

Personal Protective Equipment (PPE)

General Industry:

1910

Subpart I



Raleigh





PPE

Objectives

- Describe the hierarchy of controls as it related to PPE.
- Identify types of PPE utilized in General Industry.
- Explain PPE training requirements.
- Explain employer responsibilities regarding PPE.
- Explain employee responsibilities regarding PPE.

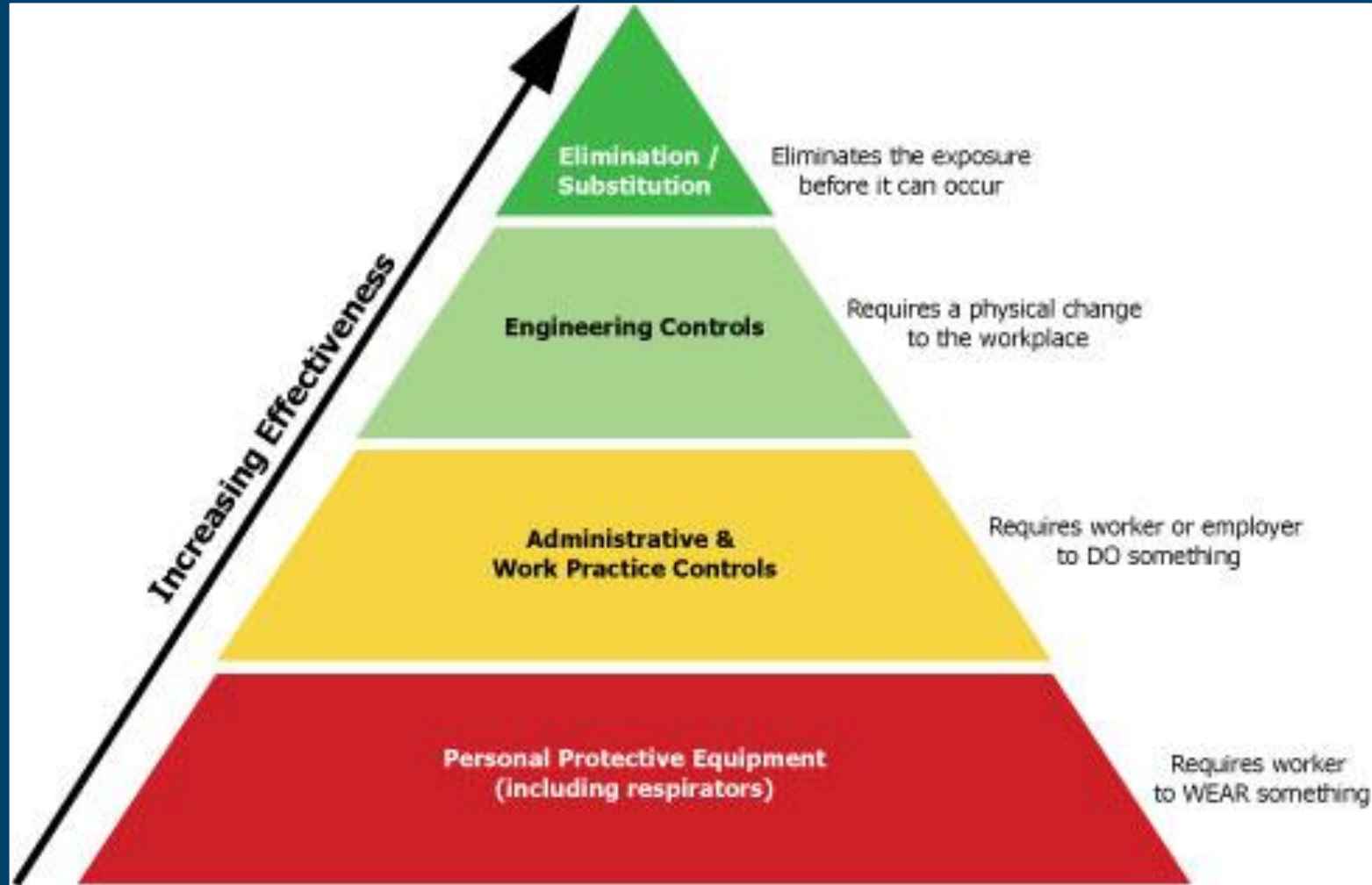


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Introduction

- Employers must protect employees:
 - Assess the workplace
 - Eliminate & reduce the hazards found using engineering & administrative controls
 - Use appropriate PPE
 - **REMEMBER: PPE is the last level of control**

