Personal Protective Equipment
Introduction

The following summarizes some of the key points of MIOSHA Part 33 (R408.13301-R408.13398). You should refer to the standard for more detailed information.

Management Responsibilities

Your first step when implementing an effective personal protective equipment (PPE) program should be a comprehensive evaluation of the equipment your employees might need to protect themselves against hazards in the workplace. Your assessment should:

- Help you understand your employees' responsibilities and the hazards they face.
- Help you determine what types of PPE to provide and to understand their limitations in protecting employees.
- Result in the development of a standard operating procedure (SOP). Your training program on personal protective equipment should include instruction on the SOP.

Ideally, engineering controls and procedural safeguards will be the first step in protecting your employees. PPE should be the last step. PPE does not eliminate hazards. It only provides a barrier between the worker and hazard. If the employee removes the equipment or the equipment fails, the employee is at risk. You must make sure that:

- Equipment fits properly.
- Your employees know how to inspect PPE for defects and how to maintain it in a clean and serviceable condition.
- Provide training so employees understand the equipment's purpose and limitations. Always document training.

You have an obligation to provide PPE at no cost to employees. Where the equipment is personal in nature and usable by the worker off the job, the matter of payment is negotiable.

Hazard Assessment

MIOSHA requires you to assess the workplace to determine if hazards that would require the use of PPE are present or are likely to be present. The assessment should record:

- The workstation and/or job classification
- The potential hazards
- The body part affected
- A determination of whether PPE is necessary, and, if so, what type.

Hazard Assessment Certification

You must maintain records that certify that you or a designated employee has completed the assessment. "Certification" means that you have a form on which you record the following information:

- Name and address of the workplace where the evaluation took place.
- The name of the person certifying that the assessment is complete.
- The date on which the employer or his designate completed the assessment.

Training

The MIOSHA standard requires you to train your employees before requiring them to use PPE. Training should cover:

- When to use PPE

- What type of PPE is necessary
- How to wear required PPE properly
- The limits of PPE
- Proper care, useful life, and disposal of PPE

Always maintain accurate records of the training you provide and have some means of documenting how well employees have understood the training. You training records should contain:

- The name of the employees trained
- The date of the training
- The subject(s) covered (that is, safety glasses, safety boots, hard hats)

You must retrain employees if:

- There are changes in the workplace or an employee changes job assignments
- There are changes in personal protective equipment
- When employees demonstrate inadequate knowledge or use of PPE.

Hazard Identification and Selection of PPE

The following summarizes the key points of MIOSHA's requirements for PPE in General Industry.

Head Protection

Hazards

A survey by the US Bureau of Labor Statistics (BLS) in 1994 revealed that most workers who suffered impact injuries to the head were not wearing head protection. Most were performing their normal job when the injury occurred.

You should look for the following hazards as you conduct their workplace assessment:

- Bump contact
- Overhead falling objects
- Side flying projectiles
- Electrical contact
- Hair entanglement. This may occur if employees whose hair is loose work around or near rotating machinery such as drill presses. To limit the potential for this type of injury, you should require employees to contain their hair by a hat, cap or net.

Providing Protection

If you identify the existence of or potential for head hazards, you must provide your employees with head protection. The protective hats must:

- Resist penetration
- Absorb the shock of blow

Protective hats protect the wearer from electrical shock. Refer to the current American National Standards Institute (ANSI) Standard to make sure your protective hats meet with current requirements.

Protective headwear that meets MIOSHA standards is made of water-resistant and slow burning material. Each helmet consists essentially of a shell and suspension. A space between the headband and the shell provides ventilation. Instructions should come with each helmet that explains the proper method of adjusting and replacing the suspension and headband.

NOTE:

Firefighter's head protection must consist of a protective head device with ear flaps and a chin strap that meet specific performance, construction, and testing requirements. For additional information, refer to MIOSHA PART 74 (R408.17434).

Fit

You should provide training so that your employees know how to adjust their head protection properly. Headbands are adjustable in 1/8-size increments. When the user adjusts the headband to the right size, there should be sufficient clearance between the shell and the headband.

Inspection and Maintenance

If your employees will wear hats or helmets while using paint or cleaning agents, consult with the manufacturer. Some paints and thinners may damage the shell and reduce protection by physically weakening or negating electrical resistance.

Users should keep their head protection clean. The most common method of cleaning shells is dipping them in hot water (approximately 140 degrees Fahrenheit) containing a good detergent for at least one minute. Users may then scrub the shells and rinse them in clean hot water.

