



# PERSONAL PROTECTIVE EQUIPMENT

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# Agenda

- 8:30 I. Introduction
- II. Three levels of control
- Engineering
  - Administrative
  - PPE
- III. Criteria for the selection, use, agency approval, care, and maintenance of PPE
- Head
  - Eyes and Face
  - Ears
- 10:00 BREAK
- 10:15
- Hands
  - Feet
  - Whole body (change of clothes; vests, aprons, coveralls, suits; heat & cold stress; natural fibers)
  - Summary
- IV. Training Requirements
- V. Documentation
- VI. Case studies
- VII. Conclusion
- 12:00 DISMISS

# Objectives

Upon completion of the class, participants will be able to:

- assess their workplace to determine if PPE is needed
- list the criteria for selecting appropriate PPE
- explain the proper use, care, and maintenance of PPE
- list the training requirements
- explain the documentation needed for compliance with OSHA regulations

## Personal Protective Equipment

### Follow-up Activities

- Conduct a hazard analysis (job safety analysis) of at least three different jobs at my workplace, complete the PPE assessment form, and make recommendations to top management for improvements.
- Research current PPE being used at my workplace, interview employees' satisfaction of their PPE, present summary of their comments to top management.
- Teach supervisors and/or other employees at my workplace how to conduct a hazard analysis.
- Explore engineering or substitution possibilities to eliminate the need for some or all PPE, present recommendations to top management.
- Draft a new or revise the current PPE program at my workplace and present it to top management.
- Research various types, various sizes, various brands of PPE for possible use at my workplace, possibly contacting the manufacturers for information; present findings to management.
- Review the OSHA 300 log for injuries or illnesses that may be due to lack of or improper use of PPE. Present findings to management.
- Perform an inventory and cost study to see how much PPE is handed out, how it is being tracked, how much is being spent monthly/weekly on PPE. Is PPE being used properly and not wasted? Present findings to management.
- Perform a walk-through of the work areas and record any employees not wearing PPE or not wearing PPE properly. Conduct a retraining session based on findings. (If you need a video on PPE, contact the DSH video library.)

# Activity Plan

	Activity	Other people involved	Target Deadline
<input type="checkbox"/>			

## Resources Available from the Division of Safety & Hygiene (DSH) Libraries

(800) 644-6292 (614) 466-7388

[library@bwc.state.oh.us](mailto:library@bwc.state.oh.us)

[www.ohiobwc.com](http://www.ohiobwc.com)

### Safety training:

- Safety talks, outlines and scripts - DSH Safety leader's discussion guide, Training Center's One-hour safety presentations, reference books, web resources
- Videos – hundreds of safety and health topics
- Books and articles on training techniques

### Machine and equipment safety:

- Safety standards (ANSI, NFPA, CGA)
- Books and articles on power presses, material handling equipment, lockout/tagout, etc.

### Sample written programs:

- DSH program profiles and sample written programs
- Reference books
- Internet resources

### Illness and injury statistics:

- Statistics from the U.S. Bureau of Labor Statistics
- National Safety Council's *Injury Facts*
- National Institute of Occupational Safety & Health (NIOSH) studies

### Hazard communication and chemical safety:

- Chemical safety information
- Material safety data sheets (MSDSs)
- Sample written programs
- Videos
- Internet resources

### Safety standards

- American National Standards Institute (ANSI) standards (including standards for construction, machinery and equipment, personal protective equipment)
- National Fire Protection Association (NFPA) fire codes (including the Life Safety Code and the National Electrical Code)
- Compressed Gas Association (CGA) standards

### Other topics of interest (books, articles, magazines, videos and standards):

- Confined spaces
- Electrical safety
- Job safety analysis
- New employee orientation
- Powered industrial trucks
- Respiratory protection
- Safety culture
- Scaffolds

Directories and lists of vendors of safety equipment

Occupational Safety & Health Administration (OSHA) regulations

*Manual of Uniform Traffic Control Devices (MUTCD)*

Recommendations of useful Internet sites

BWC publications

**INTERNET WEB SITES**  
for  
**OCCUPATIONAL SAFETY & HEALTH INFORMATION**  
January 2007

*The Ohio Bureau of Workers' Compensation provides a variety of safety tools and resources on our web site, [www.ohiobwc.com](http://www.ohiobwc.com). Click on Safety Services to find out more about what BWC's Division of Safety & Hygiene offers online. Tools and resources include lifting guidelines, recordkeeping spreadsheets, sample OSHA program guides, and training materials. You'll also find a longer version of this list of web sites.*

**GENERAL**

**CANADIAN CENTRE FOR OCCUPATIONAL HEALTH & SAFETY (CCOHS)**

<http://ccohs.ca>

This Canadian government site has an extensive Internet directory. There is also a unique feature called "OSH Answers" and a guide to safety-related acronyms.

**NATIONAL SAFETY COUNCIL (NSC)**

<http://www.nsc.org>

Visit this web site for information on safety in the workplace, at home, on the road and in the community.

**NYCOSH**

<http://www.nycosh.org>

The New York Committee for Occupational Safety & Health offers news releases, links to helpful safety resources, strategies for safer workplaces, information on workplace hazards, workers' compensation and much more.

**OCCUPATIONAL HAZARDS**

<http://www.occupationalhazards.com>

The online version of the magazine *Occupational Hazards* is filled with today's headlines, articles, white papers, case studies, and product news.

**OKLAHOMA STATE UNIVERSITY**

<http://www.pp.okstate.edu/ehs>

The Department of Environmental Health & Safety at OSU has an online safety resource library with topics from A-Z. Go to the "Links Library" option.

**OREGON HEALTH & SCIENCE UNIVERSITY**

<http://www.croetweb.com>

This site consists of information on occupations & industries, chemical hazards, workplace safety issues, ergonomic issues, biological hazards, and includes materials in Spanish.

## **VERMONT SIRI**

<http://hazard.com>

Contains a wide variety of resources: MSDSs, an online library of graphics, articles and PowerPoint presentations, e-mail discussion list archives, and a list of safety & health consultants.

## **FEDERAL GOVERNMENT**

### **AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY**

<http://www.atsdr.cdc.gov/>

Look for information on hazardous substances, emergency response and hazardous waste sites.

### **BUREAU OF LABOR STATISTICS, SAFETY & HEALTH**

<http://www.bls.gov/bls/safety.htm>

Find national statistics on work-related injuries and illnesses and fatalities.

### **CENTERS FOR DISEASE CONTROL & PREVENTION (CDC)**

<http://www.cdc.gov>

A good resource for general public health issues throughout the United States. Health topics from A-Z give an in-depth look at most communicable diseases as well as topics such as safe driving, violence, and air pollution.

### **ENVIRONMENTAL PROTECTION AGENCY (EPA)**

<http://www.epa.gov>

The EPA's web site provides a wealth of information on a wide range of topics. Of particular interest: resources on lead, asbestos, indoor air quality, mold, and school environmental issues.

### **FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)**

<http://www.fema.gov>

For information on disasters and emergencies nationwide, access this web site. Publications include options for emergency preparedness and prevention, response and recovery, disaster fact sheets, and public awareness information.

### **MINE SAFETY AND HEALTH ADMINISTRATION**

<http://www.msha.gov>

Features information on mine safety and health, including noise, dust, statistics, safety hazard alerts and talks, training, regulations, and rescue.

### **NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH (NIOSH)**

<http://www.cdc.gov/niosh/homepage.html>

NIOSH's site describes their services and research activities and provides information on many workplace safety and health topics. Most of their publications are available online.

## **NATIONAL LIBRARY OF MEDICINE (NLM)**

<http://www.nlm.nih.gov>

The world's largest medical library: a reliable source for medical, health and chemical hazard information.

## **OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA)**

<http://www.osha.gov>

OSHA'S web site includes compliance assistance resources, online publications, statistics, OSHA standards & directives, and a very useful A-Z site index.

## **OHIO**

### **OHIO DEPT. OF HEALTH**

<http://www.odh.state.oh.us>

Provides a wide variety of public health information, including occupational and environmental health, women's health, and health resources.

### **OHIO EPA (OEPA)**

<http://www.epa.state.oh.us>

Use the "Topic Index" to find Ohio EPA regulations and information on permits, hazardous waste, pollution prevention, wastewater, wetlands, and much more.

### **STATE LIBRARY OF OHIO/OHIOLINK**

<http://slonet.state.oh.us/>

Search the State Library of Ohio's online catalog which includes BWC's Division of Safety & Hygiene library books.

## **SPECIFIC (BY SUBJECT)**

### **CONSTRUCTION**

<http://www.cdc.gov/elcosh/index.html>

eLCOSH is a comprehensive library of construction safety information presented in both English and Spanish with items searchable by trade, hazard, job site, etc.

### **DRUG-FREE WORKPLACE**

<http://www.dol.gov/workingpartners/welcome.html>

Working Partners for an Alcohol- and Drug-Free Workplace. Provides guidelines on establishing a workplace substance abuse program. Search the Substance Abuse Information Database. From the U.S. Dept. of Labor.

### **EMERGENCY MANAGEMENT GUIDE FOR BUSINESS & INDUSTRY**

<http://www.fema.gov/business/guide/index.shtm>

Presents a step-by-step approach to emergency planning, response, and recovery for companies of all sizes. From the Federal Emergency Management Agency.

## **ERGONOMICS**

<http://www.ergoweb.com>

Ergoweb's site offers ergonomics news, a buyer's guide and case studies, in addition to sources for software and services.

## **HAZARDOUS MATERIALS AND HAZARDOUS WASTE**

<http://www.wetp.org/wetp>

The National Clearinghouse for Worker Safety and Health Training is a resource for workers and trainers who are involved in the handling of hazardous waste or in responding to emergency releases of hazardous materials and terrorist actions.

## **INDOOR AIR QUALITY**

<http://www.cal-iaq.org>

The California Indoor Air Quality Program has compiled information on mold and fungi, tools for healthy schools, asbestos, radon, environmental tobacco smoke, volatile organic compounds, and IAQ programs and web sites.

## **MSDS**

<http://www.ilpi.com/msds>

Touted as "Where to find material safety data sheets on the Internet", this site offers links to 100 free sites as well as news, FAQs, and an MSDS glossary.

## ***SAFETY MANUALS & SAMPLE WRITTEN PROGRAMS***

### **OSHA**

[http://www.osha.gov/dcsp/compliance\\_assistance/sampleprograms.html](http://www.osha.gov/dcsp/compliance_assistance/sampleprograms.html)

OSHA provides sample written programs for employers to use as guidance when developing their own customized programs tailored to their specific workplaces.

### **ILLINOIS ONSITE SAFETY & HEALTH CONSULTATION PROGRAM**

<http://www2.illinoisbiz.biz/osha/resource.htm>

At this site you will find sample written programs on a variety of topics. Also available are checklists and safety guide books, some in Spanish.

### **NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SERVICES (NIEHS)**

<http://www.niehs.nih.gov/odhsb/home.htm>

The NIEHS has a very concise health and safety web page offering manuals, guides, and policies on topics such as laboratory, radiation, and biological safety.

### **SAFETYNET**

<http://medical.smis.doi.gov/prog.htm>

Sponsored by the U.S. Department of the Interior, you will find sample written safety programs to use as templates. Health hazard information and medical reference material is also available.

Ohio Bureau of Workers' Compensation, Div. of Safety & Hygiene Libraries

30 W. Spring St., L-3, Columbus, OH 43215-2256

(800) 644-6292, press options 2 - 2 - 1

(614) 466-7388 (614) 644-9634 (fax)

E-Mail: [library@bwc.state.oh.us](mailto:library@bwc.state.oh.us)

[www.ohiobwc.com](http://www.ohiobwc.com)

## **Saving You Time and Research**

Requests for copies of OSHA standards, information on starting a safety committee, a video on accident investigation techniques -- these are some of the thousands of inquiries BWC's Division of Safety & Hygiene (DSH) libraries receive each year.

### **DSH has two libraries to serve you:**

- The central library in the William Green Building in downtown Columbus;
- The resource center and video library located at the Ohio Center for Occupational Safety and Health (OCOSH) in Pickerington.

Both libraries are open 8 a.m. to 4:45 p.m., Monday through Friday. Your need for information does not require a visit to the library. You can phone, fax, or e-mail your requests and receive a quick response.

**The central library** provides free information services on the topics of occupational safety and health, workers' compensation and rehabilitation.

**The OCOSH resource center** provides similar services for those who visit OCOSH for meetings and training center classes.

Students from the DSH training center can use the services and collections of the libraries to assist with the completion of their course **follow-up activities**. The librarians have recommended a variety of resources for the follow-up activities and are available to answer questions and provide assistance.

**The video library** offers an extensive collection of videotapes to supplement your organization's safety and health training program. It is a convenient and popular source for Ohio employers to borrow quality occupational safety- and health-related training aids.

Visit our Web site at **[www.ohiobwc.com](http://www.ohiobwc.com)**.

Central Library  
30 W. Spring St., Third Floor  
Columbus OH 43215-2256  
**1-800-OHIOBWC**  
(614) 466-7388  
(614) 644-9634 (fax)  
[library@bwc.state.oh.us](mailto:library@bwc.state.oh.us)

OCOSH Resource Center  
13430 Yarmouth Drive  
Pickerington OH 43147  
**1-800-OHIOBWC**  
Resource center (614) 728-6464  
Video library (614) 644-0018

# Hierarchy of Controls

## 1. Engineering

The first order of control should be an attempt to redesign or re-engineer the work process so as to eliminate the hazard. In the case of a dangerous chemical, attempts to replace it with a less hazardous one or eliminate it altogether should be taken.

## 2. Administrative

The next step if applicable, would be to administratively assign personnel so as to expose them for lesser amounts of time. This could be achieved by assigning two or more people to alternate time on the job thereby exposing them to acceptable levels as most PELs are based on an exposure level of an 8 hour TWA.

## 3. Personal Protective Equipment

This is the least desirable approach to protection as it involves the human elements. Employees could fall victim to lack of or improper training, misunderstanding of training, improper fit, improper care, cleaning, and storage of equipment, health factors that prohibit use, or non enforcement of PPE policies.

# Mandatory PPE Hazard Assessment

## A. Method

This is an assessment accomplished through an audit of each segment of the work process for the purpose of recognizing real and/or potential hazards necessitating the use of personal protective equipment.

Following are the major hazard categories to be addressed.

- (a) Impact (falling objects or potential for dropping objects)
- (b) Penetration
- (c) compression
- (d) Chemical
- (e) Heat
- (f) Harmful dust
- (g) Light (optical) radiation

## B. Sources:

During the walk-through survey the auditor(s) should look for the following:

- (a) Sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects;
- (b) Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;
- (c) Types of chemical exposures;
- (d) Sources of harmful dust;
- (e) Sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;

- (f) Sources of falling objects or potential for dropping objects;
- (g) Sources of sharp objects which might pierce the feet or cut the hands;
- (h) Sources of rolling or pinching objects which could crush the feet;
- (i) Layout of workplace and location of co-workers; and
- (j) Any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.

**C. Level of risk**

The level of risk and probability of occurrence should be considered to determine the order and urgency of the addressing the observed hazards.

<u>Risk Level</u>	<u>Probability</u>
Critical	Unless immediately addressed, high probability exists that serious injury or death will occur.
Serious	Serious injury or illness is likely to occur if not considered a high priority.
Non Serious	While injuries or illnesses are likely to occur if not properly addressed, they are likely to be of a non-serious nature.

**D. Correlation between the environmental hazards and the potential exposure to body areas which include:**

- (a) Head
- (b) Eye / face
- (c) Hand
- (d) Foot
- (e) Leg
- (f) Back
- (g) Torso

**E. Possibility of multiple hazards existing simultaneously**

**F. Who should perform the audit?**

**G. What type of format should be used?**

**H. Selection guidelines**

Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.;

Compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;

Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards;

Fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

**I. Fitting the device**

Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

**J. Devices with adjustable features**

Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

## **K. Reassessment of hazards**

It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

## **L. Selection chart guidelines for eye and face protection**

See pages Standards-25 through Standards-27.

## **M. Selection guidelines for head protection**

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts).

Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts).

Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors. Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers.

## **N. Selection guidelines for foot protection**

Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be

dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet.

Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, mechanics and repairers, plumbers and pipe fitters, structural metal workers, assemblers, drywall installers and lathers, packers, wrappers, craters, punch and stamping press operators, sawyers, welders, laborers, freight handlers, gardeners and grounds-keepers, timber cutting and logging workers, stock handlers and warehouse laborers.

#### **O. Selection guidelines for hand protection**

Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures.

Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

- (A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,
- (B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

- (A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;
- (B) Generally, any "chemical resistant" glove can be used for dry powders;
- (C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,
- (D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

#### **P. Cleaning and maintenance**

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.



