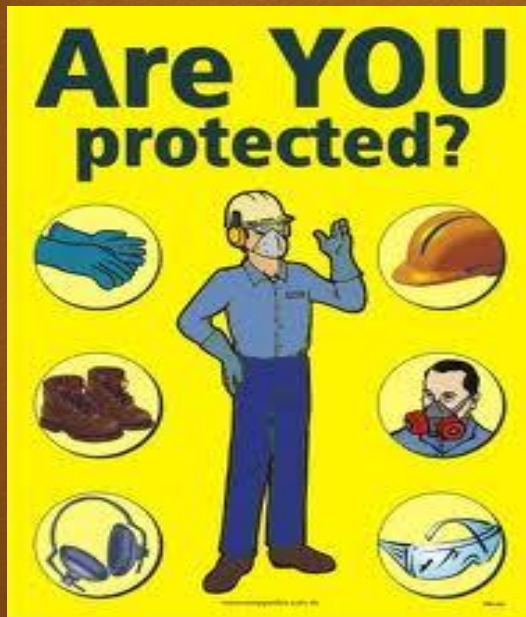


Personal Protective Equipment - PPE

What's it all about?



Objective



To ensure the proper
selection,
use, and care of PPE

Personal Protective Equipment



- ❑ Definition: Devices used to protect an employees from injury or illness resulting from contact with chemical , radiological, physical, electrical, mechanical, or other workplace hazards (OSHA)
- ❑ The need for PPE and the type of PPE used is based on hazard present; PPE requirements can be generated by industrial hygiene audits

USE



- ❑ PPE is used as a last resort
- ❑ The use of PPE signifies that the hazard could not be controlled by other methods, such as:
 - Engineering out the hazard
 - Administrative controls (i.e., shift rotation)

USE cont.

Engineering / Administrative controls to eliminate or reduce the need for PPE



- Engineering controls
 - Design (remove hazard from process)
 - Substitution (of less hazardous materials)
 - Local exhaust ventilation (at source)

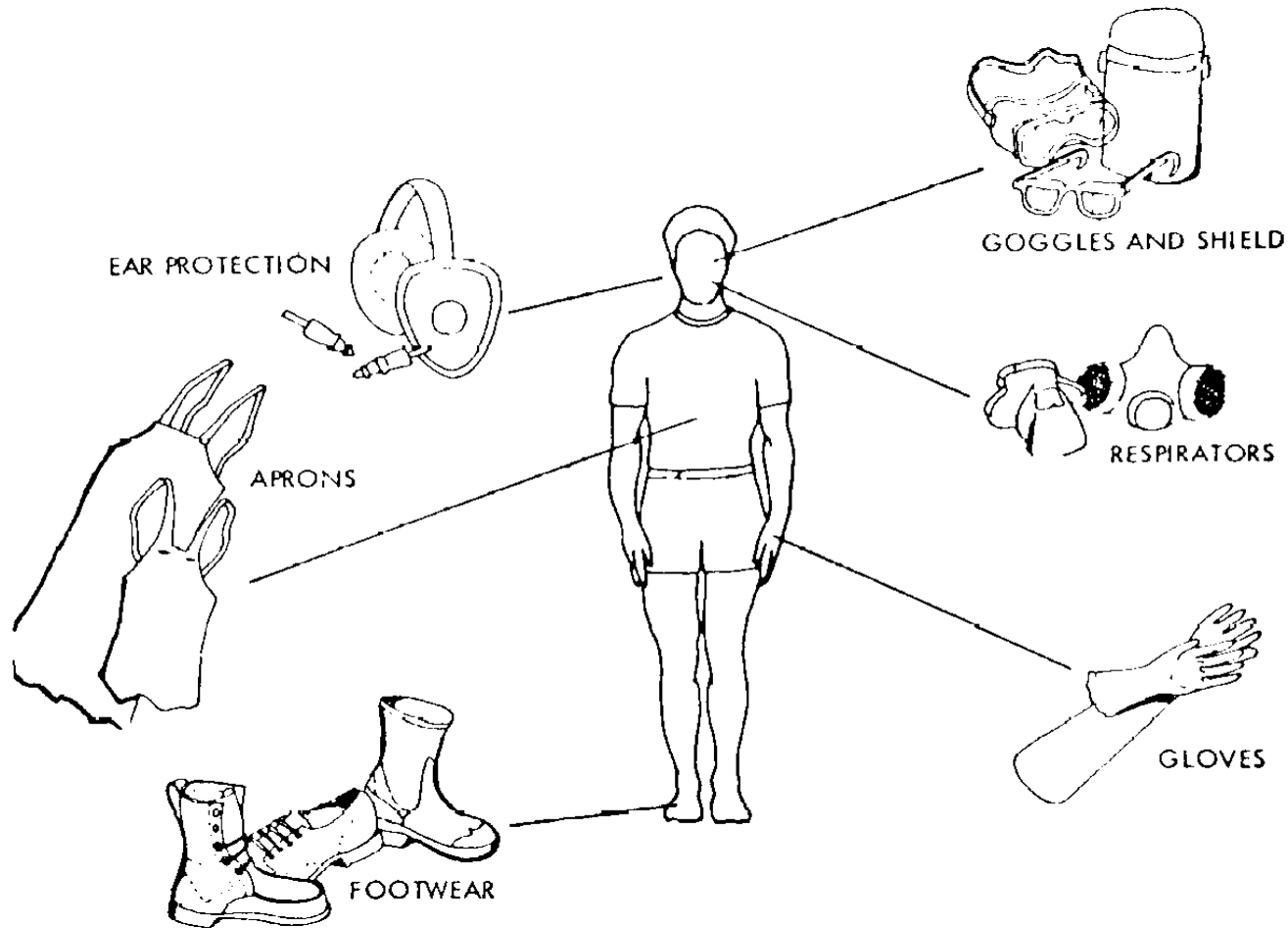
- Administrative controls
 - Rotate crews
 - Re-training on processes
 - Keeping equipment well maintained