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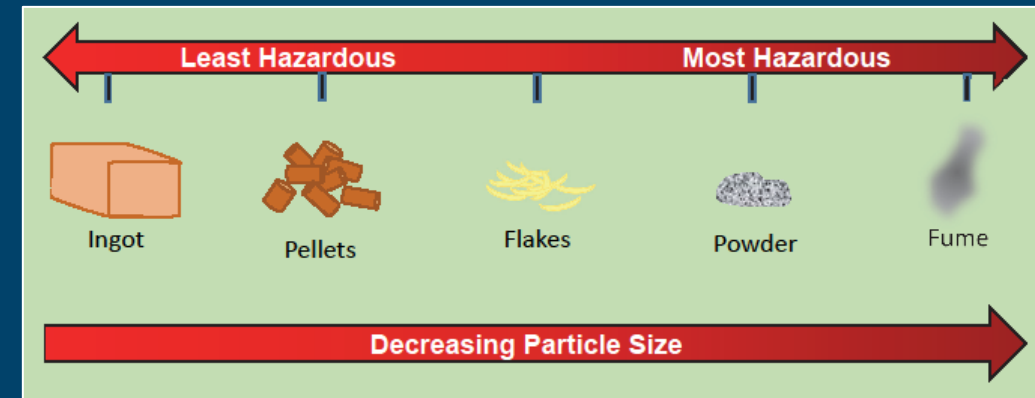


Source: OSHA

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Hierarchy of Controls

- Elimination/Substitution:
 - Highest level of protection
 - Eliminate hazard from the workplace
 - Substitute:
 - Use safer item/substance
 - Use same chemical but in a different form; as particle size of a substance decreases, hazard level increases.



Source: OTIEC Workgroup

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Hierarchy of Controls

- Engineering Controls:
 - Physical changes to workplace
 - Examples:
 - Isolation
 - Ventilation
 - Equipment modification

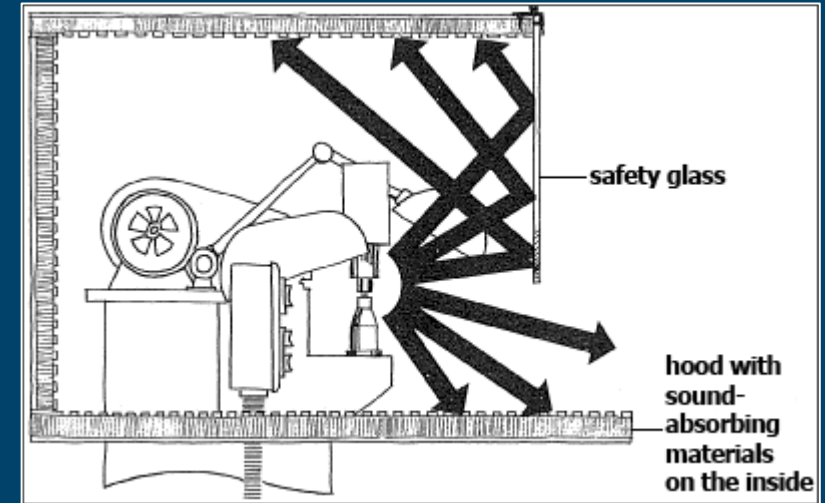


Figure 1. Grinder in use with the control in place.





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Hierarchy of Controls

- Administrative Controls/Work Practice Control:
 - Requires worker or employer to do something
 - Examples:
 - Written proper operating procedures, work permits and/or safe work practices
 - Inspection & maintenance
 - Housekeeping
 - Supervision
 - Training
 - Alarms, signs and/or warnings
 - Regulated areas

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Hierarchy of Controls

- PPE Controls:
 - Requires worker to wear something
 - Examples:





PPE

Types of PPE

- Head Protection:
 - Frequent causes of head injuries:
 - Falling objects from above striking the head;
 - Bumping head against fixed objects, such as exposed pipes or beams; and
 - Accidental head contact w/ electrical hazards.