PERSONAL PROTECTIVE EQUIPMENT  
HAZARD ASSESSMENT DATA

Auditor: \_\_\_\_\_  
Date: \_\_\_\_\_

Department: \_\_\_\_\_

Process or Source	Hazard	Risk Level	Affected Body Parts	Required PPE

# HAZARD ASSESSMENT ANALYSIS HAND PROTECTION

Department: \_\_\_\_\_  
Dept. Mgr. : \_\_\_\_\_

# of Employees: \_\_\_\_\_  
Date: \_\_\_\_\_

Application: \_\_\_\_\_  
Application Breakdown: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Hazards:	___	Snag	___	Dry Grip
	___	Abrasion	___	Heat ___ Temperature
	___	Cuts	___	Cold ___ Temperature
	___	Puncture	___	Chemicals (Obtain MSDS)
	___	Wet Grip	___	Other

Sources:

Snags	_____
Abrasion	_____
Cuts	_____
Puncture	_____
Wet Grip	_____
Dry Grip	_____
Heat	_____
Cold	_____
Chemicals	_____
Other	_____

Ergonomic Issues \_\_\_\_\_  
\_\_\_\_\_

Current Hand Protection Used:

<u>Styles</u>	<u>Descriptions</u>
_____	_____
_____	_____
_____	_____

Frequency/Probability for each specific hazard- The probability or likelihood that hand injuries would occur in the assessed work area.

	High	Medium	Low	None
Snag	___	___	___	___
Abrasion	___	___	___	___
Cuts	___	___	___	___
Puncture	___	___	___	___
Wet grip	___	___	___	___
Dry grip	___	___	___	___
Heat	___	___	___	___
Cold	___	___	___	___
Chemicals	___	___	___	___

Seriousness of Potential Injury for each specific hazard- Determine seriousness or severity of the potential hand injury for each hazard.

	High	Medium	Low	None
Snag	___	___	___	___
Abrasion	___	___	___	___
Cuts	___	___	___	___
Puncture	___	___	___	___
Wet grip	___	___	___	___
Dry grip	___	___	___	___
Heat	___	___	___	___
Cold	___	___	___	___
Chemicals	___	___	___	___

Recommendations: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I hereby verify that the above facts are true and accurate to the best of my knowledge.

\_\_\_\_\_  
 Company Representative

\_\_\_\_\_  
 Date

## 29 CFR 1910

### Subpart I

#### Personal Protective Equipment

#### 1910.132 - General requirements

**(a) Application.**

Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

**(b) Employee-owned equipment.**

Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance and sanitation.

**(c) Design.**

All personal protective equipment shall be of safe design and construction for the work to be performed.

**(d) Hazard assessment and equipment selection.**

(1) The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:

(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

(ii) Communicate selection decisions to each affected employee; and,

(iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

(2) The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

**(e) Defective and damaged equipment.**

Defective or damaged personal protective equipment shall not be used.

**(f) Training.**

(1) The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

(i) When PPE is necessary;

(ii) What PPE is necessary;

(iii) How to properly don, doff, adjust, and wear PPE;

(iv) The limitations of the PPE; and,

(v) The proper care, maintenance, useful life and disposal of the PPE.

(2) Each affected employee shall demonstrate an understanding of the training specified in paragraph (f)(1) of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

(3) When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

(i) Changes in the workplace render previous training obsolete; or

(ii) Changes in the types of PPE to be used render previous training obsolete; or

(iii) Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

(4) The employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

(g) Paragraphs (d) and (f) of this section apply only to 1910.133, 1910.135, 1910.136, and 1910.138. Paragraphs (d) and (f) of this section do not apply to 1910.134 and 1910.137.





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## Personal Protective Equipment

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- ### Course Objectives
- ◆ Perform workplace assessments
  - ◆ List criteria for selection
  - ◆ Explain proper use, care, and maintenance
  - ◆ List training requirements
  - ◆ Explain documentation for OSHA compliance

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- ### We will not address:
- ◆ Respiratory protection
  - ◆ Electrical devices
  - ◆ Bloodborne pathogens
  - ◆ Ergonomic concerns
  - ◆ Fall protection

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**Hierarchy of Controls**

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**Re-engineering**

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**Hazardous Work Process**

Redesign or re-engineer the work process so as to eliminate the hazard.

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**Hazardous Substances**

Replace it with a less hazardous one or eliminate it altogether

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<b>Hierarchy of Controls</b>
<b>Administrative</b>

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<b>Administrative Assignment</b>
Administratively assign two or more personnel to the hazardous process or exposure thereby exposing them to acceptable levels based upon an 8 hour TWA

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<b>Hierarchy of Controls</b>
<b>Personal Protective Equipment</b>

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## PPE Control

**PPE should only be considered when engineering and administrative controls are unworkable or impractical.**

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## Why?

- ◆ Lack of or improper training
- ◆ Misunderstanding of training
- ◆ Improper fit
- ◆ Improper care, cleaning and storage
- ◆ Health factors
- ◆ Non enforcement of PPE policies

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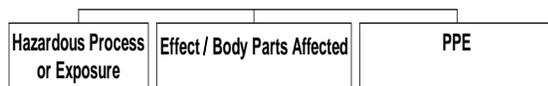
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## PPE Assessment Areas



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**PPE Hazard Assessment**  
**Hazard Categories**

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- Hazard categories**
- 
- ◆ Impact (falling objects or potential for dropping objects)
  - ◆ Penetration
  - ◆ Compression
  - ◆ Chemical

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- Hazard categories** continued
- 
- ◆ Heat/cold
  - ◆ Abrasion
  - ◆ Harmful dust
  - ◆ Light (optical) radiation

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## Head Protection

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### Head Protection

- ◆ Penetrability
- ◆ Electrical Protection
- ◆ Construction
- ◆ Materials
- ◆ Labeling
- ◆ Flammability



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### Types of Head Protection

◆ Type 1 - Helmets have full brims	◆ Class E - Reduce impact, high voltage electrical protection
◆ Type 2 - Helmets have peak but no brim	◆ Class C - Reduce impact, no electrical protection
◆ Class G - Reduce impact, low voltage electrical protection	

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## Helmet Labeling

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Helmets must be labeled as follows:

Manufacturer's Name  
ANSI Z89.1 - 2003  
Class C, G, and E

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## Helmet Selection Criteria

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- Degree of hazard
- Type of hazard
- Chemicals to which the helmet might be exposed
- Electrical hazards
- Protective devices that may be attached
- Any other job or site specific hazard

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## Conditions to Avoid

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- ◆ Wearing backwards without reason
- ◆ Wearing backwards without reversing suspension
- ◆ Wearing unapproved headgear underneath
- ◆ Painting the helmet
- ◆ Altering suspension or shell

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## Inspection

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- ◆ Before use
- ◆ After served their purpose
- ◆ Check suspension
- ◆ Check shell for cracks, dents or breaks

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## Maintenance

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- ◆ Clean with mild detergent and clean water
- ◆ No solvents
- ◆ Discard if shell is defective
- ◆ Replace suspension if defective

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## Eye and Face Protection

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## Eye & Face Protection

- ◆ Eye protection - Safety glasses and goggles
- ◆ Face protection - Faceshields
- ◆ Welding protection - Faceshields and goggles

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## Eye Protection Requirements

- ◆ Frame impact
- ◆ Lens impact
- ◆ Lens penetrability
- ◆ Optical acuity
- ◆ Flammability and corrosion resistance
- ◆ Cleanability



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## Face Protection Requirements

- ◆ Impact resistance
- ◆ Penetrability
- ◆ Optical acuity
- ◆ Haze
- ◆ Transmittance
- ◆ Flammability and corrosion resistance
- ◆ Cleanability

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## Welding: Faceshields and Goggles

- ◆ Must meet all criteria for eye protection devices plus light tightness



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## Selection: Eye and Face Protection

- ◆ Several styles should be available
- ◆ Suited for the job to be performed
- ◆ Welding - proper shade for materials and type of welding
- ◆ Safety sunglasses and photochromatic lenses - if no hazard created
- ◆ Special hazards - special protection

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## Inspection and Maintenance

- ◆ Prior to each use
- ◆ Check frames or headband
- ◆ Check lenses or faceshield
- ◆ Welding - check tint
- ◆ Protect from damage
- ◆ Keep clean

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## Hearing Protection

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### When is protection needed?

- ◆ Must be provided to employees exposed at or above  
85 dBA (8hr TWA)
- ◆ Must be worn by all employees exposed at or above  
90 dBA (8hr TWA)

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### Hearing Protector Attenuation

- ◆ Defined as:  
the reduction of sound pressure levels
- ◆ NRR  
Noise Reduction Rating



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## Noise Reduction Rating

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- ◆ Will be displayed on the packaging of hearing protection
  - ◆ NRR's used to estimate attenuation of hearing protection
- Appendix B 1910.95

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## Attenuation Criteria

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- ◆ All hearing protection must reduce exposures to at least an 8hr TWA of 90 dBA
- ◆ For employees with a Standard Threshold Shift, exposures must be reduced to an 8hr TWA of 85 dBA or less

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## Types of Hearing Protection

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- ◆ Ear Plugs
- ◆ Semi-aural Devices
- ◆ Ear Muffs

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## Hearing Protectors

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- ◆ Available in many types and sizes
  - premolded
  - formable
  - custom-molded
- ◆ Employees must be given a variety of types and sizes to choose from

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## Use and Care

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- ◆ All hearing protection must be initially fit when dispensed
- ◆ Inspect hearing protection prior to use for degradation, missing parts, and cleanliness

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## Cleaning Hearing Protection

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- ◆ Most hearing protectors are designed to be disposable, so for re-usable types:
  - Most may be cleaned with a mild soap solution; allow to completely dry before re-using
- ◆ Ear muffs may be surfaced cleaned with mild soap and water

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## Hand Protection

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- ### Hand Protection CFR 29 1910.138
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- ◆ Chemical absorption and burns
  - ◆ Cuts, abrasion, and punctures
  - ◆ Thermal burns and temperature extremes

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- ### Job Hazard Analysis
- 
- ◆ Assign competent, responsible persons
  - ◆ Obtain written job descriptions
  - ◆ Assemble relevant MSDS
  - ◆ Assemble relevant injury and accident reports
  - ◆ Observe tasks and note hazards

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## MSDS Review

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- ◆ Note chemicals listing skin as target organ
- ◆ Watch for 'skin' notation in ingredients list
- ◆ Note terms such as irritation, defatting, caustic, dermatitis, dermatoses
- ◆ Red flags: acids, bases, solvents

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## Accident and Injury Review

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- ◆ Analyze 300 log
- ◆ Review relevant BWC FROI and/or OSHA 301 forms
- ◆ Review in-house accident investigation forms
- ◆ Review first aid logs
- ◆ Analyze comp costs from BWC MREE

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## Observation of Tasks for Chemical Hazards

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- ◆ Do hands come into contact with chemicals which may harm or penetrate the skin?
- ◆ Are there residual chemicals present on parts or materials as a result of prior processes?
- ◆ Is skin contact with chemicals prolonged or repeated?

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**Observation of Tasks  
for Physical Hazards**

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- ◆ Are parts/materials/tools:
  - hot or cold, potentially causing discomfort or injury?
  - have sharp or pointed edges which may cause cuts or punctures in skin or gloves?
  - rough or abrasive?
  - slippery or awkward to handle?
  - moving when hand contact occurs?
- ◆ Is compressed air used in the process?

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**Foot Protection**

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**Foot Protection**

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- ◆ Toe box impact resistance
- ◆ Toe box compression resistance
- ◆ Metatarsal protection when required
- ◆ Electrical protection
- ◆ Sole puncture resistance
- ◆ Static dissipative footwear

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## Labeling of Footwear



- ◆ Female shoe
- ◆ Impact and compression protection
- ◆ ASTM F2412 – F2413

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## Labeling of Footwear

- ◆ Male shoe
- ◆ Impact and compression protection with puncture resistance
- ◆ ASTM F2412 - F2413



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## Foot Protection - Selection

- ◆ Type of work
- ◆ Presence of hot materials
- ◆ Potential for sole penetration
- ◆ Need for electrical protection
- ◆ Need to dissipate static
- ◆ Presence of chemicals

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## Inspection and Maintenance

- ◆ Inspection - prior to use, especially critical if footwear offers electrical protection
- ◆ Maintenance - Per manufacturers recommendations
- ◆ Note: Employer not required to provide

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## Whole Body Protection

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## Whole Body Protection



- ◆ Handling chemicals
- ◆ Hot materials
- ◆ Welding
- ◆ General
- ◆ Heat stress
- ◆ Cold stress

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## Handling Chemicals

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- ◆ Chemical suits
- ◆ Aprons
- ◆ Gloves
- ◆ Boots
- ◆ Respirators
- ◆ Face and eye protection

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## Hot Materials

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- ◆ Natural fibers
- ◆ Long sleeves
- ◆ Long pants
- ◆ Leather shoes
- ◆ Gloves
- ◆ Aprons

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## Welding

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- ◆ Aprons
- ◆ Gloves
- ◆ Sleeves
- ◆ Leather jackets
- ◆ Natural fibers
- ◆ Long pants
- ◆ Leather shoes

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## General Body Protection

- | ◆ Hazards   | ◆ Prevention   |
|-------------|----------------|
| Skin cancer | Long pants     |
| Cuts        | Shirts         |
| Abrasions   | Sunscreen      |
| Sunburn     | Repellent      |
| Frostbite   | Barrier creams |
| Insects     |                |

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## Heat Stress

- ◆ Proper clothing
- ◆ Water
- ◆ Acclimatization
- ◆ Diet
- ◆ Symptom Recognition
- ◆ No alcohol

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## Cold Stress

- ◆ Proper clothing
- ◆ Diet
- ◆ Acclimatization
- ◆ Symptom recognition
- ◆ Stay dry
- ◆ No alcohol



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## Use

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Follow all safety rules  
and manufacturers  
recommendations

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## Inspection

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- ◆ Articles designed as PPE should be inspected in accordance with manufacturers specification
- ◆ Other articles should be inspected for appropriateness to the situation

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## Maintenance

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- ◆ Maintenance of items of PPE should be accomplished in accordance with manufacturers recommendations
- ◆ Articles of personal clothing should be cleaned frequently to remove irritating or dangerous substances and allow the clothing to perform it's function

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**In conclusion....**

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- ◆ The EMPLOYER is responsible for:
  - Completing a PPE assessment for each employee, and
  - Providing PPE to employees, except for prescription glasses and some types of footwear.
- ◆ The EMPLOYEE is responsible for:
  - Making the employer aware of their needs, and
  - Using and maintaining PPE properly.

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**Summary**

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## Criteria

# **Criteria for Selection, Use and Maintenance of PPE**

- A. Head Protection
- B. Eyes & Face Protection
- C. Ear Protection
- D. Hand Protection
- E. Foot Protection
- F. Whole Body Protection



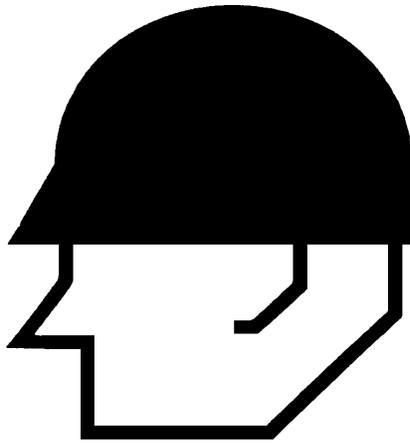
# **Criteria for Selection, Use and Maintenance of PPE**

- A. Head Protection
- B. Eyes & Face Protection
- C. Ear Protection
- D. Hand Protection
- E. Foot Protection
- F. Whole Body Protection



**A.**

## **Head Protection**





# HEAD PROTECTION

1. References: OSHA 1910.135 – Head Protection – General Industry  
OSHA 1926.100 – Head Protection – Construction  
ANSI Z89.2 – 1971  
ANSI Z89.2 – 1971  
ANSI Z89.1 – 1997

ANSI Z89.1 & 89.2 1971 are quoted by OSHA but Z89.1 1997 is more current and used by industry as the standard for head protection.

2. Criteria: The ANSI standards spell out the requirements that head protection devices must meet to offer the level of protection required. These set requirements for:

- Penetrability
- Electrical protection
- Construction
- Materials
- Labeling
- Flammability

3. Selection: Protective helmets are listed by type and class.

Type I – Intended to reduce force of an impact **only to the top of the wearer's head** from falling objects.

Type II – Intended to reduce the force of an impact resulting from a blow received **off-center or to the top of the wearer's head**.

Class E (Electrical) – Reduce force of impact and provide protection from contact with high voltage (20,000 volts) electricity.

Class G (General) – Reduce force of impact and provide protection from contact with low voltage (2200 volts) electricity.

Class C (Conductive) – Reduce force of impact but provides **no** electrical protection.

All protective helmets must be labeled on the shell with the following information:

- Manufacturer's Name
- ANSI Z89.1 – 1997
- Type I or II
- Class E, G or C

Selection should be based on:

Degree of hazard  
Type of hazard  
Chemicals to which the helmet may be exposed  
Electrical hazards  
Protective devices that may be attached to the helmet  
Any other job or site specific hazards present

The most common protective helmet (hard hat) is Type I, Class E.

4. Use: All protective helmets should be assembled and used in accordance with the manufacturers recommendations. This will provide the maximum protection for workers using the helmets.