Uses cont.



- ❑ The use of PPE signals that the hazard still exists and could not be engineered out of the workplace
- ❑ Unprotected individuals in the same area will be exposed to hazards
- ❑ Failure of PPE means that the worker will be exposed to hazards

So, what is PPE???

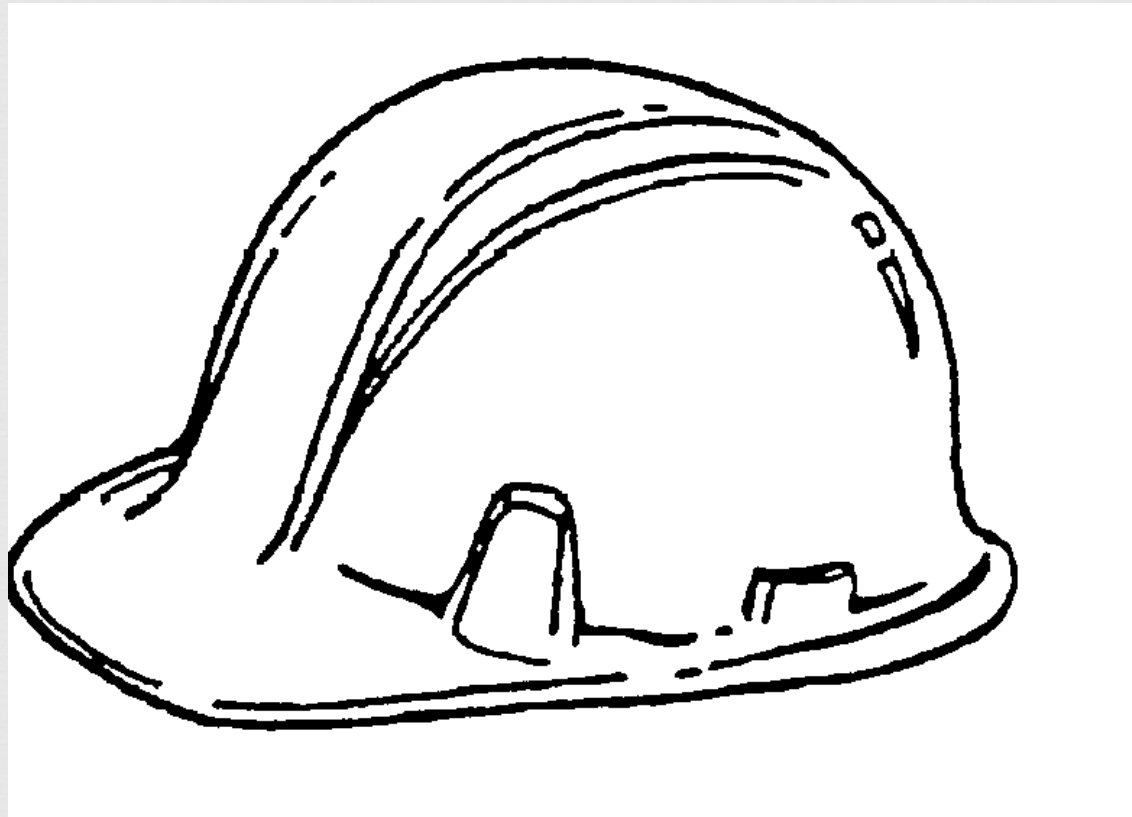


PPE



- Head** protection
- Eye and Face** protection
- Hearing** protection
- Respiratory** protection
- Arm and Hand** protection
- Foot** and **Leg** protection
- Protective clothing**

Head Protection



Hard Hats work by dissipating force



- ❑ Fit —