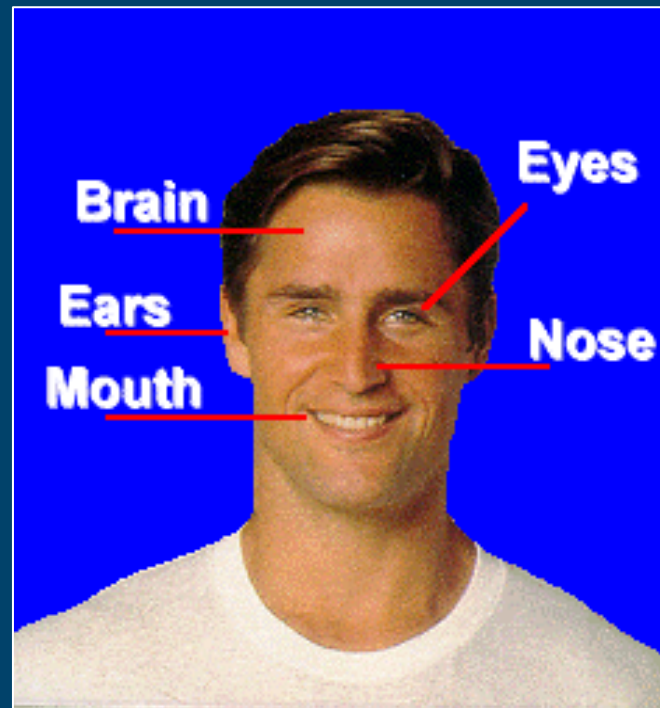
Source of Photos: OSHA



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Types of PPE

- Why head protection is important:



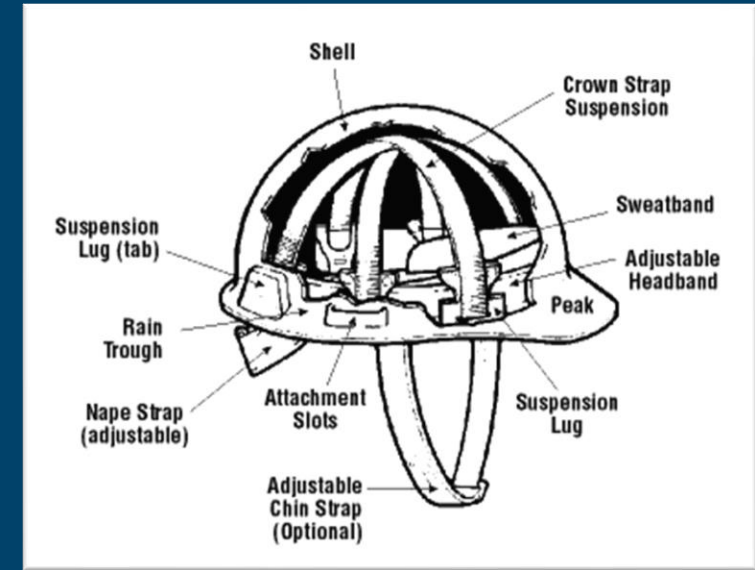
Source : OSHA



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Types of PPE

- Classes of Hard Hats:
 - Class G (General)
 - Protect against impact & penetration
 - Low-voltage electrical protection (proof-tested to 2,200 volts)



Source: OSHA



Source: OSHA



PPE

Types of PPE

- Classes of Hard Hats:
 - Class E (Electrical)
 - Designed for electrical/utility work
 - Protect against falling objects/impact
 - High-voltage electrical protection (proof-tested to 20,000 volts)



Source: OSHA



PPE

Types of PPE

- Classes of Hard Hats:
 - Class C (Conductive)
 - Designed for comfort/offers limited protection
 - Protects heads that may bump against fixed objects
 - Does not protect against falling objects or electrical hazards



Source: OSHA



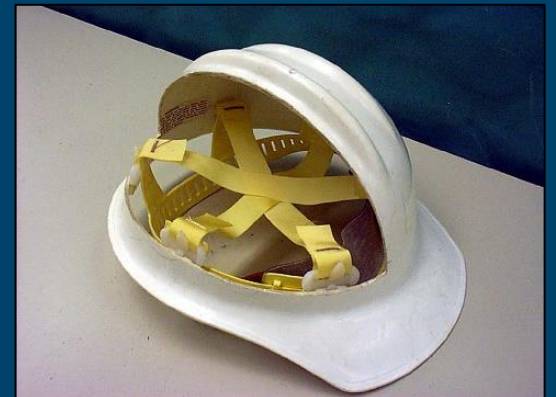
PPE

Types of PPE

- ANSI Z89.1, 1997
 - **Type I:** Provides protection from strikes to the top of the helmet, but not from strikes to the sides, front or back of the head
 - **Type II:** Provides protection from strikes to the top of the helmet & provides protection from blows to the sides, front & back of the head. More suitable for workers who are not always in a standing position