Conditions to avoid:

Wearing backwards without reason  
Wearing backwards without reversing suspension system  
Wearing ball caps or other unapproved headgear under the helmet  
Painting the helmet  
Altering the suspension or shell

5. Inspection and Maintenance:

Inspection: Protective helmets should be inspected before each use and after they have performed their function.

Check the suspension - look for broken or worn head bands, nape straps or crown straps. Make sure padding is intact.

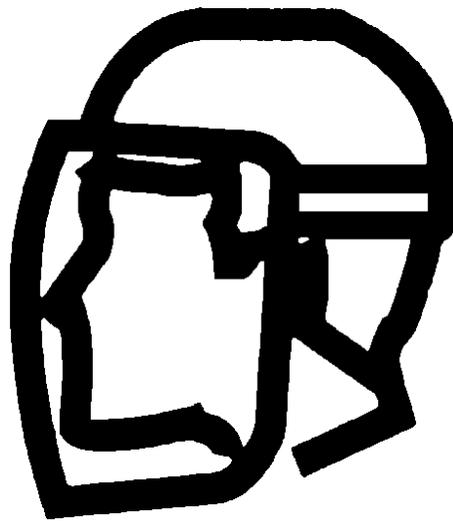
Check for cracks, dents or breaks in the shell

Maintenance: This is limited to changing the suspension and cleaning. Cleaning should be accomplished using a mild detergent and rinsed with warm clean water. Solvents should not be used as they can attack and weaken or damage the shell.

6. Responsibilities: As with most personal protective equipment, it is the responsibility of the employer to provide and the worker to use protective helmets.

**B.**

## **Eye & Face Protection**





# EYE & FACE PROTECTION

1. References: OSHA 1910.133  
OSHA 1926.102  
ANSI Z87.1 - 1989

2. Criteria: The ANSI standard spells out the requirements that eye and face protection devices must meet to offer the level of protection required. These requirements include:

## Eye Protection (Safety Glasses and Goggles)

- Frame impact
- Lens impact
- Lens penetrability
- Optical acuity
- Flammability and corrosion resistance
- Cleanability

## Face Protectors (Faceshields)

- Impact resistance
- Penetrability
- Optical acuity
- Haze
- Transmittance
- Flammability and corrosion resistance
- Cleanability

## Welding Protectors (Faceshields and Goggles)

These must meet all of the criteria for Eye Protection devices plus light tightness.

3. Selection: There are almost as many styles of eye protection as there are eyeglasses for non industrial use. To insure that the types of eye protection needed will be provided, there are certain markings to look for on the devices. They are:

## Eye Protection (Safety Glasses and Goggles)

- Frames - Must be marked with the term "Z87" on all parts
- Lenses - Each lens must have the manufacturers monogram and the shade designation if other than clear.

### Face Protectors (Faceshields)

All major faceshield components will be marked with a trademark identifying the manufacturer and be marked "Z87" and the shade designation if other than clear.

### Welding Protectors (Faceshields and Goggles)

Helmet components - All major components will be marked with "Z87" Lenses - Marked with the manufacturers' monogram and the shade designation if other than clear.

#### Selection for use:

Several styles should be available. Not everyone's head and face are the same shape or size.

Types of protectors must be suited for the job to be performed.

If welding, then the proper shade must be used for the materials and types of welding to be performed.

Safety sunglasses and photochromatic lenses are permitted but certain light conditions these lenses can create hazards for both wearers and person around the wearer.

Special hazards may require special types of protection. Check with material suppliers and MSDSs for special circumstances.

4. Use: All eye and face protective devices should be used in accordance with manufacturer's specifications. Any altering of these protective devices can denigrate their effectiveness and lead to serious eye or face injury.

#### 5. Inspection and Maintenance

Inspection: All eye and face protective devices should be inspected prior to each use.

Check the frames - Look for cracks or missing screws. Make sure side shields are securely attached. Look for evidence of melting or bending of the frames.

Check the lenses - Look for cracks or pitting. Make sure that the lenses are clean and that they are visually accurate. Make sure the lenses are securely in the frames.

Welding protectors - Same as above and insure that you have the right shade for the job to be performed. Check for light tightness.

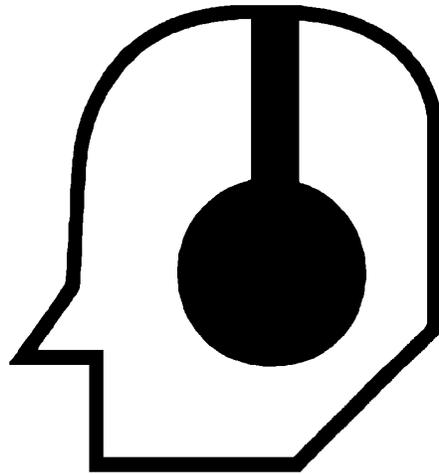
Maintenance: Keep your eye protection in a place where it won't get broken or scratched. Cleaning should be according to manufacturer's specifications. If none are available, clean with mild soap and warm water by soaking the device for ten minutes, then rinse thoroughly and allow to air dry.

6. Responsibilities: Employers are required to provide and employees are required to use eye and face protection. Employers are not required to provide prescription eyewear; however, they must provide suitable overglasses or goggles that will provide the same degree of protection and visual acuity as safety glasses.



**C.**

## **Ear Protection**





# EAR PROTECTION

1. References: OSHA 1910.95  
Noise and Hearing Conservation Manual, 4th Edition,  
edited by EH Berger, WD Ward, JC Morrill, and LH Royster,  
AIHA, 1993

2. Criteria: OSHA requires hearing protector attenuation be evaluated for the specific noise environments where they will be used. Employers must use one of the methods described in Appendix B: Methods for Estimating the Adequacy of Hearing Protection Attenuation.

Hearing protectors must attenuate employee exposures at least to an 8-hr TWA of 90 dBA.

Employees who have experienced a standard threshold shift must wear hearing protectors which attenuate exposures to an 8-hr TWA of 85 dBA or less.

Hearing protector attenuation must be re-evaluated whenever noise exposure increase to the extent that currently used hearing protectors may no longer provide proper attenuation. More effective hearing protectors must be provided where necessary.

3. Selection: Hearing protectors are available in many types and sizes.

Types of Hearing Protectors:

Ear muffs

Ear plugs

Semi-aural device

Many types of hearing protectors are available in premolded, formable, and custom molded varieties.

A variety of types and sizes must be provided for employees to choose from.

All hearing protectors must be initially fit when dispensed to the individual. Certain conditions/facial features may prevent the use of one or more types of protector.

Hearing protector's effectiveness may be compromised when worn with other types of PPE. Consideration should be given to how protectors will be worn with the other PPE.

Examples:

Wearing safety glasses with ear muff: the temple pieces will break the seal around the ear and allow noise to enter.

Use of hearing protectors in confined or restricted spaces may limit the selection available. It would be prudent to select protectors that could not become entangled or prevent the employee from safely performing duties.

4. Use: All hearing protectors should be used according to the manufacturer's recommendations. Any alterations will compromise the protection offered by the protectors.

5. Inspection and Maintenance:

Inspection: All hearing protection devices should be inspected prior to use for degradation, missing parts, and cleanliness.

Maintenance: Most types of hearing protection are designed to be disposable; but may be used several times if kept clean.

Hearing protection may be cleaned using a mild soap and water; and allowing hearing protection to dry completely before re-using.

(Ear muffs may need to be cleaned according to manufacturer's recommendations.)

6. Responsibilities:

Employer—It is the responsibility of the employer to provide a selection of hearing protection which will reduce exposures to acceptable levels. The employer must also provide initial fitting and training in the use and care of hearing protectors.

Employee—It is the responsibility of the employee to wear hearing protection properly and maintain their hearing protection.

**D.**

## **Hand Protection**





# HAND PROTECTION

## 1. References:

OSHA 1910.138	Hand protection -- General Industry
OSHA 1910.137	Electrical Protective Devices -- General Industry
OSHA 1910.268	Telecommunication -- General Industry
OSHA 1910.1000 Series	Specific contaminant standards (lead, asbestos, bloodborne, etc.)
OSHA 1926.28	Personal Protective Equipment -- Construction
OSHA 1926.95	Criteria for Personal Protective Equipment -- Construction
ANSI J6.671	Rubber Insulating Gloves
ASTM D 120-87	Specifications for Rubber Insulating Gloves

## 2. Criteria: The purpose of 1910.138 is providing hand protection against:

- a. Chemical absorption and chemical burns
- b. Cuts, abrasion, and punctures
- c. Thermal burns and temperature extremes

With the exception of electrical hazards, there are no guidelines in the OSHA , ANSI, or ASTM standards cited above to assist employers in proper selection of gloves for specific hazards.

## 3. Selection: (based on findings of Job Hazard Analysis)

### JOB HAZARD ANALYSIS

- a. Assign competent, responsible persons
- b. Obtain written job descriptions
- c. Assemble relevant Material Safety Data Sheets (MSDSs)
- d. Assemble relevant injury and accident reports
- e. Observe tasks and note hazards

### MSDS REVIEW

- a. Note chemicals listing "skin" as target organ
- b. Watch for "skin" notation in ingredients list on MSDS
- c. Note terms such as "irritation, defatting, caustic, dermatitis, dermatoses"
- d. Red flags—acids, bases, solvents

3. (continued)

#### OBSERVE TASKS FOR CHEMICAL HAZARDS

- a. Do hands come into contact with chemicals which may harm or penetrate skin?
- b. Have you accounted for residual chemicals present on parts or materials as a result of prior processes? Are residues present?
- c. Is skin contact prolonged or repeated frequently?

#### WAYS CHEMICALS COMPROMISE GLOVE PROTECTION

- a. Penetration: a substance passes through openings in the glove (Ex: loose weave, seams, punctures, tears, degraded areas)
- b. Degradation: chemical or physical processes which attack glove material  
(Ex: glove material dissolved by chemical; glove material reacts with chemical; heat, light, radiation weaken glove material over time)
- c. Permeation: physical process of diffusion or osmosis.  
Rate of permeation depends on thickness and density of glove material, temperature of chemical, concentration of chemical, pressure of chemical.  
*NOTE: Many glove selection guides list permeation rates for specific glove material of specific thickness. Thickness is usually expressed in "mils."*
- d. Contamination: gloves contaminated with chemicals become a hazard when donning and doffing. Training and/or SOPs in safe glove removal may be needed.

#### OBSERVATION OF TASKS FOR PHYSICAL HAZARDS

- a. Are parts, materials, or tools hot or cold enough to cause discomfort or injury?
- b. Do parts, materials, or tools have sharp or pointed edges?  
Can the edges cut or puncture the skin or gloves worn for chemical protection?
- c. Are parts, materials, or tools rough or abrasive?
- d. Are parts, materials, or tools slippery or awkward to handle?
- e. Are parts or materials moving when hand contact occurs?  
Is compressed air used?

#### ACCIDENT AND INJURY REVIEW

- a. 200 log
- b. First-aid logs
- c. In-house accident investigation forms
- d. BWC First Report of injury (FROI) forms or OSHA 101

*NOTE: These forms can help establish a history of hand injuries.*

*Lack of injuries alone does not indicate there is no need for gloves.*  
There is no glove made that will protect against all hazards.  
Sometimes double gloving will be needed.

4. Glove Use: All protective gloves should be used in accordance to recommendations and limitations of the manufacturer.
5. Inspection and Maintenance: Gloves should be inspected for deficiencies before each use. Damaged, deformed, or degraded gloves should be taken out of service.
6. Responsibilities: It is the responsibility of the employer to provide protective gloves where needed and to ensure correct glove usage.

It is the responsibility of the employee to use PPE in the prescribed manner.



**E.**

## **Foot Protection**







Examples of considerations for selecting footwear are:

- Type of work performed
- Presence of hot materials
- Potential for sole penetration
- Need for electrical protection
- Need to dissipate static
- Presence of chemicals

4. Use: All protective footwear should be used in accordance with manufacturer's specifications. Improper wear or alteration can result in injury.

5. Inspection and Maintenance:

Inspection: Inspect footwear prior to each use. This is especially critical when using footwear that offers electrical protection.

Maintenance: Because of the nature of different types of footwear, manufacturer's recommendations should be followed.

6. Responsibilities: This is the one item of PPE that the employer is not required to furnish. This is because of the personal nature of shoes and their general inability to be sanitized and reused by other employees. There are exceptions to these rules.

# Footwear Labeling

## IMPACT

I/75 = 75 ft lbf

I/50 = 50 ft lbf

I/30 = 30 ft lbf

## COMPRESSION

C/75 = 2500 lb

C/50 = 1750 lb

C/30 = 1000 lb

## IDENTIFICATION CODES

M - Male    F - Female

Metatarsal Protection - Mt/75 or /50 or /30

Conductive - Cd Type 1 or Type 2

Electrical Hazard - EH

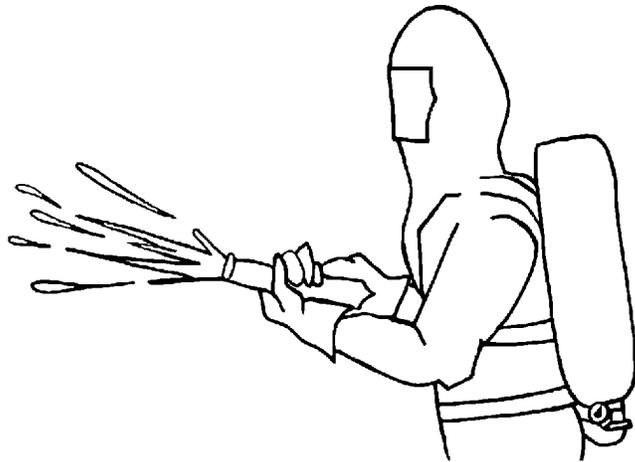
Puncture Resistance - PR

Static Dissipative - SD Type I or Type II



# F.

## Whole Body Protection





# WHOLE BODY PROTECTION

1. References: Various OSHA Standards. Prior to using the information in this section, employers should ascertain whether a specific standard applies to the process they will be performing.
2. Criteria: Selection of additional PPE will depend on the work to be performed. So far in this course we have discussed items of PPE that are covered by specific OSHA Standards. Now we will look at articles that may be required by the nature of the work.
3. Selection:
  - Handling chemicals
  - Hot materials
  - Welding, not otherwise covered
  - General body protection
  - Heat stress
  - Cold stress

## Handling chemicals:

This type of work may require chemical aprons or protective suits. Employers should check with manufacturers, suppliers, Material Safety Data Sheets, or industrial hygienists when selecting the proper type of chemical protective clothing.

## Hot materials:

When involved with hot materials, it is important to remember that you do not want to wear fabrics that may melt if the materials come in contact with them. Examples of this might be hot asphalt, grinding sparks, heated metals and other very hot materials. For this purpose, natural fibers tend to provide protection from this hazard.

## Welding:

The same precautions should be taken as with hot materials. In addition, protective aprons, sleeves and even leather jackets may be required to adequately protect you. This also applies to using a cutting torch or even possibly brazing.

#### General body protection:

This may seem like a strange topic, but with the dramatic increase in skin cancer it is no less important than any other PPE for outdoor workers and those exposed to ultraviolet radiation. Dressing properly includes wearing shirts and long pants to shield the body from the effects of this hazard. Proper dress can also help protect the body from cuts and abrasions that may not be serious but can hamper job performance.

#### Heat stress:

Heat exhaustion is a common problem with workers subjected to high heat levels. Although easily treated, if allowed to continue, it can lead to potentially fatal heat stroke. Dressing properly can help to control this hazard. Workers should wear clothing that will allow heat to escape and perspiration to accomplish its purpose, to cool the body. Once again natural fibers or blends of predominantly natural fibers seem best suited for the job.

#### Cold stress:

Cold is not only a danger to outdoor workers but also employees who work for food processing, cold storage or other unheated or artificially cooled facilities. The temperatures do not have to be below freezing for employees to experience cold stress. Dressing properly is the key to comfort. Workers should wear clothes that will allow moisture to wick away from the body and retain the heat. Natural fibers are good but there are also manmade materials that will serve the purpose. The best way is to dress in layers of loose clothing so that these layers may be removed as the worker's body heats up during the course of the work day.

4. Use: As with all PPE, manufacturers' recommendations should be followed to get the maximum protection. Although many of the above protections do not have specific standards to provide guidance to the employer, better production and increased protection for the employee can result in reduced injuries in the workforce.

#### 5. Inspection and Maintenance:

Inspection: For articles designed as PPE, such as aprons or chemical suits, they should be inspected in accordance with manufacturers instructions. Other items should be checked for appropriateness.

Maintenance: As with the inspection, maintenance should be performed on articles of PPE in accordance with manufacturers' recommendations. For items of personal clothing, maintenance should include frequent cleaning to remove substances that may build up on the fabric. This can help to prevent potentially irritating or hazardous substances from continually contacting the skin. Properly cleaned and maintained clothes will aid in preventing both heat and cold stress.

6. Responsibilities:

Some items, such as welding sleeves and chemical suits, are the responsibility of the employer to provide. Other items are the responsibility of the worker, however, the employer should provide the employee with the training necessary to protect themselves in the work environment. The guideline here is generally if the item has no equivalent non work related use, then the employer should provide.

