



# Personal Protective Equipment (PPE)

OSHA requires the use of personal protective equipment (PPE) to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. Employers are required to determine if PPE should be used to protect their workers.

If PPE is to be used, a PPE program should be implemented. This program should address the hazards present; the selection, maintenance and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness.

## Applicable standards

General Industry (29 CFR 1910)

- 1910 Subpart G, Occupational health and environment control
  - 1910.94, Ventilation
  - 1910.95, Occupational noise exposure
- 1910 Subpart H, Hazardous materials
  - 1910.120, Hazardous waste operations and emergency response
- 1910 Subpart I, Personal protective equipment

- 1910.132, General requirements
- 1910.133, Eye and face protection
- 1910.134, Respiratory protection
- 1910.135, Head protection
- 1910.136, Occupational foot protection
- 1910.137, Electrical protective devices
- 1910.138, Hand protection
- Appendix A, References for further information (Non-mandatory)
- Appendix B, Non-mandatory compliance guidelines for hazard assessment and personal protective equipment selection
- 1910 Subpart J, General environmental controls
  - 1910.146, Permit-required confined spaces
- 1910 Subpart Q, Welding, cutting, and brazing
  - 1910.252, General requirements
- 1910 Subpart Z, Toxic and hazardous substances

The Occupational Safety and Health Administration (OSHA) requires that employers protect their employees from workplace hazards that can cause injury. Controlling a hazard at its source is the



best way to protect employees. Depending on the hazard or workplace conditions, OSHA recommends the use of engineering or work practice controls to manage or eliminate hazards to the greatest extent possible. When engineering, work practice and administrative controls are not feasible or do not provide sufficient protection, employers must provide PPE to their employees and ensure its use.

To ensure the greatest possible protection for employees in the workplace, the cooperative efforts of both employers and employees will help in establishing and maintaining a safe and healthful work environment.

In general, employers are responsible for:

- Performing a “hazard assessment” of the workplace to identify and control physical and health hazards
- Identifying and providing appropriate PPE for employees
- Training employees in the use and care of the PPE
- Maintaining PPE, including replacing worn or damaged PPE
- Periodically reviewing, updating and evaluating the effectiveness of the PPE program

In general, employees should:

- Properly wear PPE
- Attend training sessions on PPE
- Care for, clean and maintain PPE
- Inform a supervisor of the need to repair or replace PPE

### **The hazard assessment**

Employers should identify physical and health hazards in the workplace. The hazard assessment should begin with a walk-through survey of the facility to develop a list of potential hazards in the following basic hazard categories:

- Impact
- Penetration
- Compression (roll-over)
- Chemical
- Heat/cold
- Harmful dust
- Light (optical) radiation
- Biological

Documentation of the hazard assessment is required through a written certification that includes the following information:

- Identification of the workplace evaluated
- Name of the person conducting the assessment
- Date of the assessment
- Identification of the document certifying completion of the hazard assessment

### **Training employees**

Employers are required to train each employee who must use PPE. Employees must be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary
- How to properly put on, take off, adjust and wear the PPE
- The limitations of the PPE
- Proper care, maintenance, useful life and disposal of PPE

Employers should make sure that each employee demonstrates an understanding of the PPE training as well as the ability to properly wear and use PPE before being allowed to perform work requiring the use of the PPE.

### **Eye protection**

OSHA requires employers to ensure that employees have appropriate eye or face protection if they are exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially infected material, or potentially harmful light radiation.

Examples of potential eye or face injuries include:

- Dust, dirt, metal or wood chips entering the eye from activities such as chipping, grinding, sawing, hammering, the use of power tools or even strong wind forces
- Chemical splashes from corrosive substances, hot liquids, solvents or other hazardous solutions
- Objects swinging into the eye or face such as tree limbs, chains, tools or ropes
- Radiant energy from welding, harmful rays from the use of lasers or other radiant light (as well as heat, glare, sparks, splash and flying particles)

Some of the most common types of eye and face protection include the following:

- Safety spectacles. These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side shields are available on some models.