Source of photos: OSHA





PPE

Types of PPE

- Eye & Face Protection



Source of images: OSHA



PPE

Types of PPE

- Eye & Face Protection
 - Must comply w/:
 - ANSI Z87.1-2003; or
 - ANSI Z87.1-1989 (R-1998)



Source: OSHA



PPE

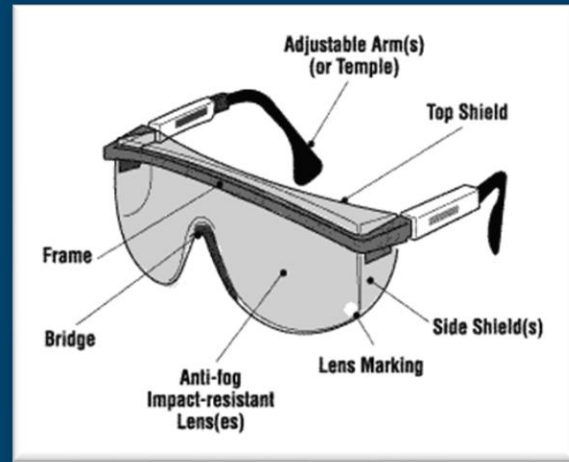
Types of PPE

- Eye & Face Protection
 - Selecting eye & face protection – elements to consider:
 - Ability to protect against workplace hazards
 - Should fit properly
 - Should provide unrestricted vision & movement
 - Durable & cleanable
 - Allow unrestricted functioning of other PPE

PPE

Types of PPE

- Eye & Face Protection
 - Safety Glasses
 - Used to protect against moderate impacts from particles



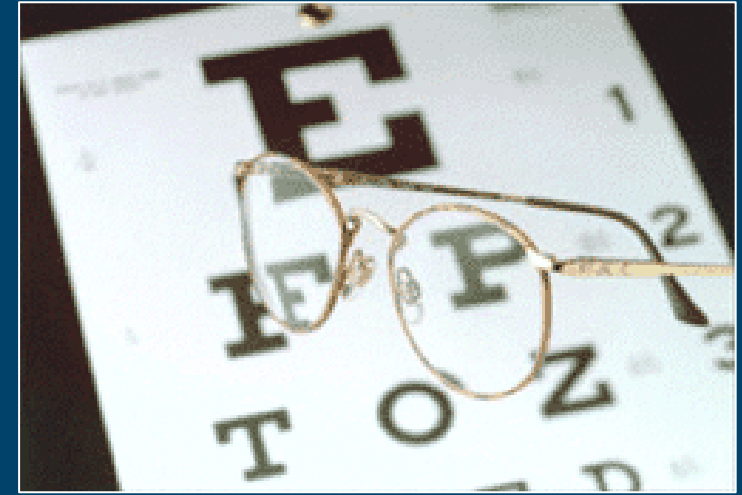
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PPE

Types of PPE

- Eye & Face Protection
 - Prescription Glasses
 - Employees who use prescription glasses while performing operations w/ potential eye hazards must use eye protection that:
 - Incorporates the prescription in its design; or
 - Can be used over your prescription glasses without interfering w/ the proper positioning of the prescription glasses or goggles



Source: OSHA



PPE

Types of PPE

- Eye & Face Protection
 - Goggles
 - Protect eyes & the facial area immediately surrounding the eyes from impact, dust & splashes
 - Some can be used over corrective lenses, if they fit them



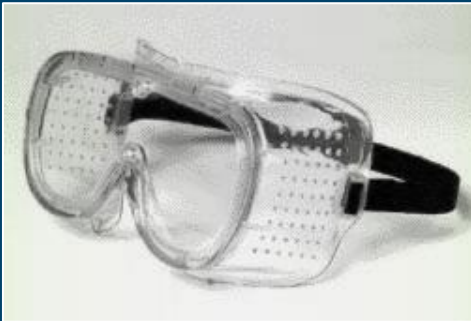
Source: OSHA



PPE

Types of PPE

- Eye & Face Protection
 - Goggle Types:



Direct-ventilated

- Prevents fogging by allowing air circulation
- Resist direct passage of large particles into the goggles



Indirect-ventilated

- Prevents fogging by allowing air circulation
- Protects against liquid or chemical splash entry



Non-ventilated

- May fog & require frequent lens cleaning
- Does not allow the passage of air into the goggles
- Prevents splash entry



PPE

Types of PPE

- Eye & Face Protection
 - Face Shields
 - Protect face from nuisance dusts & potential splashes or sprays of hazardous liquids
 - Do NOT protect from impact hazards unless so rated
 - Shields are for face protection. To protect the eyes, wear safety glasses w/ side shields or goggles under the face shield.