## Heat Stress

<b>Disorder</b>	<b>Symptoms</b>	<b>Cause</b>	<b>First Aid</b>
Heat stroke	Chills, restlessness, irritability	Excessive exposure, subnormal tolerance (genetic or acquired), drug, alcohol abuse	Immediate, aggressive, effective cooling. Transport to hospital. Take body temperature.
Heat exhaustion	Fatigue, weakness, blurred vision, dizziness, headache	Dehydration, distribution of blood to the periphery, low level of acclimation, low level of fitness	Lie down flat on back in cool environment. Drink water, loosen clothing.
Dehydration	No early symptoms. Fatigue, weakness, dry mouth	Excessive fluid loss by sweating, illness (vomiting or diarrhea), alcohol consumption	Fluid and salt replacement
Heat cramps	Painful muscle cramps, especially in abdominal or fatigued muscles	Electrolyte imbalance caused by prolonged sweating without adequate fluid intake	Rest in cool environment. Drink salted water (0/5% salt solution). Massage muscles.

## **Cold Stress**

Hypothermia victims often sense certain symptoms that tell them they're in trouble. Muscle tensing, fatigue, a deep feeling of cold or numbness, shivering and confusion may signal they've had enough of the cold.

It's important to be on the lookout for suspicious signs of hypothermia among your workers.

### Common Indicators

- Uncontrolled shivering
- Poor coordination
- Slurred speech
- Irrationality and poor judgment
- Blueness or puffiness of skin
- Dilated pupils
- Weak or irregular pulse

### Action Steps

- Remove them from the cold environment.
- Wrap the person with blankets and apply warm, not hot, pads or water bottles to the back of the neck and in the groin and armpits.
- Feed the person warm, non-alcoholic beverages or soup to help warm the body. Avoid coffee and alcohol since they will increase body heat loss.
- Take unconscious victims to the hospital immediately. An unconscious victim with severe hypothermia may not show signs of life; however, under these circumstances vital signs can only be detected with specialized equipment.

### Preventive Techniques

- Cold-proof equipment by covering metal handles and bars with thermal insulating materials.
- Workers should wear appropriate personal protective equipment like insulated gloves and jackets. Layers of clothing provide better insulation than a single thick garment. If the work environment is wet, outer clothing should resist water and wind.
- A wool knit cap or a cotton liner under a hard hat can prevent 50% loss of body heat through the head.
- New employees should have time to become accustomed to cold working conditions.
- Give workers frequent breaks and shortened work days when working in cold conditions.





# Training

The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life and disposal of the PPE.

Each affected employee shall demonstrate an understanding of the training specified in paragraph 1910.132(f)(1) and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete; or
- Changes in the types of PPE to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

The employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

# **TRAINING**

## **HEARING CONSERVATION PROGRAM**

As part of a Hearing Conservation Program, the following requirements apply:

- All employees exposed to noise at or above the Action Level of 85 dBA, as an 8-hour TWA must be included in the training program.
- Training shall be repeated annually.
- Training shall include:
  - The effects of noise on hearing
  - The purpose of hearing protectors
  - Advantages/disadvantages of hearing protectors
  - Attenuation of various types of hearing protectors
  - Instruction on selection, fitting, use, and care of hearing protectors
- The purpose of audiometric testing
- Explanation of audiometric testing procedure



# Documentation

OSHA believes that a hazard assessment is an important element of a PPE program because it produces the information needed to select the appropriate PPE for the hazards present or likely to be present at particular workplaces. The Agency believes that the employer will be capable of determining and evaluating the hazards of a particular workplace. Paragraph (d) of 1910.132 is a performance-oriented provision which simply requires employers to use their awareness of workplace hazards to enable them to select the appropriate PPE for the work being performed.

It clearly indicates that the employer is accountable both for the quality of the hazard assessment and for the adequacy of the PPE selected.

OSHA believes that some form of record is needed to provide OSHA compliance officers and affected employees with appropriate assurance that the required hazard assessment has been performed.

Such situations in other rules require employers to verify their compliance with a requirement through a written certification. The Agency has found that a written certification is a reasonable means by which to establish accountability for compliance to this rule as well.

Therefore, the Agency has determined that employers can adequately verify compliance with 1910.132(d) of the final rule through a written certification which identifies:

The workplace evaluated

The person certifying that the evaluation has been performed

The date(s) of the hazard assessment

The document as a certification of hazard assessment.

This requirement has been added to the final rule as paragraph (d)(2)





## **STANDARDS**

<b>Head Protection (1910.135)</b>	<b>91</b>
<b>Eyes and Face Protection (1910.133)</b>	<b>92</b>
<b>Occupational Noise Exposure (1910.95)</b>	<b>95</b>
<b>Hand Protection (1910.138)</b>	<b>105</b>
<b>Foot Protection (1910.136)</b>	<b>106</b>
<b>PPE Selection (1910, Appendix B)</b>	<b>107</b>



# 1910.135 — HEAD PROTECTION

29 CFR 1910

## Subpart I – Personal Protective Equipment

**(a) General requirements.** (1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(2) The employer shall ensure that a protective helmet designed to reduce electrical shock hazard is worn by each such affected employee when near exposed electrical conductors which could contact the head.

**(b) Criteria for protective helmets.** (1) Protective helmets purchased after July 5, 1994 shall comply with ANSI Z89.1-1986, “American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements,” which is incorporated by reference as specified in Sec. 1910.6, or shall be demonstrated to be equally effective.

(2) Protective helmets purchased before July 5, 1994 shall comply with the ANSI standard “American National Standard Safety Requirements for Industrial Head Protection,” ANSI Z89.1-1969, which is incorporated by reference as specified in Sec. 1910.6, or shall be demonstrated by the employer to be equally effective.

[59 FR 16362, April 6, 1994; 61 FR 9227, March 7, 1996; 61 FR 19547, May 1, 1996]

**(SEE PAGE 6-24 FOR SELECTION GUIDELINES)**

# 1910.133 — EYE AND FACE PROTECTION

## 29 CFR 1910

### Subpart I — Personal Protective Equipment

(a) **General requirements.** (1) The employer shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

(2) The employer shall ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g. clip-on or slide-on side shields) meeting the pertinent requirements of this section are acceptable.

(3) The employer shall ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

(4) Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer.

(5) The employer shall ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation. The following is a listing of appropriate shade numbers for various operations.

#### Filter Lenses for Protection Against Radiant Energy

Operations	Electrode Size 1/32 in.	Arc Current	Minimum(*) Protective Shade
------------	-------------------------	-------------	-----------------------------

Shielded metal arc welding	Less than 3 .....	Less than 60 ...	7
	3-5 .....	60-160 .....	8
	5-8 .....	160-250 .....	10
	More than 8 .....	250-550 .....	11

Operations	Electrode Size 1/32 in.	Arc Current	Minimum(*) Protective Shade
Gas metal arc welding and flux cored arc welding		less than 60 ...	7
		60-160 .....	10
		60-250 .....	10
		250-500 .....	10
<hr/>			
Gas Tungsten arc welding		less than 50 ...	8
		50-150 .....	8
		150-500 .....	10
<hr/>			
Air carbon Arc cutting	(Light) .....	less than 500 ..	10
	(Heavy) .....	500-1000 .....	11
<hr/>			
Plasma arc welding		less than 20 ...	6
		20-100 .....	8
		100-400 .....	10
		400-800 .....	11
<hr/>			
Plasma arc cutting	(light)(**) .....	less than 300 ..	8
	(medium)(**) .....	300-400 .....	9
	(heavy)(**) .....	400-800 .....	10
<hr/>			
Torch brazing		.....	3
Torch soldering		.....	2
Carbon arc welding		.....	14
<hr/>			

## Filter Lenses for Protection Against Radiant Energy

Operations	Plate thickness-inches	Plate thickness-mm	Minimum(*) Protective Shade
Gas Welding:			
Light	Under 1/8 .....	Under 3.2 .....	4
Medium	1/8 to 1/2 .....	3.2 to 12.7 .....	5
Heavy	Over 1/2 .....	Over 12.7 .....	6
<hr/>			
Oxygen cutting:			
Light	Under 1 .....	Under 25 .....	3
Medium	1 to 6 .....	25 to 150 .....	4
Heavy	Over 6 .....	Over 150 .....	5
<hr/>			

Footnote(\*) As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

Footnote(\*\*) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

### **(b) Criteria for protective eye and face devices.**

(1) Protective eye and face devices purchased after July 5, 1994 shall comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference as specified in Sec. 1910.6.

(2) Eye and face protective devices purchased before July 5, 1994 shall comply with the ANSI "USA standard for Occupational and Educational Eye and Face Protection," Z87.1-1968, which is incorporated by reference as specified in Sec. 1910.6, or shall be demonstrated by the employer to be equally effective.

**(SEE PAGE 6-21 FOR SELECTION GUIDELINES)**

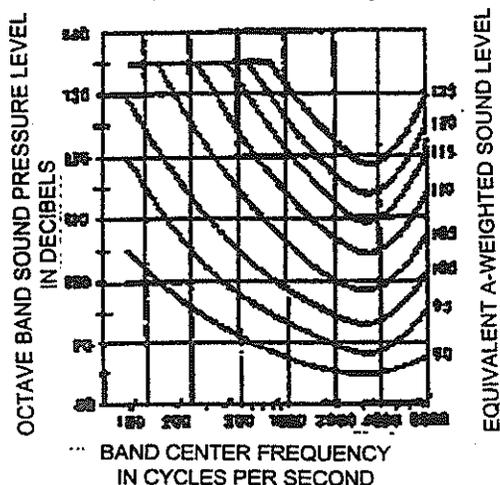
# 1910.95 — OCCUPATIONAL NOISE EXPOSURE

29 CFR 1910

## Subpart G — Occupational Health and Environmental Control

(a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table G-16 when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows:

FIGURE G-9 - Equivalent A-Weighted Sound Level



Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on this graph and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from Table 1.G-16.

(b)(1) When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

(b)(2) If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1)

Duration per day, hours	Sound level dBA slow response
8.....	90
6.....	92
4.....	95
3.....	97
2.....	100
1 1/2 .....	102
1.....	105
1/2 .....	110
1/4 or less.....	115

Footnote(1) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:  $C(1)/T(1) + C(2)/T(2) + \dots + C(n)/T(n)$  exceeds unity, then, the mixed exposure should be considered to exceed the limit value.  $C_n$  indicates the total time of exposure at a specified noise level, and  $T_n$  indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

**(c)** "Hearing conservation program."

**(c)(1)** The employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

**(c)(2)** For purposes of paragraphs (c) through (n) of this section, an 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.

**(d)** "Monitoring."

**(d)(1)** When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.

**(d)(1)(i)** The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

**(d)(1)(ii)** Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.

**(d)(2)**

**(d)(2)(i)** All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.

**(d)(2)(ii)** Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

**(d)(3)** Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

**(d)(3)(i)** Additional employees may be exposed at or above the action level; or

**(d)(3)(ii)** The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

**(e)** "Employee notification." The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

**(f)** "Observation of monitoring." The employer shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.

**(g)** "Audiometric testing program."

**(g)(1)** The employer shall establish and maintain an audiometric testing program as provided in this paragraph by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.

**(g)(2)** The program shall be provided at no cost to employees.

**(g)(3)** Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the

Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

**(g)(4)** All audiograms obtained pursuant to this section shall meet the requirements of Appendix C: "Audiometric Measuring Instruments."

**(g)(5)** "Baseline audiogram."

**(g)(5)(i)** Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

**(g)(5)(ii)** "Mobile test van exception." Where mobile test vans are used to meet the audiometric testing obligation, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

**(g)(5)(iii)** Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

**(g)(5)(iv)** The employer shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

**(g)(6)** "Annual audiogram." At least annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

**(g)(7)** "Evaluation of audiogram."

**(g)(7)(i)** Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift as defined in paragraph (g)(10) of this section has occurred. This comparison may be done by a technician.

**(g)(7)(ii)** If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

**(g)(7)(iii)** The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:

**(g)(7)(iii)(A)** A copy of the requirements for hearing conservation as set forth in paragraphs (c) through (n) of this section;

**(g)(7)(iii)(B)** The baseline audiogram and most recent audiogram of the employee to be evaluated;

**(g)(7)(iii)(C)** Measurements of background sound pressure levels in the audiometric test room as required in Appendix D: Audiometric Test Rooms.

**(g)(7)(iii)(D)** Records of audiometer calibrations required by paragraph (h)(5) of this section.

**(g)(8)** "Follow-up procedures."

**(g)(8)(i)** If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift as defined in paragraph (g)(10) of this section has occurred, the employee shall be informed of this fact in writing, within 21 days of the determination.

**(g)(8)(ii)** Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:

**(g)(8)(ii)(A)** Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

**(g)(8)(ii)(B)** Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

**(g)(8)(ii)(C)** The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

**(g)(8)(ii)(D)** The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

**(g)(8)(iii)** If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the employer:

**(g)(8)(iii)(A)** Shall inform the employee of the new audiometric interpretation; and

**(g)(8)(iii)(B)** May discontinue the required use of hearing protectors for that employee.

**(g)(9)** "Revised baseline." An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

**(g)(9)(i)** The standard threshold shift revealed by the audiogram is persistent; or

**(g)(9)(ii)** The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

**(g)(10)** "Standard threshold shift."

**(g)(10)(i)** As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

**(g)(10)(ii)** In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F: "Calculation and Application of Age Correction to Audiograms."

**(h)** "Audiometric test requirements."

**(h)(1)** Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

**(h)(2)** Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for

Audiometers, S3.6-1969, which is incorporated by reference as specified in Sec. 1910.6.

**(h)(3)** Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in Appendix C: "Audiometric Measuring Instruments."

**(h)(4)** Audiometric examinations shall be administered in a room meeting the requirements listed in Appendix D: "Audiometric Test Rooms."

**(h)(5)** "Audiometer calibration."

**(h)(5)(i)** The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.

**(h)(5)(ii)** Audiometer calibration shall be checked acoustically at least annually in accordance with Appendix E: "Acoustic Calibration of Audiometers." Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.

**(h)(5)(iii)** An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3.; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

**(i)** "Hearing protectors."

**(l)(1)** Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

**(l)(2)** Employers shall ensure that hearing protectors are worn:

**(i)(2)(i)** By an employee who is required by paragraph (b)(1) of this section to wear personal protective equipment; and

**(i)(2)(ii)** By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:

**(i)(2)(ii)(A)** Has not yet had a baseline audiogram established pursuant to paragraph (g)(5)(ii); or

**(i)(2)(ii)(B)** Has experienced a standard threshold shift.

**(l)(3)** Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer.

**(l)(4)** The employer shall provide training in the use and care of all hearing protectors provided to employees.

**(l)(5)** The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

**(j)** "Hearing protector attenuation."

**(j)(1)** The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The employer shall use one of the evaluation methods described in Appendix B: "Methods for Estimating the Adequacy of Hearing Protection Attenuation."

**(j)(2)** Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels as required by paragraph (b) of this section.

**(j)(3)** For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.

**(j)(4)** The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

**(k)** "Training program."

**(k)(1)** The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.

**(k)(2)** The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

**(k)(3)** The employer shall ensure that each employee is informed of the following:

**(k)(3)(i)** The effects of noise on hearing;

**(k)(3)(ii)** The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and

**(k)(3)(iii)** The purpose of audiometric testing, and an explanation of the test procedures.

**(l)** "Access to information and training materials."

**(l)(1)** The employer shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

**(l)(2)** The employer shall provide to affected employees any informational materials pertaining to the standard that are supplied to the employer by the Assistant Secretary.

**(l)(3)** The employer shall provide, upon request, all materials related to the employer's training and education program pertaining to this standard to the Assistant Secretary and the Director.

**(m)** "Recordkeeping" -

**(m)(1)** "Exposure measurements." The employer shall maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.

**(m)(2)** "Audiometric tests."

**(m)(2)(i)** The employer shall retain all employee audiometric test records obtained pursuant to paragraph (g) of this section:

**(m)(2)(ii)** This record shall include:

**(m)(2)(ii)(A)** Name and job classification of the employee;

**(m)(2)(ii)(B)** Date of the audiogram;

**(m)(2)(ii)(C)** The examiner's name;

**(m)(2)(ii)(D)** Date of the last acoustic or exhaustive calibration of the audiometer; and

**(m)(2)(ii)(E)** Employee's most recent noise exposure assessment.

**(m)(2)(ii)(F)** The employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

**(m)(3)** "Record retention." The employer shall retain records required in this paragraph (m) for at least the following periods.

**(m)(3)(i)** Noise exposure measurement records shall be retained for two years.

**(m)(3)(ii)** Audiometric test records shall be retained for the duration of the affected employee's employment.

**(m)(4)** "Access to records." All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20 (a)-(e) and (g)-

**(m)(4)(i)** apply to access to records under this section.

**(m)(5)** "Transfer of records." If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period prescribed in paragraph (m)(3) of this section.

**(n)** "Appendices."

**(n)(1)** Appendices A, B, C, D, and E to this section are incorporated as part of this section and the contents of these appendices are mandatory.