 - Head band adjusted so that the top of the hard hat is 1-1/4 inches above head

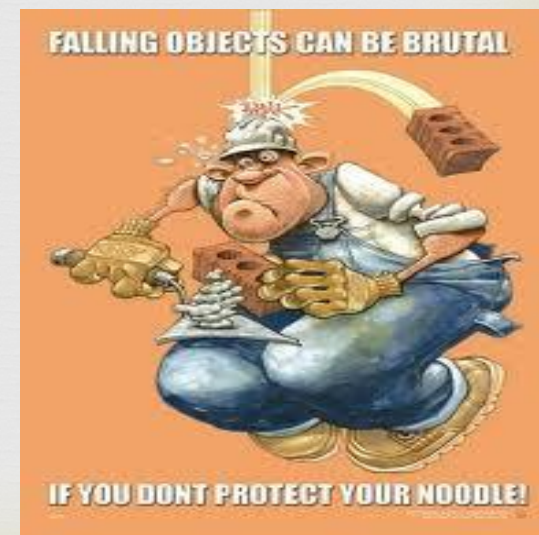
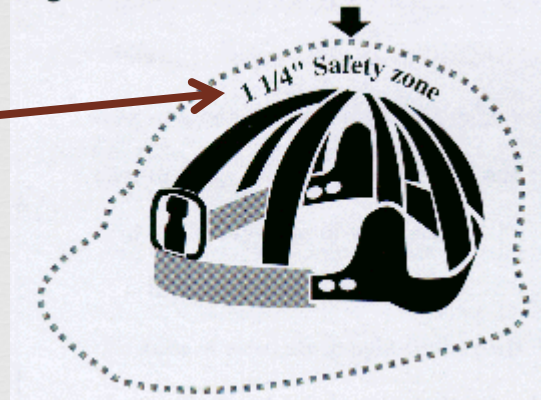
- ❑ When to Wear —
 - There is a possibility that a person may be struck on the head by a falling object.

 - A person may strike their head against a fixed or protruding object.

 - Accidental head contact may be made with electrical hazards.

 - Where signs indicate “Hard Hat Area”

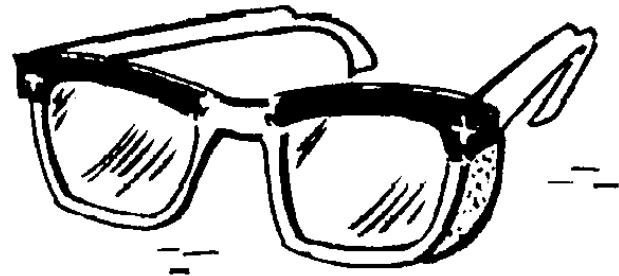
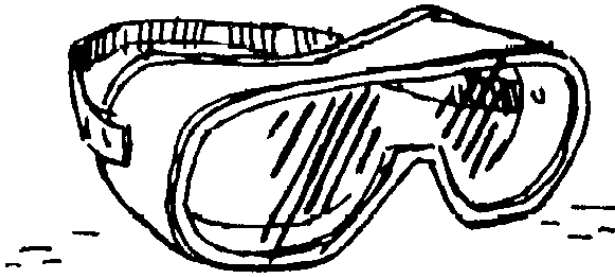
Figure 2. Hard Hat



Head Protection cont.