Source: OSHA



PPE

Types of PPE

- Eye & Face Protection
 - Welding Shields
 - Protect eyes from burns caused by:
 - Infrared light
 - Intense radiant light
 - Protect eyes & face from flying sparks, metal spatter & slag chips



Source of graphics: OSHA





PPE

Types of PPE

- Eye & Face Protection
 - Laser Safety Goggles
 - Provide protection from following hazards:
 - Physical contact, such as flying particles
 - Ultraviolet (UV) light, laser & welding

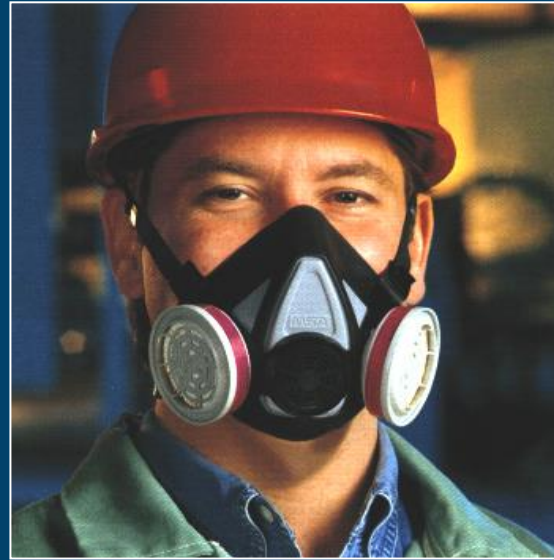


Source: OSHA

PPE

Types of PPE

- Respiratory Protection



Source of photos: OSHA



PPE

Types of PPE

- Respiratory Protection
 - Elimination, substitution or engineering controls
 - Eliminate toxic material or substitute a less toxic material
 - Enclose or confine operation
 - General or local exhaust ventilation
 - Only when engineering controls are not feasible will respirators be used

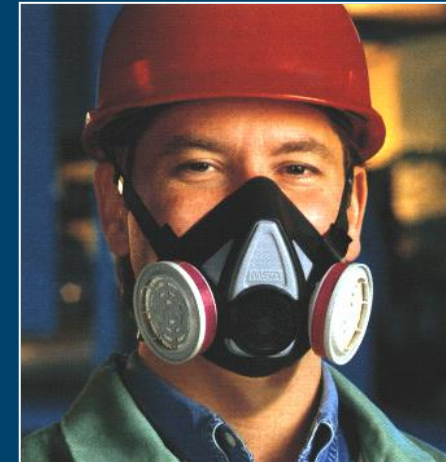


Source: OSHA

PPE

Types of PPE

- Respiratory Protection
 - Types of respirators:
 - Air-Purifying (APR) – remove contaminants from air
 - Particulate respirators
 - Chemical cartridge/gas mask respirator
 - Powered Air-Purifying Respirator (PAPR)





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Types of PPE

- Respiratory Protection
 - Types of respirators:
 - Atmosphere-Supplying – provide clean, breathable air
 - Self-Contained Breathing Apparatus (SCBA)
 - Supplied-Air Respirator (SAR)





PPE

Types of PPE

- Respiratory Protection
 - Medical Evaluation
 - Before fit tests are conducted & an employee is authorized to use a respirator, a medical evaluation must be conducted to determine the ability of the employee to use a respirator.
 - Identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical evaluation w/ which the same information is obtained.



PPE

Types of PPE

- Respiratory Protection
 - Inspecting & Cleaning Respirators
 - Inspect all respirators for wear & tear before & after each use
 - Wash in a detergent solution & then disinfect by immersing in a sanitizing solution



Source of photos: Carmen Vazquez



PPE

Types of PPE

- Respiratory Protection
 - Storing Respirators
 - Protect against dust, sunlight, heat, extreme cold, excessive moisture & damaging chemicals
 - Store in position to retain natural configuration