**(n)(2)** Appendices F and G to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

**(o)** "Exemptions." Paragraphs (c) through (n) of this section shall not apply to employers engaged in oil and gas well drilling and servicing operations.

**(p)** "Startup date." Baseline audiograms required by paragraph (g) of this section shall be completed by March 1, 1984.

[39 FR 23502, June 27, 1974, as amended at 46 FR 4161, Jan. 16, 1981; 46 FR 62845, Dec. 29, 1981; 48 FR 9776, Mar. 8, 1983; 48 FR 29687, June 28, 1983; 54 FR 24333, June 7, 1989; 61 FR 5507, Feb. 13, 1996; 61 FR 9227, March 7, 1996]

# 1910.138 — HAND PROTECTION

29 CFR 1910

## Subpart I – Personal Protective Equipment

**(a) General requirements.** Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. **(b) Selection.** Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

[59 FR 16362, April 6, 1994]

**(SEE PAGE 6-25 FOR SELECTION GUIDELINES)**

# 1910.136 - FOOT PROTECTION

29 CFR 1910

## Subpart I – Personal Protective Equipment

**(a) General requirements.** The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards.

**(b) Criteria for protective footwear.** (1) Protective footwear purchased after July 5, 1994 shall comply with ANSI Z41-1991, "American National Standard for Personal Protection-Protective Footwear," which is incorporated by reference as specified in Sec. 1910.6, or shall be demonstrated by the employer to be equally effective.

(2) Protective footwear purchased before July 5, 1994 shall comply with the ANSI standard "USA Standard for Men's Safety-Toe Footwear," Z41.1-1967, which is incorporated by reference as specified in Sec. 1910.6, or shall be demonstrated by the employer to be equally effective.

[59 FR 16360, April 6, 1994; 59 FR 33910, July 1, 1994; 61 FR 9227, March 7, 1996; 61 FR 19547, May 2, 1996; 61 FR 21228, May 9, 1996]

**(SEE PAGE 6-25 FOR SELECTION GUIDELINES)**

# 1910 Subpart I App B — PPE SELECTION

## Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection

### 29 CFR 1910

#### Subpart I -- Personal Protective Equipment

This Appendix is intended to provide compliance assistance for employers and employees in implementing requirements for a hazard assessment and the selection of personal protective equipment.

#### **1. Controlling hazards.**

PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

#### **2. Assessment and selection.**

It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational or educational operation or process, and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.

#### **3. Assessment guidelines.**

In order to assess the need for PPE the following steps should be taken:

##### **a. Survey.**

Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

- (a) Impact
- (b) Penetration
- (c) Compression (roll-over)
- (d) Chemical
- (e) Heat
- (f) Harmful dust
- (g) Light (optical) radiation

##### **b. Sources.**

During the walk-through survey the safety officer should observe:

(a) sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects;

(b) sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;

(c) types of chemical exposures;

(d) sources of harmful dust;

(e) sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;

(f) sources of falling objects or potential for dropping objects;

(g) sources of sharp objects which might pierce the feet or cut the hands;

(h) sources of rolling or pinching objects which could crush the feet;

(i) layout of workplace and location of co-workers; and (j) any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.

#### c. Organize data.

Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.

#### d. Analyze data.

Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph 3.a.) should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

### **4. Selection guidelines.**

After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to:

(a) Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.;

(b) compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;

(c) select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and

(d) fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

### **5. Fitting the device.**

Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

### **6. Devices with adjustable features.**

Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

### **7. Reassessment of hazards.**

It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

### **8. Selection chart guidelines for eye and face protection.**

Some occupations (not a complete list) for which eye protection should be routinely considered are: carpenters, electricians, machinists, mechanics and repairers, millwrights, plumbers and pipe fitters, sheet metal workers and tinsmiths, assemblers, sanders, grinding machine operators, lathe and milling machine operators, sawyers, welders, laborers, chemical process operators and handlers, and timber cutting and logging workers. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

### Eye and Face Protection Selection Chart

Source	Assessment of Hazard	Protection
IMPACT - Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.	Flying fragments, objects, large chips, particles sand, dirt, etc.	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use faceshield.
HEAT-Furnace operations pouring, casting, hot dipping, and welding.	Hot sparks	Faceshields, goggles, spectacles with side protection. For severe exposure use faceshield. See notes (1), (2), (3).
	Splash from molten metals	Faceshields worn over goggles. See notes (1), (2), (3).
	High temperature exposure	Screen face shields, reflective face shields. See notes (1), (2), (3).
CHEMICALS-Acid and chemicals handling, degreasing plating.	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11).
	Irritating mists	Special-purpose goggles.
DUST - Woodworking, buffing, general dusty conditions.	Nuisance dust	Goggles, eyecup and cover types. See note (8).
LIGHT and/or RADIATION Welding:	Optical radiation Electric arc	Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12).

Source	Assessment of Hazard	Protection
Welding: Gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9).
Cutting, Torch brazing, Torch soldering	Optical radiation	Spectacles or welding face-shield. Typical shades, 1.5-3. See notes (3), (9).
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).

(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4) . Select the darkest shade that allows task performance.

### **9. Selection guidelines for head protection.**

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors. Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers.

## **10. Selection guidelines for foot protection.**

Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, mechanics and repairers, plumbers and pipe fitters, structural metal workers, assemblers, drywall installers and lathers, packers, wrappers, craters, punch and stamping press operators, sawyers, welders, laborers, freight handlers, gardeners and grounds-keepers, timber cutting and logging workers, stock handlers and warehouse laborers.

## **11. Selection guidelines for hand protection.**

Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

(A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;

(B) Generally, any "chemical resistant" glove can be used for dry powders;

(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,

(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

## **12. Cleaning and maintenance.**

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

[59 FR 16362, April 6, 1994]



# Case Study 1

You are responsible for determining the PPE requirements for the XYZ Chemical Company. One of the workers in this company is going to be handling sodium hydroxide in a liquid form. The company is in the process of determining what engineering controls they can implement to protect workers, but until this has been accomplished workers must utilize appropriate PPE. Sodium hydroxide is a corrosive.

Industrial hygiene monitoring has indicated that the concentrations are below the PEL and so no respiratory protection is required. What PPE would you recommend for this job?

# Case Study 2

Date: January 14

Site: Fremont, Ohio

Weather: Clear, 18 degrees F. with a 5 to 10 MPH wind from the Northwest.

The foreman has given you the job of breaking up a concrete slab as part of the demolition work being performed prior to construction of an addition to the Last National Bank. This slab is located on the east side of the building adjacent to a brick and block wall that is being removed as part of the project. Environmental testing has shown that there is not asbestos or other listed hazardous materials present. Project estimates indicate this job will take about five hours. What procedures would you take to protect yourself in this situation?

## Resources

# Resources

Division of Safety & Hygiene  
Overview of PPE Standard

National Safety Council Booklet  
PPE Awareness

OSHA Booklet  
Personal Protective Equipment

Ruling on OSHA  
Obligation of Employers to Pay for PPE

OSHA  
Obligation of Employers to Pay for PPE

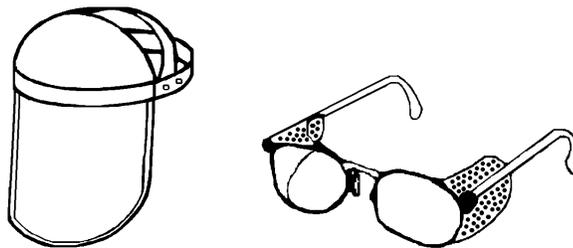


**Overview of Occupational Safety and Health Administration (OSHA)**

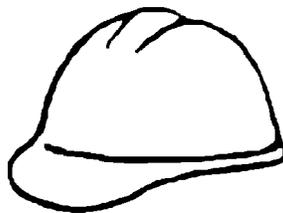
**Personal Protective Equipment (PPE) Standards**

**29 CFR Part 1910 Amended Subpart I**

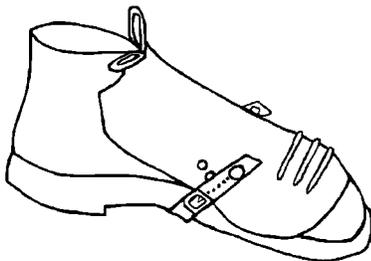
**1910.132 (revised standard)  
General Requirements**



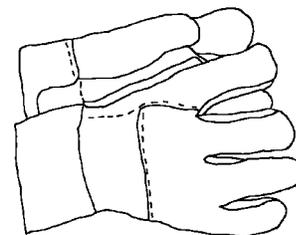
**1910.133 (revised standard)  
Eye and Face protection**



**1910.135 (revised standard)  
Head Protection**



**1910.136 (revised standard)  
Foot Protection**



**1910.138 (new standard)  
Hand Protection**

**PREPARED BY THE DIVISION OF SAFETY & HYGIENE**

**Key Issues:** The revised PPE rules require employers to: (1) assess the workplace to determine if hazards necessitate PPE usage and to select and have each affected employee use the types of PPE that will protect against the specific hazard; (2) provide training for each employee required to use PPE; (3) document the hazard assessment in writing, as well as certify in writing that the employee has received and understands the training.

The standards have performance-oriented provisions addressing eye, face, hand, head and foot hazards that allow employers to adopt the most up-to-date PPE. The flexibility to substitute new materials and technologies should produce more comfortable and protective PPE, increasing worker acceptance.

In controlling hazards, PPE alone should not be relied on to provide protection, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

**What does “performance standard” mean?**

A performance standard gives general requirements, and allows the employer the latitude to design a hazard assessment and PPE selection plan.

**Can an employer build on a company’s current PPE program?**

Current PPE programs based on the 1971 OSHA PPE standards can serve as a basis for complying with the revised standards (re: selection and use of PPE). Also, PPE complying with the earlier standards is permitted if purchased before July 5, 1994.

**What types of PPE are included in these general industry standards?**

PPE for eyes, face, head, foot, and hands is included. Respiratory protection (1910.134) and electrical protective devices (1910.137) are not included in these revisions, but are covered in separate standards. These PPE general industry standards do not apply to the construction industry.

**What new provisions are listed in the general requirements standard?**

Employers must select PPE based on a hazard assessment of their workplace. Employers are accountable for quality of hazard assessment and adequacy of PPE selected.

Employers are required to have a written certification of hazard assessment. The written document must be identified as the certification of hazard assessment. It must also: (a) identify the workplace evaluated; (b) the name of person certifying the assessment was performed; and (c) the date(s) of hazard assessment.

Defective or damaged PPE shall not be used. Defects are not limited to those that are visible.

Employee training must include as a minimum: when and what PPE is necessary; how to properly don, doff, adjust, and wear PPE; the limitations, proper care, maintenance, useful life and disposal of the PPE.

Employees must demonstrate an understanding of the requirements and ability to properly use PPE before permission to perform work requiring PPE is given. Employers must inform employees of PPE selection decisions and assure that they understand the decision logic used. Employers must issue written certification verifying PPE training for affected employees.

Retraining is required when changes in the workplace or type of PPE used render previous training obsolete; or there is a lack of understanding or skill demonstrated by employee’s misuse of assigned PPE.

**What occupational exposures require the use of eye and/or face protection?**

Flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation require such protection. Sources of light radiation include welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc. Some exposures such as to molten metals or sparks require face shields to be worn over primary eye protection (i.e., goggles or spectacles).

**What consensus standards must personal protective equipment meet for (a) protective eye and face devices, (b) head protection, and (c) foot protection?**

American National Standards Institute (ANSI) standards incorporated into the specified OSHA PPE standards must be used. ANSI currently has no criteria for hand protection nor for chemical protective clothing.

OSHA does not require third party certification of PPE. However, the PPE manufacturing industry has already voluntarily adopted third party certification to a limited extent through certification programs conducted by groups such as the Safety Equipment Institute.

**How does the new standard treat the following devices: (a) detachable side shields on eye protectors, (b) eye protection with no side protectors, (c) eye protection worn over prescription lenses, (d) tinted or variable tinted lenses, (e) unmarked lenses meeting ANSI Z87 requirements, or (f) contact lenses?**

- (a) Some types of side shields (detachable or fixed) must be provided when flying object hazards are present.
- (b) OSHA permits eye protection with no side protectors only if there are no flying object hazards present.
- (c) Permissible if the proper positioning of the prescription lenses or protective lenses remain undisturbed.
- (d) The employer or company safety professional must determine when tinted or variable tint lenses should or should not be used, based on awareness of workplace conditions. Employer must comply with "Filter Lenses for Protection Against Radiant Energy" chart information in 1910.133 for protection from injurious light radiation from welding, plasma arc cutting, etc.
- (e) These are not permitted. Eye and face PPE must be distinctly marked to facilitate manufacturer's identification.
- (f) OSHA believes contact lenses, while they are not eye protective devices, do not pose additional hazards to the wearer. OSHA determined additional regulation addressing contact lens use is unnecessary. If eye hazards are present, appropriate eye protection must be worn instead of, or in conjunction with, contact lenses. (Refer to standard's preamble; see references at the end of the overview.)

**What should one look for when purchasing the correct form of PPE?**

Eye and face devices, head protection, and foot protection that comply with ANSI standards, all have the required ANSI marking on the product.

**What recordkeeping or documentation is needed for compliance?**

Written certification of the hazard assessment and employee training are needed.

**What does "grandfathering of PPE" mean?**

The use of PPE purchased before July 5, 1994, that meets the requirements of the 1971 OSHA PPE standards is allowed.

**What general requirements are contained in the head protection standard?**

The requirements are: (1) wearing of protective helmets when working in areas with a potential for head injury from falling objects; and (2) wearing of a protective helmet designed to reduce electrical shock hazard when employees are near exposed electrical conductors that could contact the head.

OSHA ruled that Class B helmets currently in use already comply with the electrical insulation requirements (ANSI Z89.1-1986). According to the preamble, OSHA is not restricting the use of bump caps. OSHA will evaluate an employer's choice of head protection based on: (1) the hazards to which employees may be exposed, and (2) compliance with the hazard assessment requirement.

**What general requirements are contained in the foot protection standard?**

Wearing of protective footwear when working in areas containing a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or where such employees' feet are exposed to electrical hazards are general requirements. If it is determined through a hazard assessment that employees are exposed to multiple hazards, the employer is required to ensure the employees wear shoes that protect against all of the potential hazards encountered.

**What general requirements are contained in the hand protection standard, 1910.138?**

Employers must: (a) select and require the use of appropriate hand protection from hazards and (b) base appropriate hand protection selection on performance characteristics of the PPE relative to the task(s), conditions present, duration of use, and the identified hazards. Examples of hazards include: skin absorption or skin contact with harmful substances; severe cuts, lacerations, or severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

**What are included in the guidelines to Subpart I for hazard assessment and PPE selection?**

During a walk-through survey, the company's safety officer should identify hazards to the workers caused by: impact, penetration, compression (roll-over), chemical, heat, harmful dust, and optical radiation. Each of the basic hazards should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found. The possibility of multiple hazards existing simultaneously should be considered. PPE selection discussion, examples of occupations for PPE consideration, and training and fitting guidelines are listed in the standard's non-mandatory Appendix B. It is the safety officer's responsibility to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

**What is the impact of compliance with the standard?**

OSHA conservatively estimates employers' cost averages \$4,000 per injury to non-use or misuse of PPE. However, the primary cost of workplace injuries is typically borne by the employees. OSHA estimates that the standard will prevent 4 fatalities and 102,000 injuries annually for the exposed population of approximately 22 million general industry employees. Compliance should be easily achieved, because the means of compliance are readily available and because the final rule "grandfathers" equipment that complies with the existing standards.

References are available from Division of Safety & Hygiene's Library: 800-644-6292, press 22, then 4.

- *Federal Register*, Vol. 59, No. 66, April 6, 1994, pp. 16334-16360 Preamble; pp. 16360-16364 PPE Standard
- *Federal Register*, Vol. 59, No. 126, July 1, 1994, pp. 33910-33911, PPE Final rule; corrections
- U.S. Dept. of Labor, OSHA 3077, 1993 (Revised), "Personal Protective Equipment"
- U.S. Dept. of Labor, Fact Sheet No. OSHA 89-08, Program Highlights, "Protect Yourself with Personal Protective Equipment"
- Various journal articles on specific types of PPE and on hazard assessment from the Library's vertical files
- Available for checkout: American Conference of Governmental Industrial Hygienists, *Guidelines for the Selection of Chemical Protective Clothing*, Third Edition, 1987.

