hearing Protectors

1910.95(i)

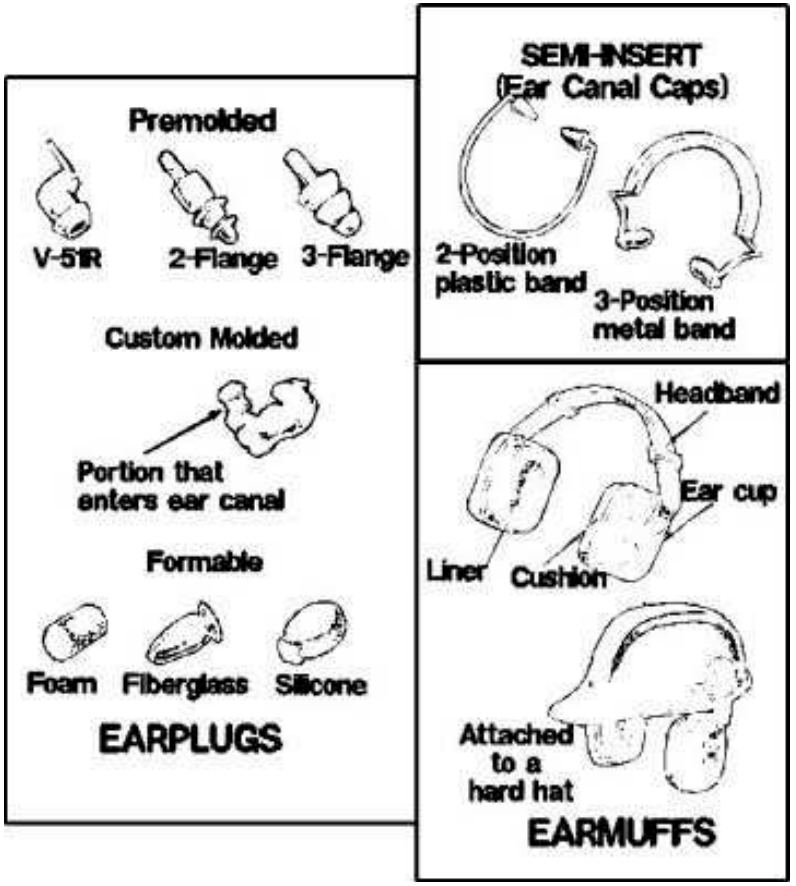
- Shall be available to **“action level”** employees

- Shall be required for those employees:
  - Exposed at or above 90 dBA
  - Exposed at or above 85 dBA (without an audiometric baseline)
  - Who have an STS

Hearing Protectors

1910.95(i)

- Provided at no cost to the employee
- Selected from a variety of types and brands
- Properly fitted
- Replaced as necessary



Protector Attenuation

1910.95(j)

- Hearing protectors shall:
  - For overexposed employees
    - » Attenuate < 90 dBA 8-hr TWA
  - For employees with an STS
    - » Attenuate < 85 dBA 8-hr TWA

  - Whenever noise exposures increase
    - » Be reevaluated to determine adequacy

Noise Reduction Rating

Appendix B

- Defined as the maximum number of decibels (dB) that the hearing protector will reduce the sound level when worn
- NRR must be on the hearing protector package.
- NRR example for A-weighted data
  - **Estimated exposure (dBA) = TWA (dBA) - (NRR - 7)**

Training

1910.95(k)

- Must be annual

- Must include:
  - Effects of noise on hearing
  - Purpose of hearing protectors
  - Instruction in protector hearing protector selection, fitting, use and care
  - Purpose of audiometric test and explanation of the procedures and results

Posting the Standard

1910.95(l)

- The employer shall make available to affected employees or their representatives copies of the standard.

- The employer shall also post a copy of the standard in the workplace.

Recordkeeping

1910.95(m)

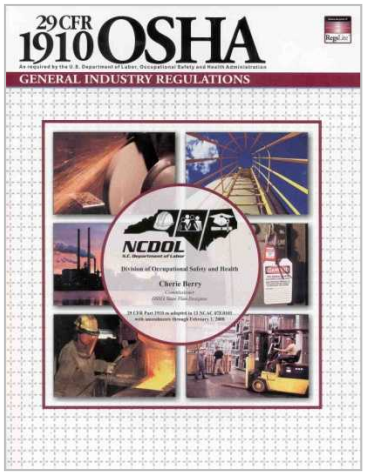
- Provide employee and DOL access and transfer records to successor employer
- Noise measurements: ≥ 2 years
- Audiometric tests ≥ employment duration:
  - Name, job classification and dBA-TWA
  - Date, examiner's name and calibration date
  - Background measurements of audiometric test room

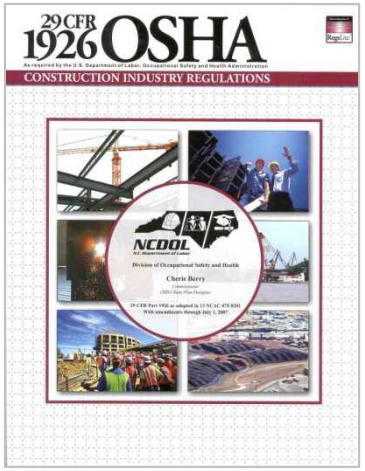
Other Paragraphs

1910.95

- (f) - Observation of monitoring
- (h) - Audiometric test requirements
- (l) - Access to information and training
- (o) - Exemptions

**Note: 1926.52 applies to construction*





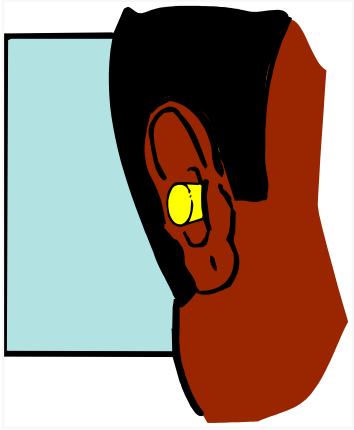
Appendices

1910.95(n)

- A - Noise exposure computation
- B - Methods for establishing the adequacy of hearing protector attenuation
- C - Audiometric measuring equipment
- D - Audiometric test rooms
- E - Acoustic calibration of audiometers
- F - Calculations and application of age corrections to audiograms
- G - Monitoring noise levels

Summary

- Distinguish between sound and noise
- Discuss types of hearing loss
- Become familiar with types of noise measuring equipment
- Understand the requirements of 29 CFR 1910.95



Thank You For Attending!

Final Questions?