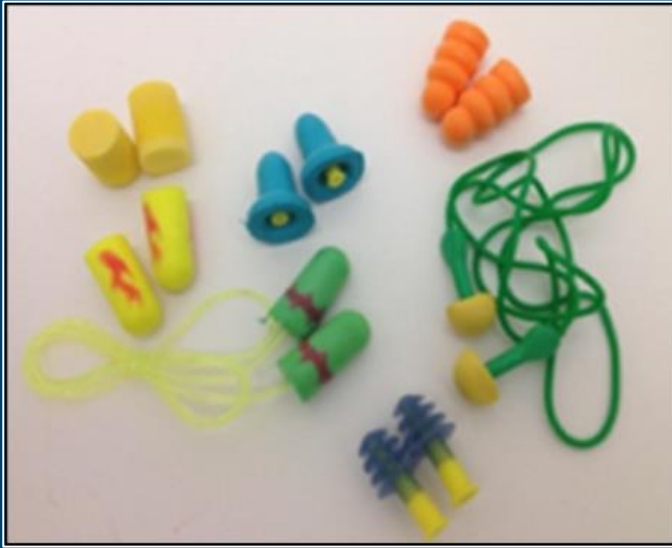




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Types of PPE

- Hearing Protection

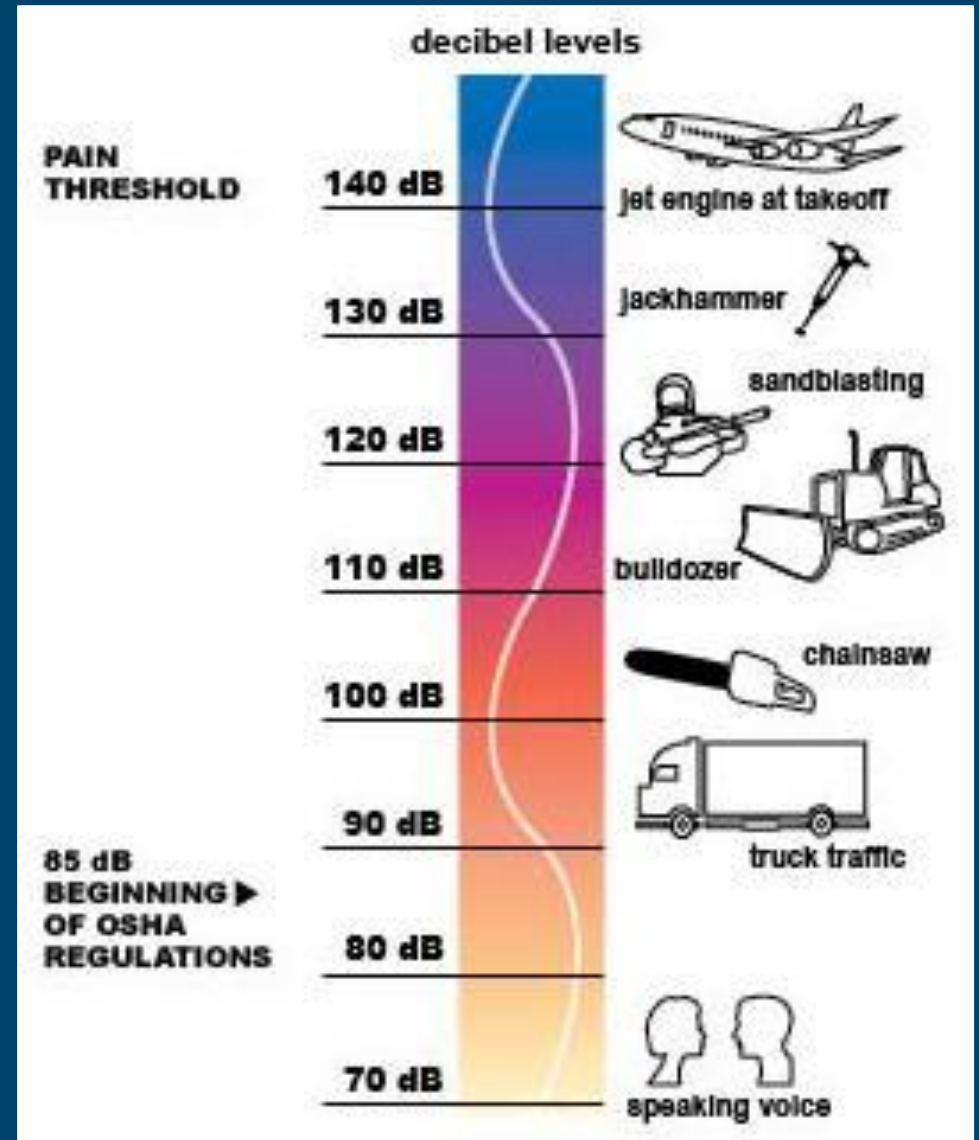


Source of photos: OSHA

PPE

Types of PPE

- Hearing Protection
 - Exposure to noise levels over 85 dB can cause hearing loss
 - Hearing protection required at 90 dB
 - Implement effective Hearing Conservation Program