Effective Date of Standard: July 5, 1994

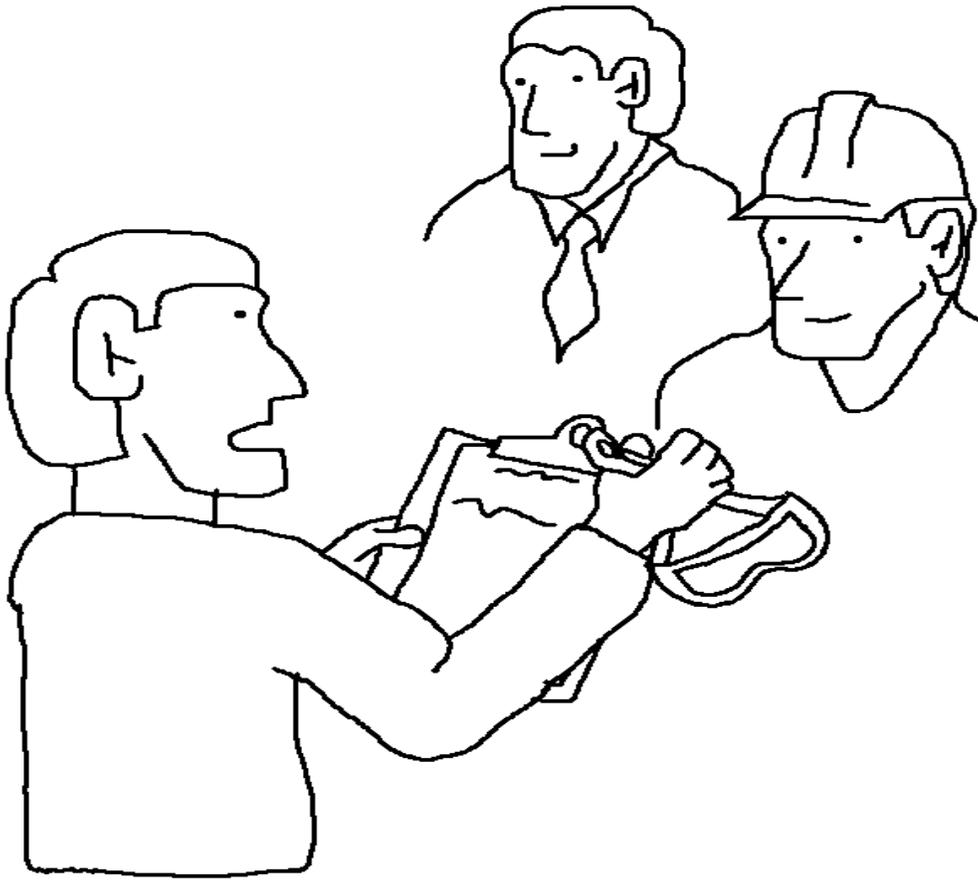
**Ohio employers and employees may contact their local Division of Safety & Hygiene Service Office for consultation on hazard assessment or any other safety and health topic.**



# PPE Awareness

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The National Safety Council



## Equipped for Safety

Safety professionals prefer to eliminate on-the-job hazards. When that's not possible, the next choice is administrative controls to reduce hazards to acceptable levels. Personal protective equipment (PPE) should be used only when other measures can't offer the protection you need.

**Your employer must furnish the right PPE for your work and provide training on how to use and maintain it.** You're responsible for using the equipment properly and following the specific management policies on PPE in your workplace.



## Eye Protection

Ask your supervisor or safety professional to help you select the right eye protection for your work. Among the choices available are spectacles, face shields, welding masks, and goggles, including those for special purposes such as welding and chipping.

If you need prescription eye care, make sure your safety spectacles or goggles have prescription eyeglass lenses. Or wear extra protection over your regular prescription eyeglasses.

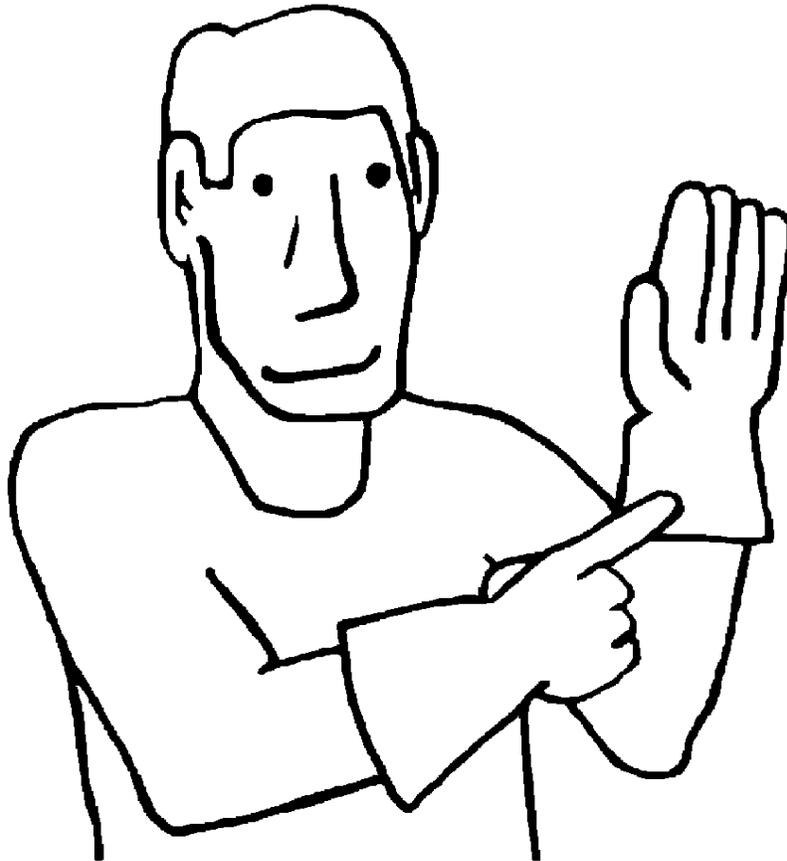
If you wear contact lenses, keep in mind that liquid chemicals, gases, vapors, fumes and dust may affect them. And in some work situations, contact lenses may be prohibited altogether. Wear eye protection in addition to contact lenses.



## Head Protection

Your head is the command center for your body. Head protection is vital because it helps protect your head from injury.

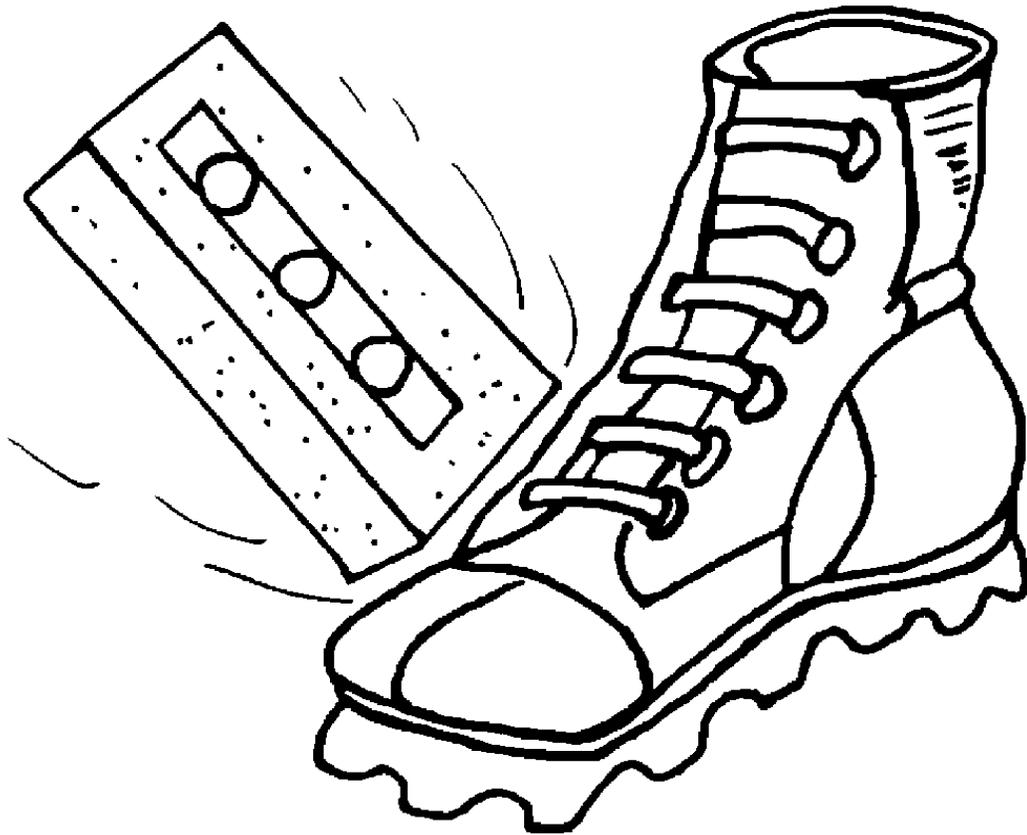
- ⌋ A hard hat is a status symbol that says you think with your head. Wear yours with pride, and add whatever additional protection you need, such as a respirator, goggles or hearing protection.
- ⌋ Make sure your helmet fits right and the suspension is adjusted properly.
- ⌋ Report any head injury to your supervisor immediately.



## Hand Protection

Almost 20 percent of all disabling job accidents involve hand injuries. To take care of your hands on the job:

- ⌋ Take off rings, watches and bracelets before you start work.
- ⌋ Use gloves that are appropriate for your work.
- ⌋ When you're cleaning, inspecting and repairing machines, turn off the power, lock out and tag the machine, block any moving parts, put up warning signs and release all energy.
- ⌋ Don't use tools or equipment that are worn or broken or have dull cutting blades.
- ⌋ Don't bypass safety guards on tools or machines.



## Foot Protection

Your feet are your transportation. Take care of them by following these tips:

- Ask your supervisor or safety professional to recommend the correct style of safety shoes or boots for your work.
- Have your safety footwear fitted by an expert so it fits right and feels comfortable.
- The ANSI-Z41 label inside your safety footwear means that your shoes or boots meet recognized safety standards.
- Safety shoes can protect your feet only if you wear them whenever you're on the job.



## Hearing Protection

Long-term exposure to noise can damage your hearing. Even exposure to loud noise over short periods can sometimes cause temporary hearing loss. And temporary hearing loss can become permanent if the noise exposure continues. To protect yourself:

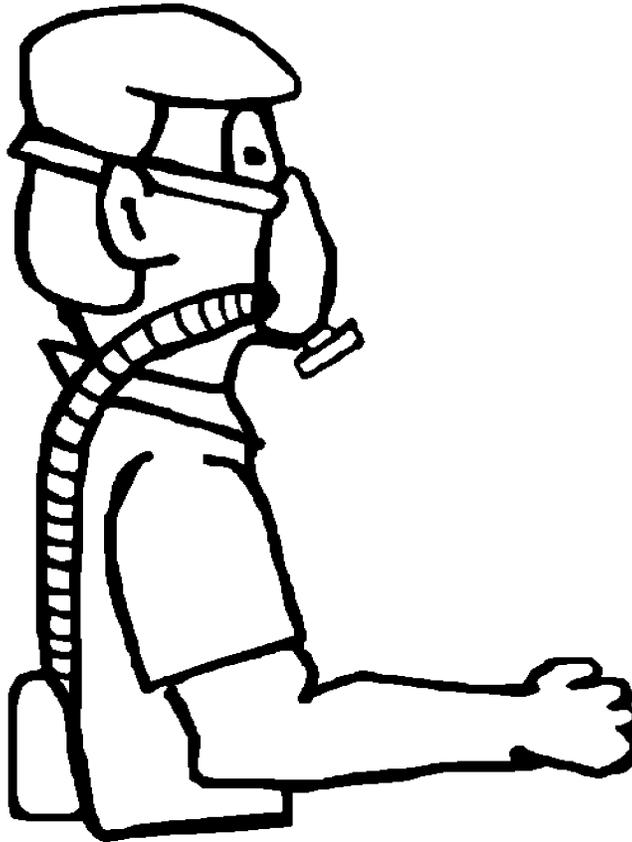
- ⌋ If you think your workplace is too noisy, ask to have the noise level measured.
- ⌋ When you're exposed to noise levels above 85 dBA during an eight-hour period, your company must provide a yearly hearing test.
- ⌋ Your employer can sometimes reduce noise with engineering controls, such as mufflers on compressed air lines and sound-absorbing enclosures around noisy equipment.
- ⌋ Reducing the length of time you are exposed to noise can also reduce the risk.
- ⌋ If you need hearing protection, your employer must supply and help you choose the right ear plugs or ear muffs.



## Skin Protection

One out of every four workers is exposed to a skin irritant. In addition to irritation, some chemicals can also cause other serious health problems. Here's how you can protect your skin:

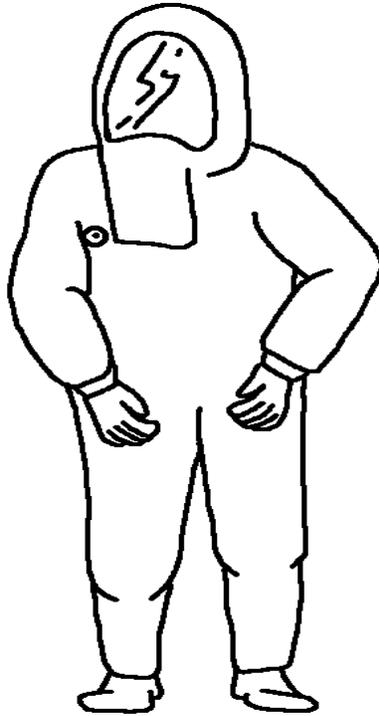
- ⌋ Know what you work with, particularly cleaning solvents, cutting oils, chemicals on rags you reuse, glues, adhesives, epoxies, fiberglass, pesticides and more.
- ⌋ Wear protective gloves, protective clothing that resists chemicals and abrasive or mechanical hazards, and eye protection recommended by a safety professional.
- ⌋ Wash you hands regularly with soap, and again after work, to remove skin contaminants.
- ⌋ Use skin cream to restore moisture to dry skin.



## Respiratory Protection

At least one out of every four workers in the U.S. is exposed to substances that are respiratory hazards. It is best to remove the hazard or use engineering controls. If that cannot be done, you may need to wear respiratory protection. If so:

- ⌋ Make sure an industrial hygienist, safety professional or other trained person has evaluated potential contaminants in the work area.
- ⌋ Your company must provide properly fitted respiratory protection appropriate for the air contaminants you're exposed to and training in its use.
- ⌋ Always wear the right respiratory protection. Care for it according to the manufacturer's instructions.
- ⌋ Never use a respirator that doesn't fit securely; has become clogged or damaged, or one through which you can smell contaminants.

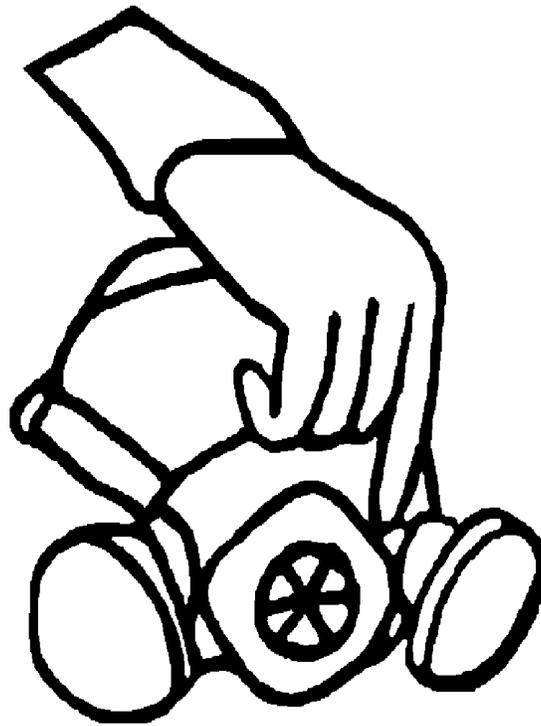


## Full-Body Protection

Hazards can induce sparks, corrosive materials, molten metal, heat, toxic dusts, vapors, gases and liquids. Protection against these hazards may require:

- ⌋ Aprons, bibs, leggings, vests, sleeves, capes, coats and coveralls for partial and full-body protection.
- ⌋ Full-body suits for hazardous work such as asbestos removal or for work with other extremely hazardous substances.
- ⌋ High-visibility and night-hazard clothing protection against traffic hazards.
- ⌋ Lead clothing to protect against X-rays and gamma radiation.
- ⌋ Thermal and quilted clothing for low-temperature work.
- ⌋ Heat-reflective or other specialized clothing for work in hot environments.

Ask your safety professional or industrial hygienist to recommend the right protective clothing for your work.

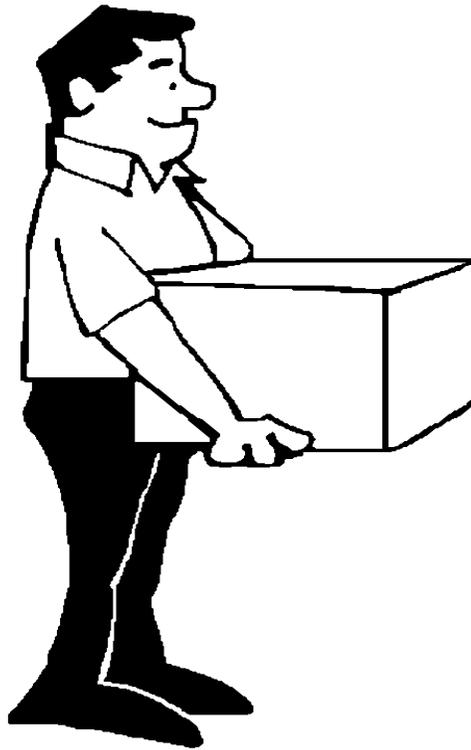


## **Cleaning and Maintaining PPE**

You can clean and maintain some personal protective equipment yourself. For instance, thermal underwear, coveralls, and some cotton hand protectors should be laundered regularly. If you're in doubt about how to clean your PPE, follow the manufacturer's instructions. For some substances, such as lead, regulations may require employers to launder workers' clothing.