Users should inspect their helmets daily after cleaning them. They should check all components, shells, suspensions, headbands, sweatbands, and any accessories daily for signs of dents, cracks, penetration, or any other damage that might reduce the degree of safety originally provided.

Users should not store or carry protective headwear on the rear-window shelf of an automobile for two reasons. First sunlight and extreme heat may adversely affect the degree of protection. Second, the helmets could become flying projectiles.

Eye and Face Protection

Hazards

The US Bureau of Labor Statistics (BLS) Study found that about 60 percent of workers who suffered eye injuries were not wearing face protection. Employers must provide suitable eye protection where there is a potential for injury to the eye or face from the following:

- Flying particles,
- Molten metal,
- Liquid chemicals, acids or caustic liquids,
- Chemical gases or vapors,
- Potentially injurious light or heat radiation or a combination of these.

Look for the existence of the following conditions when you assess your workplaces for possible eye hazards:

- Frontal and side impact
- Electrical arc
- Molten metal
- Chemical splash
- Injurious light radiation
- Suspended particles
- Extreme hot/cold splash

Providing Eye Protection

The design of type of each eye, face or face-and-eye protection targets a particular hazard. Therefore, you should consider the kind and degree of hazard and select the protection accordingly.

Protection must meet the following minimum requirements. It must:

- Adequately protect against the specific hazards for which it is designed.
- Be reasonably comfortable when worn under the designated conditions. It must fit snugly and not interfere with the wearer's vision or movements. It must be durable.
- Be capable of being disinfected and be easily cleaned.
- Be kept clean and in good repair.

MIOSHA requires that every face and eye protector have the manufacturer's name and ANSI rating clearly marked on it.

Persons using corrective spectacles and those whom MIOSHA requires to wear eye protection must wear face shields, goggles, or spectacles of one of the following types:

- Spectacles with protective lenses providing optical correction;
- Goggles worn over corrective spectacles without disturbing the adjustment of the spectacles; or
- Goggles that incorporate corrective lenses mounted behind the protective lenses.

Employers must inform employees who use eye, face, or face-and-eye protectors about any limitations or precautions that the manufacturer indicates. It is very important that the user observe any limitations.

Eye protection is available in many types and styles in order to meet the wide range of demands for protection in the workplace. Goggles also come in a number of different styles for specific uses such as protecting against dusts and splashes. They also come in models for chippers, welders and cutters.

Safety spectacles require special frames. Combinations of normal street wear frames with safety lenses are not acceptable.

Fit

You should assure that an individual skilled in fitting goggles and safety spectacles helps employees to achieve a proper fit. Only a qualified optical person should fit spectacles.

Inspection and Maintenance

Users must keep eye protection clean because dirty lenses can cause eyestrain. Your employees should inspect and clean their eye protection with soap and hot water or with a cleaning solution and tissue daily. They should look for deep scratches or excessive pitting. These can cause lenses to break more easily. They should also check the headband to make sure it has enough elasticity to hold the eyewear in the proper position.

Employees should keep goggles in a case when not in use. Since rough usage of prescription spectacles can damage the frame, nose pads, and temples, employees who wear them should care for them as they would for their own glasses.

You should:

- Make certain that replacement lenses are available when old ones become pitted.
- Disinfect previously used eye and/or face protection before issuing it to another employee.
- Store the dry parts or items in a clean, dust-proof container, such as a box, bag, or plastic envelope for protection until you reissue them.

If it is necessary to coat eye protection with an anti-fogging or other agent so that water beads and runs off quickly, check with the manufacturer to assure that the agent will not damage it or reduce protection.

Arm & Hand, Foot & Leg, Torso Protection

Arm and Hand Protection

Hazards

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

A recent BLS study found that seven of ten workers were not wearing hand protection at the time of the injury. About 60 percent worked in manufacturing processes. More than two out of every five workers received injuries while operating, maintaining, or repairing fixed machinery or equipment.

The study also revealed that the most common condition(s) leading to the injury were:

- Working at too fast a pace.
- Lack of worker's awareness that hands were in a hazardous area.
- Misjudged time and/or distance needed to avoid injury.

When you assess the workplace for arm and hand hazards, look for the following potential hazards:

- Skin absorption
- Severe abrasions
- Severe lacerations
- Thermal burns
- Extreme cold
- Puncture
- Chemical burns

Providing Skin, Arm, and Hand Protection

A wide assortment of gloves, hand pads, and wristlets is available for protection against various hazardous situations.