- ❑ **Protective helmets, or hard hats, should**
 - Resist penetration by objects,
 - Absorb the shock of a blow,
 - Come with instructions explaining proper adjustment and replacement of the suspension and headband.

Eye Protection



Eye Protection

- ❑ Goggles provide protection from –
 - Splashes, Liquids and Dusts
 - Should fit tightly against your face
 - Provides the best protection against liquid pesticides and other toxic chemicals



- ❑ Eye protection **MUST** be worn in areas posted with:
Eye Protection Required.

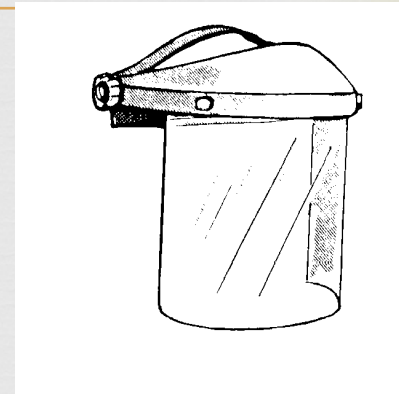


Face / Welding Shields



- ❑ Face shields are used when -
 - Very high chance of exposure to an airborne substance
 - Not enough to protect your eyes by itself; It should be worn with Goggles

- ❑ Welding shields protect both the eyes and face from -
 - Flying sparks, metal spatter
 - Slag chips produced during welding, brazing, soldering and cutting operations