Some respiratory protection should be professionally cleaned and repaired only by people who are trained and authorized. This could take a day or more, so make sure you have the proper respirator to use while the first is cleaned or repaired.

Check your PPE regularly and replace any equipment that's cracked or shows excessive wear. If you're unsure, ask your safety professional how to clean and maintain your PPE.

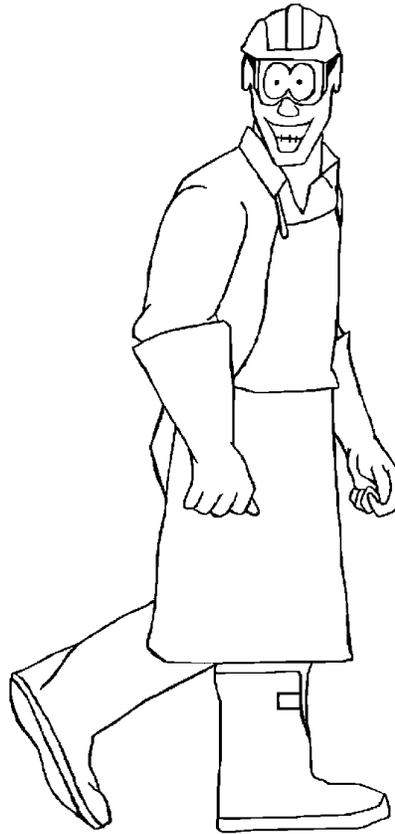


## Storing Your PPE

Store your personal protective equipment away from heat, dust, sunlight and moisture.

- ⌋ Wrap spectacles, goggles and masks in a clean soft cloth or a protective case.
- ⌋ Store safety shoes standing upright.
- ⌋ Keep your safety hat or cap in a clean, dry place when you're not wearing it.
- ⌋ Ask your supervisor or safety professional for instructions on how to store respiratory protection.

Your personal protective equipment can safeguard you from exposure to hazards. Give it the care and attention it deserves.



## Head-to-Toe Fit

Just like people, personal protective equipment comes in all shapes and sizes. Some personal protective equipment is also available in a variety of colors and materials.

Protective equipment is available in sizes for all body types. Sizes range from extra-large to small. A good fit helps ensure the comfort and effectiveness of PPE.

Get the right fit! The better your equipment fits, the more you'll wear it. And the better it will protect you.



## The Protection You Need

No matter how good the fit or how safe the design of your PPE—you're the key ingredient. You have to wear it to make it work. Put it on, leave it on and take good care of it. **It's that simple—and that important!**

# **H The United States Department of Labor Occupational Safety and Health Administration**

## **Personal Protective Equipment OSHA 1995**

### Contents:

- Introduction
- Hazard Assessment
- Training
- Head Protection
- Eye and Face Protection
- Ear Protection
- Respiratory Protection
- Torso Protection
- Arm and Hand Protection
- Foot and Leg Protection
- Other Related Issues
- Conclusion
- Other Sources of OSHA Assistance

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### **Introduction**

The goal of the Occupational Safety and Health Act of 1970 is to ensure safe and healthful working conditions for working men and women in the nation. This Act, which established the Occupational Safety and Health Administration (OSHA) in the Department of Labor, provides for research, information, education, and training in the field of occupational safety and health and authorizes enforcement of OSHA standards.

The Act covers more than 90 million employees throughout the United States. This landmark legislation, the first national safety and health law, establishes standards requiring employers to provide their workers with workplaces free from recognized hazards that could cause serious injury or death. It also requires the employees to abide by all safety and health standards that apply to their jobs.

Although the aim of this booklet is to assist in providing a safe and healthful workplace, the scope is restricted to preventing employee exposure to unsafe equipment and situations. Words such as "must," "shall," "required," and "necessary" indicate requirements under the OSHA standards. Procedures indicated by "should," "may," "suggested," and "recommended" constitute generally accepted good practices.

Much of the personal protective equipment (PPE) information in this booklet is framed in general terms and is intended to complement relevant regulations and manufacturers' requirements. For more specific information, refer to the OSHA standards collected in Title 29, Code of Federal Regulations (CFR), Parts 1900-1999. In some instances, the standards or this booklet refer to specifications by the American National Standards Institute (ANSI), 11 West 42nd St., New York, NY 10036, and the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103. Employers are encouraged to use the most recent ANSI consensus standards and resolutions to provide protection equal to or greater than Federal OSHA regulations.

Information in this booklet also reflects OSHA's latest revisions to PPE standards (1910.132 through 1910.138) as published in the Federal Register Vol. 59, No. 66, pp. 16334-16364, April 6, 1994. The final rule also contains nonmandatory guidelines for a hazard assessment and a chart identifying the appropriate personal protective equipment for particular hazards.

Personal protective equipment should not be used as a substitute for engineering, work practice, and/or administrative controls. Personal protective equipment should be used in conjunction with these controls to provide for employee safety and health in the workplace. Personal protective equipment includes all clothing and other work accessories designed to create a barrier against workplace hazards. The basic element of any management program for personal protective equipment should be an in-depth evaluation of the equipment needed to protect against the hazards at the workplace. Management dedicated to the safety and health of employees should use that evaluation to set a standard operating procedure for personnel, then train employees on the protective limitations of personal protective equipment, and on its proper use and maintenance.

Using personal protective equipment requires hazard awareness and training on the part of the user. Employees must be aware that the equipment does not eliminate the hazard. If the equipment fails, exposure will occur. To reduce the possibility of failure, equipment must be properly fitted and maintained in a clean and serviceable condition.

Selection of the proper personal protective equipment for a job is important. Employers and employees must understand the equipment's purpose and its limitations. The equipment must not be altered or removed even though an employee may find it uncomfortable. (Sometimes equipment may be uncomfortable simply because it does not fit properly.)

This booklet discusses those types of equipment most commonly used for protection of the head, including eyes and ears and the torso, arms, hands, and feet. The use of equipment to protect against life-threatening hazards also is discussed. Information on respiratory protective equipment may be found in Title 29, CFR, Part 1910.134. The standard should be consulted for information on specialized equipment such as that used by firefighters.

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### **Hazard Assessment**

Employers are required to assess the workplace to determine if hazards that require the use of head, eye, face, hand, or foot protection are present or are likely to be present. If hazards or the likelihood of hazards are found, employers must select and have affected employees use properly fitted personal protective equipment suitable for protection from these hazards.





The wearer should be able to identify the type of helmet by looking inside the shell for the manufacturer, ANSI designation and class. For example:

Manufacturer's Name  
ANSI Z89.1-1969 (or later year)  
Class A

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**Fit**

Headbands are adjustable in 1/8-size increments. When the headband is adjusted to the right size, it provides sufficient clearance between the shell and the headband. The removable or replaceable type sweatband should cover at least the forehead portion of the headband. The shell should be of one-piece seamless construction and designed to resist the impact of a blow from falling material. The internal cradle of the headband and sweatband forms the suspension. Any part that comes into contact with the wearer's head must not be irritating to normal skin.

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**Inspection and Maintenance**

Manufacturers should be consulted with regard to paint or cleaning materials for their helmets because some paints and thinners may damage the shell and reduce protection by physically weakening it or negating electrical resistance.

A common method of cleaning shells is dipping them for at least a minute in hot water (approximately 140 F ) that contains a good detergent. Shells should then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.

All components, shells, suspensions, headbands, sweatbands, and any accessories should be visually inspected daily for signs of dents, cracks, penetration, or any other damage that might reduce the degree of safety originally provided.

Users are cautioned that if unusual conditions occur (such as higher or lower extreme temperatures than described in the standards), or if there are signs of abuse or mutilation of the helmet or any component, the margin of safety may be reduced. If damage is suspected, helmets should be replaced or representative samples tested in accordance with procedures contained in ANSI Z89.1-1986. This booklet references national consensus standards, for example, ANSI standards, that were adopted into OSHA regulations. Employers are encouraged to use up-to-date national consensus standards that provide employee protection equal to or greater than that provided by OSHA standards.

Helmets should not be stored or carried on the rear-window shelf of an automobile, since sunlight and extreme heat may adversely affect the degree of protection.



### Filter Lenses for Protection Against Radiant Energy

| OPERATION                                        | ELECTRODE SIZE (1/32) | AMPS          | MINIMUM PROTECTIVE* |
|--------------------------------------------------|-----------------------|---------------|---------------------|
| Shielded metal arc welding                       | Less than 3/32        | Less than 60  | 7                   |
|                                                  | 3/32-5/32             | 60-160        | 8                   |
|                                                  | 5/32-8/32             | 160-250       | 10                  |
|                                                  | More than 8/32        | 250-500       | 11                  |
| Gas metal arc welding and flux cored arc welding |                       | Less than 60  | 7                   |
|                                                  |                       | 60-160        | 10                  |
|                                                  |                       | 160-250       | 10                  |
|                                                  |                       | 250-500       | 10                  |
| Gas tungsten arc welding                         |                       | Less than 50  | 8                   |
|                                                  |                       | 50-150        | 8                   |
|                                                  |                       | 150-500       | 10                  |
| Air carbon arc cutting                           | Light                 | Less than 500 | 10                  |
|                                                  | Heavy                 | 500-1000      | 11                  |
| Plasma arc welding                               |                       | Less than 20  | 6                   |
|                                                  |                       | 20-100        | 8                   |
|                                                  |                       | 100-400       | 10                  |
|                                                  |                       | 400-800       | 11                  |
| Plasma arc cutting                               | Light**               | Less than 300 | 8                   |
|                                                  | Medium**              | 300 to 400    | 9                   |
|                                                  | Heavy**               | 400 to 800    | 10                  |
| Torch brazing                                    |                       |               | 3                   |
| Torch soldering                                  |                       |               | 2                   |
| Carbon arc welding                               |                       |               | 14                  |

| OPERATION       | INCHES     | MILLIMETERS | MINIMUM PROTECTIVE*<br>SHADE |
|-----------------|------------|-------------|------------------------------|
| Gas Welding:    |            |             |                              |
| Light           | Under 1/8  | Under 3.2   | 4                            |
| Medium          | 1/8 to 1/2 | 3.2 to 150  | 5                            |
| Heavy           | over 1/2   | Over 12.7   | 6                            |
| Oxygen cutting: |            |             |                              |
| Light           | Under 1    | Under 25    | 3                            |
| Medium          | 1-6        | 25-50       | 4                            |
| Heavy           | Over 6     | Over 150    | 5                            |







Respirators shall be used in the following circumstances:

- Where exposure levels exceed the PEL, during the time period necessary to install or implement feasible engineering and work practice controls;
- In those maintenance and repair activities and during those brief or intermittent operations where exposures exceed the PEL and engineering and work practice controls are not feasible or are not required;
- In regulated areas; Where the employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL;
- In emergencies.

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### **Torso Protection**

Many hazards can threaten the torso: heat, splashes from hot metals and liquids, impacts, cuts, acids, and radiation. A variety of protective clothing is available: vests, jackets, aprons, coveralls, and full body suits.

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### **Selection**

Wool and specially treated cotton are two natural fibers that are fire-resistant and comfortable since they adapt well to changing workplace temperatures.

Duck, a closely woven cotton fabric, is good for light-duty protective clothing. It can protect against cuts and bruises on jobs where employees handle heavy, sharp, or rough material.

Heat-resistant material, such as leather, is often used in protective clothing to guard against dry heat and flame. Rubber and rubberized fabrics, neoprene, and plastics give protection against some acids and chemicals.

It is important to refer to the manufacturers' selection guides for the effectiveness of specific materials against specific chemicals.

Disposable suits of plasticlike or other similar synthetic material are particularly important for protection from dusty materials or materials that can splash. If the substance is extremely toxic, a completely enclosed chemical suit may be necessary. The clothing should be inspected to ensure proper fit and function for continued protection.

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### **Arm and Hand Protection**

Examples of injuries to arms and hands are burns, cuts, electrical shock, amputation, and absorption of chemicals.

There is a wide assortment of gloves, hand pads, sleeves, and wristlets for protection against various hazardous situations.







The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

- Management commitment and employee involvement;
- Worksite analysis;
- Hazard prevention and control; and
- Safety and health training.

The guidelines recommend specific actions, under each of these general elements, to achieve an effective safety and health program. A single free copy of the guidelines can be obtained from U.S. Department of Labor, OSHA/OSHA Publications, P.O. Box 37535, Washington DC 20210 by sending a self-addressed mail label with your request.

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## References

U.S. Department of Labor. Bureau of Labor Statistics. Accidents Involving Head Injuries. Report 605. Washington, DC: U.S. Government Printing Office, July 1980. 17 Pp.

Accidents Involving Eye Injuries. Report 597. Washington, DC: U.S. Government Printing Office, April 1980. 23 Pp.

Accidents Involving Face Injuries. Report 604. Washington, DC: U.S. Government Printing Office, May 1980. 20 Pp.

Accidents Involving Foot Injuries. Report 626. Washington, DC: U.S. Government Printing Office, January 1981. 22 Pp.

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# Legal News

## Personal Protective Equipment

### **OSHA to Change Rule Rather Than Appeal Commission Decision on Employer Payment**

**T**he Occupational Safety and Health Administration has decided to let stand a ruling that employers are not required to pay for personal protective equipment under 29 CFR 1910.132(a), the agency announced Dec. 15 (*Secretary of Labor v. Union Tank Car Co.*, OS-HRC, No. 96-0563, decision not to appeal 12/15/97).

The Occupational Safety and Health Review Commission ruled Oct. 16 in *Secretary of Labor v. Union Tank Car Co.* that employers are not responsible for paying for the cost of personal protective equipment (18 OSHC 1067). The language of the regulation—which requires only that such equipment be “provided,” not “paid for”—coupled with OSHA’s failure to clarify the employer’s duty in rulemaking and years of directives led to the commission’s decision.

Rather than engage in more litigation, OSHA will address the issue through “administrative action including rulemaking,” the agency said. In the press release, OSHA Administrator Charles N. Jeffress said that the agency will also “revise its policy directive to make clear that we expect employers to pay for protective equipment that is not uniquely personal in nature and that employees must use to perform their jobs safely. We will proceed as quickly as possible to amend our standard so there will be no further question from OS-HRC on the subject.”

Both unions and employers were stunned by the *Union Tank* decision (27 OSHR 836). Since a policy directive in 1995 instructed employers that they were obligated to pay for non-personal PPE, many employers and employees assumed that employer payment for the equipment was required.

Many employers will continue to pay for equipment in spite of *Union Tank*, management attorneys told BNA, because supplying equipment is the only way to make sure the equipment meets the standard’s requirements.

OSHA spokesman Stephen Gaskill told BNA Dec. 16 that the agency has no time frame for revising the directive or issuing a new rule.

BY CYNTHIA OMBERG

From *The National Bureau of National Affairs, Inc.*, Washington, D.C., OSHR, Vol. 27, No. 29, p. 1048.

# News

United States Department of Labor

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Office of Information      Washington, D.C. 20210

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Occupational Safety and Health  
Administration

USDL: 94-520

CONTACT: Frank Kane  
OFFICE: (202) 219-8151

FOR RELEASE: Immediate  
Thursday, Oct. 20, 1994

## OSHA CLARIFIES OBLIGATION OF EMPLOYERS TO PAY FOR PERSONAL PROTECTIVE EQUIPMENT

The Occupational Safety and Health Administration (OSHA) today clarified its position that employers, in most cases, must provide and pay for workers' personal protective equipment (PPE).

In a compliance memorandum sent to field offices, OSHA noted that its general PPE standard, as well as specific standards, should be interpreted to require employers to provide and pay for personal protective equipment required by the company to do his or her job safely and in compliance with OSHA standards.

If the equipment is very personal in nature and is usable by the workers off the job, the matter of payment may be left to labor-management negotiations.

Examples of personal protective equipment that would not normally be used away from the worksite include, but are not limited to, welding gloves, wire mesh gloves, respirators, hard hats, specialty glasses and goggles (such as those designed for laser or ultraviolet radiation protection), specialty foot protection (such as metatarsal shoes and linemen's shoes with built-in gaffs, face shields and rubber gloves, blankets, cover-ups, hot sticks and other live-line tools used by power generation workers.

Examples of personal protective equipment that is personal in nature and often used away from the worksite include non-specialty safety glasses, safety shoes and cold-weather outerwear of the type worn by construction workers. However, shoes or outerwear subject to contamination by carcinogens or other toxic or hazardous substances which cannot be safely worn off-site must be paid for by the employer.

Failure of the employer to pay for PPE that is not personal and not used away from the job is a violation of OSHA standards and shall be cited, the memorandum noted.

Compliance officers were advised to evaluate carefully assertions by employers that particular items of personal protective equipment should be paid for by employees.