- Goggles. These are tight-fitting eye protection that completely cover the eyes, eye sockets and the facial area immediately surrounding the eyes and provide protection from impact, dust and splashes. Some goggles will fit over corrective lenses.
- Welding shields. Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect the eyes and face from flying sparks, metal spatter and slag chips produced during welding, brazing, soldering and cutting operations. OSHA requires filter lenses to have a shade number appropriate to protect against the specific hazards of the work being performed in order to protect against harmful light radiation.
- Face shields. These transparent sheets of plastic extend from the eyebrows to below the chin and across the entire width of the employee's head. Some are polarized for glare protection. Face shields protect against nuisance dusts and potential splashes or sprays of hazardous liquids but will not provide adequate protection against impact hazards. Face shields used in combination with goggles or safety spectacles will provide additional protection against impact hazards.

### **Head protection**

Employers must ensure that their employees wear head protection if any of the following apply:

- Objects might fall from above and strike them on the head
- They might bump their heads against fixed objects, such as exposed pipes or beams
- There is a possibility of accidental head contact with electrical hazards

Hard hats are divided into three industrial classes:

- Class G hard hats provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts).
- Class E hard hats provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects.
- Class C hard hats provide lightweight comfort and impact protection but offer no protection from electrical hazards.

### **Foot and leg protection**

Examples of situations in which an employee should wear foot and/or leg protection include:

- When heavy objects such as barrels or tools might roll onto or fall on the employee's feet
- Working with sharp objects such as nails or spikes that could pierce the soles or uppers of ordinary shoes
- Exposure to molten metal that might splash on feet or legs
- Working on or around hot, wet or slippery surfaces
- Working when electrical hazards are present

Safety footwear must meet ANSI minimum compression and impact performance standards in ANSI Z41-1991

### **Hand and arm protection**

If a workplace hazard assessment reveals that employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, employers must ensure that employees wear appropriate protection.

### **Hearing protection**

Employee exposure to excessive noise depends upon a number of factors, including:

- The loudness of the noise as measured in decibels (dB)
- The duration of each employee's exposure to the noise
- Whether employees move between work areas with different noise levels
- Whether noise is generated from one or multiple sources

For a more detailed discussion of the requirements for a comprehensive hearing conservation program, see OSHA Publication 3074 (2002), "Hearing Conservation," or refer to the OSHA Standard at 29 CFR 1910.95, Occupational Noise Exposure, section (c).

Permissible noise exposures:

Duration per day, in hours	Sound level in dB*
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110

Minimum PPE required at a precast concrete plant:

- Safety shoes/boots
- Safety glasses
- Hard hats
- Gloves
- Hearing protection

## Chapter 5 – Summary

Employers must protect their employees from any and all hazards that are present or created in the work environment.

*If ...* the machine or work environment can be physically changed to prevent employee exposure to the potential hazard,

*Then ...* the hazard can be eliminated with an engineering control.

*If ...* employees can be removed from exposure to the potential hazard by changing the way they do their jobs,  
*Then ...* the hazard can be eliminated with a work practice control.

### **Employees required to use PPE must be trained to know:**

- When PPE is necessary
- What type of PPE is necessary
- How to properly put on, take off, adjust and wear
- Limitations of the PPE
- Proper care, maintenance, useful life and disposal

### **Eye protection consists of:**

- Safety glasses
- Goggles
- Welding helmets
- Face shields

### **Head Injuries are caused by:**

- Falling objects
- Bumping head against fixed objects
- Contact with exposed electrical conductors

### **Classes of hard hats**

- Class G – General service: Good impact protection but limited voltage protection
- Class E: Protect against falling objects and high-voltage shock and burns
- Class C: Designed for comfort, offer limited protection

### **Hearing Protection must be worn when:**

- Employees are exposed to noise greater than 85 decibels over an eight-hour period
- Vibrating concrete

### **Hazards for foot protection**

- Heavy objects, such as barrels or tools that might roll onto or fall on employees' feet
- Sharp objects, such as nails or spikes that might pierce the soles or uppers of ordinary shoes
- Pieces of concrete
- Hot or wet surfaces
- Slippery surfaces

### **Employers must implement a PPE program where they:**

- Assess the workplace for hazards
- Use engineering and work practice controls to eliminate or reduce hazards before using PPE

- Select appropriate PPE to protect employees from hazards that cannot be eliminated
- Inform employees why the PPE is necessary and when it must be worn
- Train employees how to use and care for their PPE and how to recognize deterioration and failure
- Require employees to wear selected PPE in the workplace