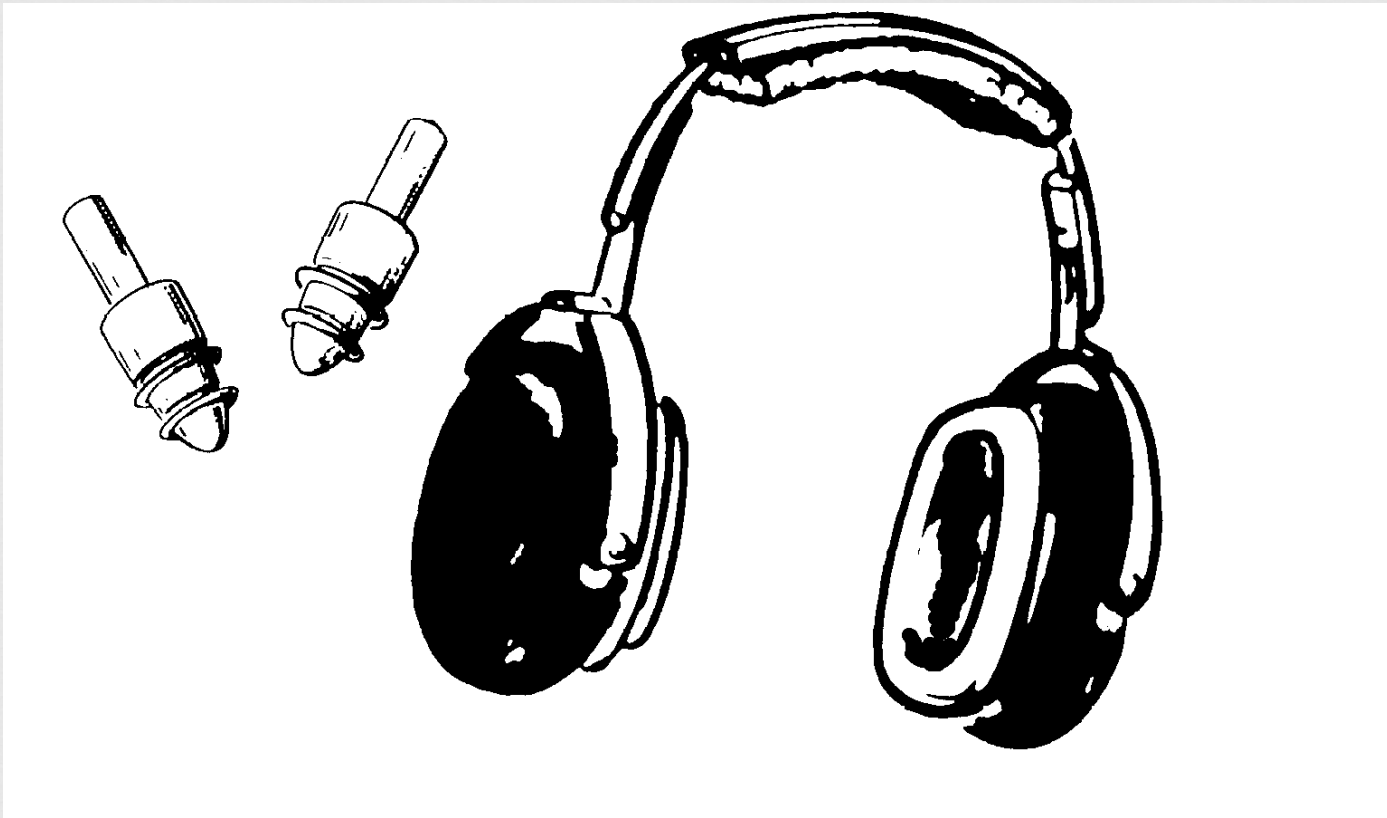


Eye Protection cont.



- ❑ Visitor specs are only appropriate for non-employees with no true exposure to hazards
- ❑ Safety glasses are used to protect the eyes from flying objects (no face protection)
- ❑ Chemical splash goggles protect against fluids by sealing tightly against the face
- ❑ Face shields provide highest level of protection

Hearing Protection



Hearing Protection Basics



- ❑ Noise induced hearing loss can occur with exposures >90 dBA
- ❑ A hearing conservation program becomes a requirement at exposures >85 dBA
- ❑ Higher levels of noise exposure have shorter allowable exposure times

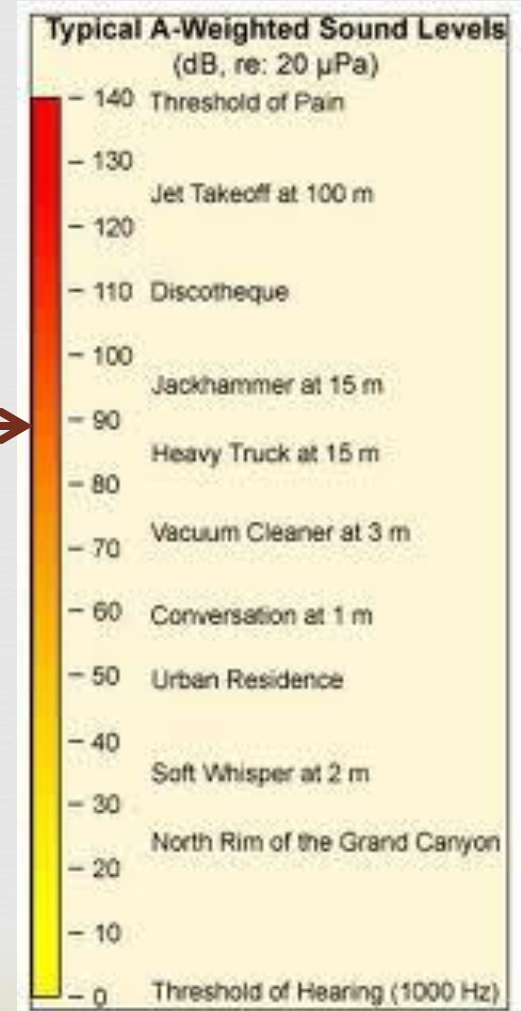
Noise levels versus Duration



Sound Level (dBA) - Exposure (hours)

90	(8)
92	(6)
95	(4)
100	(2)
105	(1)
110	(.5)
115	(.25)

Hearing loss begins



Hearing Protection



- ❖ Rule of Thumb - if you cannot carry on a conversation in a normal tone of voice with someone at arm's length, you are likely near 90dBA

Hearing Protection - Types



- ❖ Ear Plugs - less expensive, disposable, good ones have fairly high Noise Reduction Rating (NRRs) - sometimes difficult to tell if employees are wearing them
- ❖ Ear Muffs - more expensive, more durable, typically higher NRRs than plugs, more obvious
- ❖ Can be used together in very high noise areas