The memorandum noted that the PPE standard does make an exception to allow employees to provide their own equipment to accommodate work situations in which it is customary for workers in a particular trade to provide their own PPE. But the standard does not specify that practice as the norm. Instead, the standard underscores the employer's obligation to ensure that such equipment is adequate and that it is properly maintained.

# # #

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The text of this news release is available from the Department of Labor electronic bulletin board, LABOR NEWS, at 202-219-4784. Callers must pay any toll-call charges. 300, 1200, 2400, 9600 or 14,400 BAUD; Parity: None; Data Bits = 8; Stop Bit = 1; Voice phone: 202-219-8831.

Information on this news release will be made available to sensory impaired individuals upon request. Voice phone: 202-219-8151.



## **One Hour Safety Presentation**

## One Hour Safety Presentation

The main goal of the Division of Safety & Hygiene is the reduction of accidents and illnesses in the workplace. Toward this goal, the One Hour Safety presentation is designed to support the delivery of a presentation to co-workers in your workplace to help them understand and promote safer and healthier work environments. It is recommended that you take the DSH Training Center course as a background for using One Hour Safety Presentation to train others at your workplace. Call 1-800-OHIOBWC, option 2, 2, 2 for class dates and locations.

The One Hour Safety Presentation contains:

- Transparency Masters from which films can be made to use on an overhead projector,
- Instructor Notes which gives the instructor suggestions and script notations to use during the presentation, and
- Student Handouts which can be copied for those attending the presentation.

Materials are included for a one-hour presentation on each of these topics:

- ✓ Accident Analysis
- ✓ Bloodborne Pathogens
- ✓ Effective Safety Teams
- ✓ Enhancing Safety through a Drug-Free Workplace
- ✓ Ergonomics Basic Principles
- ✓ Ergonomics Developing an Effective Process
- ✓ Hazard Communication
- ✓ Lockout/Tagout and Safety-related Work Practices
- ✓ Machine Guarding Basics
- ✓ Measuring Safety Performance
- ✓ Powered Industrial Trucks Training Program
- ✓ Respiratory Protection
- ✓ Violence in the Workplace

Applications used:

- 1) Text documents (ending in .txt) can be opened with any word processing program.
- 2) Microsoft PowerPoint slides (ending in .ppt) can be opened with the Microsoft PowerPoint program. If you do not have PowerPoint and you do have Windows 95, 98, 2000 or Windows NT operating system, you can view the PowerPoint slides by downloading a free PowerPoint Viewer from the following website:  
<http://office.microsoft.com/downloads/default.aspx?Product=PowerPoint&Version=95|97|98|2000|2002&Type=Converter|Viewer>
- 3) Adobe Reader document (ending in .pdf) contains the One Hour Safety Presentation in read-only format. It can be opened when you download Adobe Reader, which is available free of charge at the following website:  
<http://www.adobe.com/products/acrobat/readstep2.html>

If you have comments or questions about these materials for One Hour Safety Presentation, please e-mail us: [OCOSHTrng@bwc.state.oh.us](mailto:OCOSHTrng@bwc.state.oh.us)

# Transparency Masters

# Personal Protective Equipment

- ◆ Workplace assessments
- ◆ Criteria for selection
- ◆ Proper use, care, and maintenance



# Hierarchy of controls

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- ◆ Engineering controls
- ◆ Administrative controls
- ◆ PPE



# PPE Hazard Assessment Categories

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- ◆ Impact (falling objects or potential for dropping objects)
- ◆ Penetration
- ◆ Compression
- ◆ Chemical
- ◆ Heat/cold
- ◆ Abrasion
- ◆ Harmful dust
- ◆ Light (optical) radiation



# Overview of topics

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- ◆ Head protection
- ◆ Eye & face protection
- ◆ Hearing protection
- ◆ Hand protection
- ◆ Foot protection
- ◆ Whole body protection



# Types of Head Protection

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- ◆ Type 1 - Helmets have full brims
- ◆ Type 2 - Helmets have peak but no brim
- ◆ Class A - Reduce impact, low voltage electrical protection
- ◆ Class B - Reduce impact, high voltage electrical protection
- ◆ Class C - Reduce impact, no electrical protection



# Eye & Face Protection

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- ◆ Eye protection - Safety glasses and goggles
- ◆ Face protection - Faceshields
- ◆ Welding protection - Faceshields and goggles



# Hearing Protection: When is it needed?

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- ◆ Must be provided to employees exposed at or above

85 dBA (8hr TWA)

- ◆ Must be worn by all employees exposed at or above

90 dBA (8hr TWA)



# Hand Protection

## CFR 29 1910.138

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- ◆ Chemical absorption and burns
- ◆ Cuts, abrasion, and punctures
- ◆ Thermal burns and temperature extremes



# Foot Protection

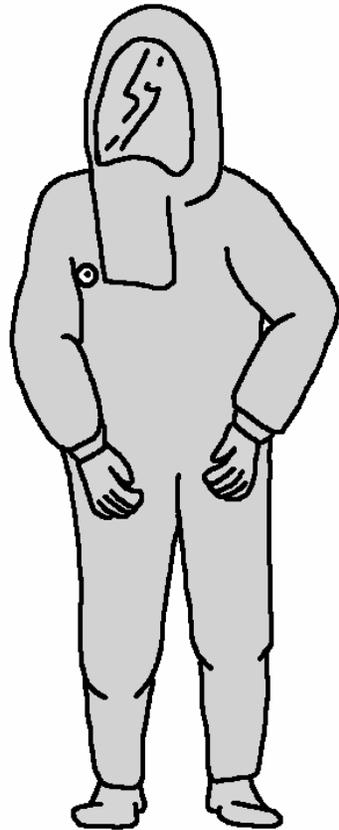
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- ◆ Toe box impact resistance
- ◆ Toe box compression resistance
- ◆ Metatarsal protection when required
- ◆ Electrical protection
- ◆ Sole puncture resistance
- ◆ Static dissipative footwear



# Whole Body Protection

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- ◆ Handling chemicals
- ◆ Hot materials
- ◆ Welding
- ◆ General
- ◆ Heat stress
- ◆ Cold stress



# General Body Protection

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## ◆ Hazards

Skin cancer

Cuts

Abrasions

Sunburn

Frostbite

Insects

## ◆ Prevention

Long pants

Shirts

Sunscreen

Repellent

Barrier creams



# In conclusion....

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- ◆ The EMPLOYER is responsible for:
  - Completing a PPE assessment for each employee, and
  - Providing PPE to employees, except for prescription glasses and some types of footwear.
- ◆ The EMPLOYEE is responsible for:
  - Making the employer aware of their needs, and
  - Using and maintaining PPE properly.



# Instructor Notes

## Personal Protective Equipment

- ◆ Workplace assessments
- ◆ Criteria for selection
- ◆ Proper use, care, and maintenance

## Hierarchy of controls

---

- ◆ Engineering controls
- ◆ Administrative controls
- ◆ PPE

The first choice is always to redesign or re-engineer the work process so as to eliminate the hazard. If there are hazardous substance, **replace it with a less hazardous one or eliminate it altogether.**

The second choice is to use administrative controls, **such as assigning two or more personnel to the hazardous process or exposure thereby exposing them to acceptable levels based upon an 8 hour TWA**

**PPE should only be considered when engineering and administrative controls are unworkable or impractical.**

# PPE Hazard Assessment Categories

---

- ◆ Impact (falling objects or potential for dropping objects)
- ◆ Penetration
- ◆ Compression
- ◆ Chemical
- ◆ Heat/cold
- ◆ Abrasion
- ◆ Harmful dust
- ◆ Light (optical) radiation

An assessment or walk-through survey is done for each segment of the work process for the purpose of recognizing real and/or potential hazards, which may result in the use of PPE.

## **Job Hazard analysis**

- ◆ Assign competent, responsible persons
- ◆ Obtain written job descriptions
- ◆ Assemble relevant MSDS
- ◆ Assemble relevant injury and accident reports
- ◆ Observe tasks and note hazards

# Overview of topics

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- ◆ Head protection
- ◆ Eye & face protection
- ◆ Hearing protection
- ◆ Hand protection
- ◆ Foot protection
- ◆ Whole body protection

# Types of Head Protection

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- ◆ Type 1 - Helmets have full brims
- ◆ Type 2 - Helmets have peak but no brim
- ◆ Class A - Reduce impact, low voltage electrical protection
- ◆ Class B - Reduce impact, high voltage electrical protection
- ◆ Class C - Reduce impact, no electrical protection

## **Helmet selection criteria**

- ◆ Degree of hazard
- ◆ Type of hazard
- ◆ Chemicals to which the helmet might be exposed
- ◆ Electrical hazards
- ◆ Protective devices that may be attached
- ◆ Any other job or site specific hazard

## **Conditions to avoid**

- ◆ Wearing backwards without reason
- ◆ Wearing backwards without reversing suspension
- ◆ Wearing unapproved headgear underneath
- ◆ Painting the helmet
- ◆ Altering suspension or shell

## **Inspection**

- ◆ Before use
- ◆ After served their purpose
- ◆ Check suspension
- ◆ Check shell for cracks, dents or breaks

## **Maintenance**

- ◆ Clean with mild detergent and clean water
- ◆ No solvents
- ◆ Discard if shell is defective
- ◆ Replace suspension if defective

# Eye & Face Protection

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- ◆ Eye protection - Safety glasses and goggles
- ◆ Face protection - Faceshields
- ◆ Welding protection - Faceshields and goggles

## **Eye protection requirements**

- ◆ Frame impact
- ◆ Lens impact
- ◆ Lens penetrability
- ◆ Optical acuity
- ◆ Flammability and corrosion resistance
- ◆ Cleanability

## **Face protection requirements**

- ◆ Impact resistance
- ◆ Penetrability
- ◆ Optical acuity
- ◆ Haze
- ◆ Transmittance
- ◆ Flammability and corrosion resistance
- ◆ Cleanability

## **Welding: Faceshields and Goggles**

- ◆ Must meet all criteria for eye protection devices plus light tightness

Selection of eye and face protection

- ◆ Several styles should be available
- ◆ Suited for the job to be performed
- ◆ Welding - proper shade for materials and type of welding
- ◆ Safety sunglasses and photochromatic lenses - if no hazard created
- ◆ Special hazards - special protection

## **Inspection & Maintenance**

- ◆ Prior to each use
- ◆ Check frames or headband
- ◆ Check lenses or faceshield
- ◆ Welding - check tint
- ◆ Protect from damage
- ◆ Keep clean

## Hearing Protection: When is it needed?

---

- ◆ Must be provided to employees exposed at or above  
85 dBA (8hr TWA)
- ◆ Must be worn by all employees exposed at or above  
90 dBA (8hr TWA)

### **Hearing protection attenuation**

- ◆ Defined as the reduction of sound pressure levels
- ◆ NRR = Noise Reduction Rating

### **Noise reduction rating**

- ◆ Will be displayed on the packaging of hearing protection
- ◆ NRR's used to estimate attenuation of hearing protection
- ◆ Appendix B 1910.95

### **Attenuation criteria**

- ◆ All hearing protection must reduce exposures to at least an 8hr TWA of 90 dBA
- ◆ For employees with a Standard Threshold Shift, exposures must be reduced to an 8hr TWA of 85 dBA or less

### **Types of hearing protection**

- ◆ Ear Plugs
- ◆ Semi-aural Devices
- ◆ Ear Muffs

### **Hearing protectors**

- ◆ Available in many types and sizes
  - premolded
  - formable
  - custom-molded
- ◆ Employees must be given a variety of types and sizes to choose from

### **Use & care**

- ◆ All hearing protection must be initially fit when dispensed
- ◆ Inspect hearing protection prior to use for degradation, missing parts, and cleanliness

### **Cleaning hearing protection**

- ◆ Most hearing protectors are designed to be disposable, so for re-usable types:
- ◆ Most may be cleaned with a mild soap solution; allow to completely dry before re-using
- ◆ Ear muffs may be surfaced cleaned with mild soap and water

# Hand Protection

## CFR 29 1910.138

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- ◆ Chemical absorption and burns
- ◆ Cuts, abrasion, and punctures
- ◆ Thermal burns and temperature extremes

### **MSDS review**

- ◆ Note chemicals listing skin as target organ
- ◆ Watch for 'skin' notation in ingredients list
- ◆ Note terms such as irritation, defatting, caustic, dermatitis, dermatoses
- ◆ Red flags: acids, bases, solvents

### **Accident & injury review**

- ◆ Analyze 300 log
- ◆ Review relevant BWC FROI and/or OSHA 101 forms
- ◆ Review in-house accident investigation forms
- ◆ Review first aid logs
- ◆ Analyze comp costs from BWC MREE

### **Observation of tasks for chemical hazards**

- ◆ Do hands come into contact with chemicals which may harm or penetrate the skin?
- ◆ Are there residual chemicals present on parts or materials as a result of prior processes?
- ◆ Is skin contact with chemicals prolonged or repeated?

### **Observation of tasks for physical hazards**

- ◆ Are parts/materials/tools:
  - hot or cold, potentially causing discomfort or injury?
  - have sharp or pointed edges which may cause cuts or punctures in skin or gloves?
  - rough or abrasive?
  - slippery or awkward to handle?
  - moving when hand contact occurs?
- ◆ Is compressed air used in the process?

# Foot Protection

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- ◆ Toe box impact resistance
- ◆ Toe box compression resistance
- ◆ Metatarsal protection when required
- ◆ Electrical protection
- ◆ Sole puncture resistance
- ◆ Static dissipative footwear

## **Labeling of footwear**

### ◆ Female shoe

Impact and compression protection  
ANSI Z41 PT91  
F I/75 C/50

### ◆ Male shoe

Impact and compression protection with puncture resistance  
ANSI Z41 PT91  
M I/75 C/50  
PR

## **Selection**

Type of work  
Presence of hot materials  
Potential for sole penetration  
Need for electrical protection  
Need to dissipate static  
Presence of chemicals

## **Inspection & maintenance**

Inspection - prior to use, especially critical if footwear offers electrical protection  
Maintenance - Per manufacturers recommendations  
Note: Employer not required to provide

# Whole Body Protection

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- ◆ Handling chemicals
- ◆ Hot materials
- ◆ Welding
- ◆ General
- ◆ Heat stress
- ◆ Cold stress

## **Handling chemicals**

- ◆ Chemical suits
- ◆ Aprons
- ◆ Gloves
- ◆ Boots
- ◆ Respirators
- ◆ Face and eye protection

## **Hot materials**

- ◆ Natural fibers
- ◆ Long sleeves
- ◆ Long pants
- ◆ Leather shoes
- ◆ Gloves
- ◆ Aprons

## **Welding**

- ◆ Aprons
- ◆ Gloves
- ◆ Sleeves
- ◆ Leather jackets
- ◆ Natural fibers
- ◆ Long pants
- ◆ Leather shoes

# General Body Protection

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## ◆ Hazards

Skin cancer  
Cuts  
Abrasions  
Sunburn  
Frostbite  
Insects

## ◆ Prevention

Long pants  
Shirts  
Sunscreen  
Repellent  
Barrier creams

### **Heat stress**

- ◆ Proper clothing
- ◆ Water
- ◆ Acclimatization
- ◆ Diet
- ◆ Symptom Recognition
- ◆ No alcohol

### **Cold stress**

- ◆ Proper clothing
- ◆ Diet
- ◆ Acclimatization
- ◆ Symptom recognition
- ◆ Stay dry
- ◆ No alcohol

### **Inspection**

- ◆ Articles designed as PPE should be inspected in accordance with manufacturers specification
- ◆ Other articles should be inspected for appropriateness to the situation

### **Maintenance**

- ◆ Maintenance of items of PPE should be accomplished in accordance with manufacturers recommendations
- ◆ Articles of personal clothing should be cleaned frequently to remove irritating or dangerous substances and allow the clothing to perform it's function

## In conclusion....

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# Student Handouts

## Personal Protective Equipment

- ◆ Workplace assessments
- ◆ Criteria for selection
- ◆ Proper use, care, and maintenance

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## Hierarchy of controls

- ◆ Engineering controls
- ◆ Administrative controls
- ◆ PPE

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When is it needed?**

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**Hand Protection  
CFR 29 1910.138**

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- ◆ Chemical absorption and burns
- ◆ Cuts, abrasion, and punctures
- ◆ Thermal burns and temperature extremes

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**Foot Protection**

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- ◆ Toe box impact resistance
- ◆ Toe box compression resistance
- ◆ Metatarsal protection when required
- ◆ Electrical protection
- ◆ Sole puncture resistance
- ◆ Static dissipative footwear

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## Whole Body Protection



- ◆ Handling chemicals
- ◆ Hot materials
- ◆ Welding
- ◆ General
- ◆ Heat stress
- ◆ Cold stress

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## General Body Protection

- | ◆ Hazards   | ◆ Prevention   |
|-------------|----------------|
| Skin cancer | Long pants     |
| Cuts        | Shirts         |
| Abrasions   | Sunscreen      |
| Sunburn     | Repellent      |
| Frostbite   | Barrier creams |
| Insects     |                |

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