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Types of PPE

- Hearing Protection
 - Employer must provide ear protection when the noise level in the work area is greater than indicated in this table:



Source: NIOSH

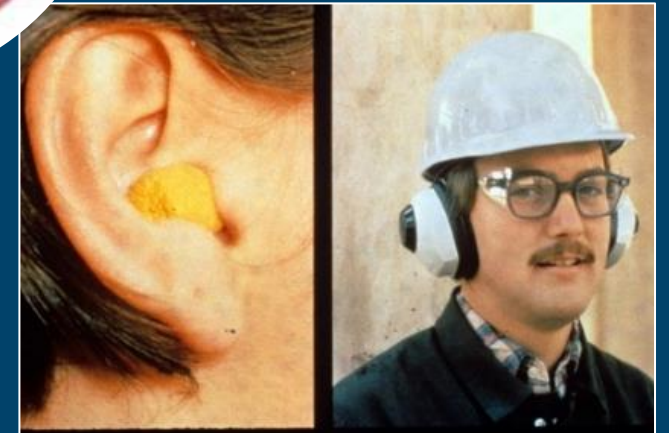
Permissible Noise Exposure 29 CFR 1910.95(b)(1)	
Duration per Day (hours)	Sound Level (dBA)
8	90
6	92
4	95
3	97
2	100
1	105
1/2	110
1/4	115

Impact noise should not exceed 140 dB.

PPE

Types of PPE

- Hearing Protection
 - Examples of hearing protection:
 - Disposable foam plugs
 - Molded ear plugs
 - Noise-cancelling ear plugs
 - Earmuffs
 - Consider “Noise Reduction Rating” (NRR) of devices



Source of graphics: NIOSH



PPE

Types of PPE

- Hearing Protection
 - How to insert ear plugs properly:

How To Wear Soft Foam Earplugs

To get the best protection from your soft foam earplugs, remember to **roll**, **pull**, and **hold** when putting them in. Use clean hands to keep from getting dirt and germs into your ears!



- 1. Roll** the earplug up into a small, thin "snake" with your fingers. You can use one or both hands.



- 2. Pull** the top of your ear up and back with your opposite hand to straighten out your ear canal. The rolled-up earplug should slide right in.



- 3. Hold** the earplug in with your finger. Count to 20 or 30 out loud while waiting for the plug to expand and fill the ear canal. Your voice will sound muffled when the plug has made a good seal.

Check the fit when you're all done. Most of the foam body of the earplug should be within the ear canal. Try cupping your hands tightly over your ears. If sounds are much more muffled with your hands in place, the earplug may not be sealing properly. Take the earplug out and try again.



PPE

Types of PPE

- Hand Protection
 - Potential hazards for hands:
 - Skin absorption of hazardous substances
 - Lacerations or severe cuts
 - Punctures
 - Chemical burns
 - Thermal burns
 - Extreme temperatures



Source of photos: OSHA

PPE

Types of PPE

- Hand Protection
 - Types of gloves:



Anti-vibration



Chemical-resistant



Leather Palm



Permeation-resistant



Heat-resistant



Cut-resistant



PPE

Types of PPE

- Foot & Leg Protection
 - Causes of foot injuries:
 - Falling or rolling of heavy objects
 - Crushing or penetrating materials
 - Sharp objects that can penetrate the sole
 - Exposure to molten metal
 - Working on or around hot, wet or slippery surfaces
 - Working when electrical hazards are present



Source: OSHA



PPE

Types of PPE

- Foot & Leg Protection
 - Conditions requiring foot protection:
 - Impacts
 - Compressions
 - Cuts/punctures
 - Chemicals
 - Temperatures



Source: OSHA



PPE

Types of PPE

- Foot & Leg Protection
 - Examples of foot & leg protection:
 - Impact-resistant toe and/or instep
 - Steel
 - Composite
 - Heat-resistant soles
 - Metal shanks
 - Specialty footwear may be needed
 - Metatarsal guards
 - Liquid- or chemical-resistant
 - Conductive or non-conductive