Arm and Hand Protection



Gloves - Typical Uses



- Chemical protection
- Biohazard protection
- Abrasion protection
- Friction protection
- Protection from extremes of heat and cold

See next slide for uses

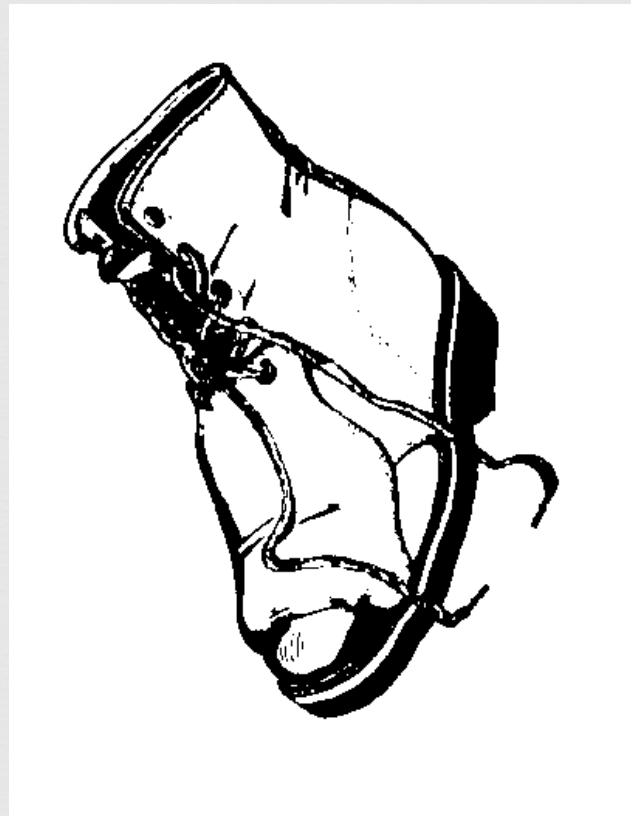
Gloves	Material	Usage	Comments	Recommended for	Not recommended
Latex	Natural Rubber	Incidental contact	Good for biological and water-based materials. Poor for organic solvents. Little chemical protection. Can puncture holes Can cause or trigger latex allergies	Weak Acids, Weak bases, alcohols, aqueous solutions	Oils, greases and organics
Nitrile	Synthetic Rubber	Incidental contact	Good for solvents, oils, greases, and some acids and bases. Clear indication of tears and breaks. Good alternative for those with latex allergies	Oils, greases, acids, caustics, aliphatic solvents	Aromatic solvents, many ketones, esters, many chlorinated solvents
Butyl	Synthetic Rubber	Extended contact	Good for ketones and esters. Poor for gasoline and aliphatic, aromatic, and halogenated hydrocarbons	Aldehydes, ketones, esters, glycol ethers, polar organic solvents	Aliphatic, aromatic and chlorinated solvents
Neoprene	Synthetic Rubber	Extended contact	Good for acids, bases, alcohols, fuels, peroxides, hydrocarbons, and phenols. Poor for halogenated and aromatic hydrocarbons	Oxidizing acids, bases, alcohols, oils, fats, aniline, phenol, glycol ethers	Chlorinated solvents
Leather	Leather	Incidental contact	Good for heat/cold and while cutting	Handeling hot/cold items and while cutting	Wet processes

Gloves cont.



- ❑ No “1” glove will protect against all hazards; consult your MSDS requirements
- ❑ Gloves have a finite lifespan and must be periodically replaced
- ❑ When donning gloves, examine them for signs of tears, cracks, holes and dry rot
- ❑ Hands should always be washed after removing gloves

Foot Protection



Protective Footwear



- ❑ Steel-toed footwear, preferably with metatarsal guards, is used to protect feet from crushing injuries caused by heavy objects
- ❑ Rubber boots are often used to protect feet from exposure to liquids
- ❑ Chaps or leggings are used in certain applications (i.e., using a chainsaw)