Source of photos: OSHA



PPE

Types of PPE

- Foot & Leg Protection
 - Protective footwear must comply w/ any of the following consensus standards:
 - ANSI Z41.1 – 1991 – “American National Standard for Personal Protection – Protective Footwear”
 - ASTM F-2412 – 2005 – “Standard Test Methods for Foot Protection”
 - ASTM F-2413 – 2005 – “Standard Specification for Performance Requirements for Protective Footwear”



Source: OSHA



PPE

Types of PPE

- Foot & Leg Protection
 - Protection from hazards:
 - Shoes w/ metal toe-cap protect against knocks & falling objects
 - Rubber shoes protect against chemical materials, as directed by the SDS





PPE

Types of PPE

- Body Protection
 - Protective clothing:



Source of photos: OSHA

PPE

Types of PPE

- Body Protection
 - Provide protective clothing for those parts of the body exposed to possible injuries
 - Types of body protection:
 - Laboratory coats
 - Coveralls
 - Vests
 - Jackets
 - Aprons
 - Surgical gowns
 - Full body suits



Source of photos: OSHA



PPE

Types of PPE

- Body Protection
 - Selection of body protection – variety of materials effective against certain hazards:
 - Paper-like fiber – dust & splashes
 - Treated wool & cotton – fire-resistant, dust abrasions & rough/irritating surfaces
 - Duck – cuts & bruises
 - Leather – dry heat & flames
 - Rubber, rubberized fabrics, neoprene & plastics – certain chemicals & physical hazards



Source of photos: OSHA



PPE

Types of PPE

- Body Protection

- Protective clothing is required for HAZWOPER activities
- EPA's levels of PPE:

Level A:

- Provides highest level of protection
- Required when greatest potential for exposure exists & greatest level of skin, respiratory & eye protection is required
- Examples:
 - Positive-pressure, full facepiece SCBA or positive-pressure supplied air respirator w/ escape SCBA
 - Totally encapsulated chemical- & vapor-protective suit
 - Inner & outer chemical-resistant gloves
 - Disposable protective suit, gloves & boots





PPE

Types of PPE

- Body Protection
 - EPA's levels of PPE:

Level B:

- Required for highest level of respiratory protection & lesser level of skin protection
- Examples:
 - Positive-pressure, full facepiece SCBA or positive-pressure supplied air respirator w/ escape SCBA
 - Inner & outer chemical-resistant gloves
 - Face shield
 - Hooded, chemical-resistant clothing
 - Coveralls
 - Outer chemical-resistant boots





PPE

Types of PPE

- Body Protection



EPA's levels of PPE:

- Level C:
 - Required when concentration & type of airborne substances are known & criteria for using APR is met
 - Examples:
 - Full-face, air-purifying respirators
 - Inner & outer chemical-resistant gloves
 - Hard hat
 - Escape mask
 - Disposable, chemical-resistant outer boots



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Types of PPE



- Safety glasses
- Face shield
- Chemical-resistant, steel-toe boots or shoes

operations
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PPE

Types of PPE

- Training Requirements
 - Each employee who is required to use PPE must be trained to know:
 - When PPE is necessary
 - What PPE is necessary
 - How to properly put on, take off, adjust & wear the PPE
 - The limitation of the PPE
 - Proper care, maintenance, useful life & disposal of PPE



PPE

Types of PPE

- Responsibilities

- Employer

- The employer is required to:
 - Perform hazards assessment
 - Provide appropriate PPE
 - Train employees
 - Maintain/replace PPE
 - Review/update/evaluate PPE Program



PPE

Types of PPE

- Responsibilities

- Employer

- The employer is required to pay for PPE used to comply w/ OSHA stands/
 - Examples:
 - Metatarsal foot protection
 - Rubber boots w/ steel toes
 - Non-prescription eye protection
 - Prescription eyewear inserts/lenses for full-face respirators
 - Goggles & face shields
 - Fire fighting PPE
 - Hard hats
 - Hearing protection
 - Welding PPE





PPE

Types of PPE

- Responsibilities

- Employer

- Employer payment exemptions:

- Non-specialty, safety-toe protective footwear & non-specialty, prescription safety eyewear
 - Everyday clothing
 - Ordinary clothing, skin creams or other items used solely for protection from weather
 - Consumer safety items worn by food workers
 - Lifting belts
 - When employee lost or intentionally damaged PPE





PPE

Types of PPE

Responsibilities

- Employee
 - Employees are required to:
 - Properly wear PPE
 - Attend PPE training
 - Care for, clean & maintain PPE
 - Inform supervisor of needs for PPE repair/replacement



Source: OSHA



THANK YOU!!!

Questions???

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