See next slide for foot protection chart

FOOT PROTECTION CHART

Source	Assessment of Hazard	Protection
Impact	Falling objects, parts, heavy tools	Safety shoes. For severe exposure use metatarsal guards (<i>See ANSI performance requirement</i>)
Penetration	Nails, scrap metal, and other sharp objects	Footwear with puncture-resistant soles/steel insert
Compression	Rolling or pinching objects, rolls, carts or vehicles	Safety shoes. For severe exposure use metatarsal guards (<i>See ANSI performance requirement</i>)
Chemicals	Splashing/spilling liquids, i.e., solvents, oils, paints, corrosives, acids, etc.	Leather shoes for mild exposures. Rubber boots or shoes with spats for severe exposure
Electrical	Contact with power lines, conductors, arcing, sparks or static discharges.	Footwear with special conductive/insulated soles
Heat	Splash from molten metal	Safety shoes with metatarsal guards or spats
Water	Wetness/moisture from prolonged exposure	Insulated shoes or boots
	Slipping hazard	Footwear with slip-resistant soles
Temperature	Exposure to extreme cold	Insulated shoes/boots

Protective Clothing



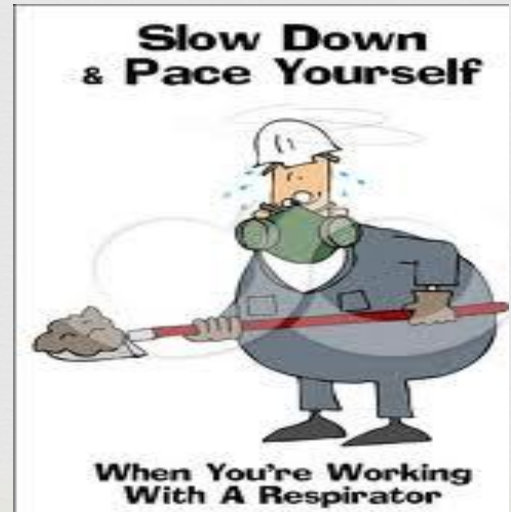
Protective Clothing cont.



- ❑ Used to protect street clothes from hazards in the workplace
- ❑ Rubber aprons should be maintained on sites that handle
 - Acids
 - Caustic
 - Chemicals
 - Bleaches



Respiratory Protection



Respirators cont.

LUNG PROTECTION



- ❑ Protects users by removing harmful materials that may enter the body via the lungs i.e. paint fumes and pesticides.
- ❑ Inhalation is the quickest, most efficient way to introduce lethal levels of hazardous materials into the body

Respirators cont.

Types



□ Air Purifying Respirators (APR)

▪ Half-face



▪ Full Face



□ Powered Air Purifying Respirators (PAPR)



Respirators cont.

Dust Mask



- N95 masks are commonly called “particulate respirators”.
 - “N” means ‘Not resistant to oil’,
 - “95” refers to a 95% filter efficiency.

- N95 Dust masks are good for large particulates like wood dust & household dust, **BUT will not** block fumes or vapors from paints or chemicals

Respirators - cont.

Health Concerns



- ❑ Employees should not wear a respirator unless they have been medically cleared to do so!
- ❑ This clearance may take the form of a questionnaire, annual physical examination, pulmonary function testing, chest X-Ray, or a combination of the above.

Respirators cont.

What are the health concerns?



- ❑ Respirators put additional resistance against the respiratory system of the wearer
- ❑ Persons with undiagnosed respiratory system or cardiovascular problems could trigger a serious medical problem (respiratory distress, asthma, heart attack, etc.) by using a respirator

PPE Usage



- ❑ Supervisors are responsible for ensuring that PPE is **available** and worn
- ❑ Employees are responsible for **wearing & maintaining** PPE (**Inspect prior to each use**), and reporting worn or defective PPE to their supervisor

Summary



- ❑ PPE is hazard specific; the hazards of each workplace and task must be evaluated
- ❑ PPE is used as a last resort when the hazard cannot be controlled by other methods
- ❑ Supervisors are responsible to ensure it is available and worn; Employees must wear and maintain their PPE properly.

Summary cont.



- ❑ PPE is only considered effective if it prevents the contaminant from reaching the wearer
- ❑ Respirators should not be worn by employees unless they have been medically cleared to do so

Dressed for Success!



Protective Eyewear



Gloves

Respirator