You must determine what hand protection employees will need after evaluating their activities. Other considerations are:

- The degree of dexterity employees need to perform job responsibilities,
- The duration, frequency, and degree of exposure to hazards, and
- The physical stresses of the job.

You need to select gloves--like other PPE -- to fit the job. Criteria for selection should be performance requirements, conditions, duration and hazards. For example, employees may need to use gloves--such as wire mesh, leather, and canvas--that tests have shown provide insulation from burns or cuts.

Certain occupations require special protection. For example, electricians and people working around electricity need special protection from shocks and burns.

Inspection and Maintenance

Employees should use and maintain gloves following the manufacturer's recommendations.

Employers must be aware of the "degradation" and "permeation" of the gloves they select. Degradation means the material is physically breaking down. Permeation refers to the ability of the chemical to penetrate the material without necessarily affecting the materials. Prompt decontamination of gloves after exposure to chemicals is necessary to reduce the effects of degradation and permeation. When decontamination of protective clothing is not possible, the organization should discard it.

Foot and Leg Protection

Hazards

The BLS found that most of the workers in selected occupations who suffered foot injuries were not wearing protective footwear. Furthermore, their employers did not require the use of foot protection.

Workers need foot and/or leg protection when there is a danger of failing or rolling objects, sharp objects, molten metal, hot surfaces, and wet slippery surfaces.

In assessing the workplace for foot hazards, look for the following potential hazards:

- Falling objects
- Rolling objects
- Electrical contact
- Sole puncture
- Wet slippery surfaces
- Molten metal
- Hot surfaces

Providing Foot and Leg Protection

Safety shoes should be sturdy and have an impact-resistant toe. Some shoes have metal insoles to protect against puncture wounds. Some types of footwear provide additional protection such as metatarsal guards. Safety shoes come in a variety of styles and materials, such as leather and rubber boots and oxfords.

Leggings protect the lower leg and feet from molten metal or welding sparks. Safety snaps permit their rapid removal.

Aluminum alloy, fiberglass, or galvanized steel foot guards are available for wear over work shoes. However the guard may catch on something, causing a worker to trip.

Heat-resistant soled shoes protect against hot surfaces such as those found in the roofing, paving, and hot metal industries.

Refer to the ANSI Standard for Men's Safety-Toe Footwear to determine if the protective footwear your employees use meets current requirements.

Inspection and Maintenance

Employees should receive training on inspecting foot and leg protection in accordance with manufacturer's recommendations to assure that continued protection is afforded.

Body Protection

Hazards

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

When assessing the workplace for torso hazards, look for these potential hazards:

- Chemical contact
- Splashes from dipping, plating, and other operations
- Thermal burns
- Extreme cold
- Severe lacerations

Providing Body (Torso) Protection

To guard against heat and flame, look for clothing of wool and specially treated cotton. These natural fibers are fire-resistant and comfortable since they adapt well to changing workplace temperatures. You should also consider heat-resistant material, such as leather, in protective clothing to guard against heat and flame.

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.

To guard against **chemical hazards**, you should request information from the manufacturers of protective clothing to determine if the protection is appropriate for the hazard(s) that you anticipate. You must determine the properties of the chemical(s) by consulting the Material Safety Data Sheet during the selection process.

Rubber and rubberized fabrics, neoprene, and plastics give protection against some acids and chemicals.

Disposable suits of plastic-like 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.

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

Inspection and Maintenance

Users should inspect clothing regularly to make sure of proper fit and function and for continued protection in accordance with manufacturer's recommendations.

Personal Protective Equipment Guide to Hazard Sources

Source		Type of Hazard	Protection
Impact	Chipping, grinding, machining, wood working, sawing, masonry work, drilling, turning, chiseling,	Flying fragments, objects, chips, turnings, and particles, grinding fines.	Safety glasses, side shields, face shields.

	sanding, etc.		
Light or Radiation	Welding, cutting, brazing, and torch soldering.	Optical Radiation	Welding goggles or shields with shades
Heat	Furnace operations	High temperature, hot sparks, molten metal	Face shields (reflective), arm sleeves, gloves, coat, leggings
Chemicals	Acid and chemical handling, fumes, degreasing, dipping, plating	Splash, irritating mists, direct contact	Gloves, chemical goggles, face shields, aprons, special shoes or boots
Falling Objects	Working in areas where potential for failing objects exists or bumping hazards	Steel receiving, heavy parts transfer, overhead conveyors for parts movement, or low ceilings or mechanisms	Hard hat, bump caps, safety shoes
Sharp Objects	Handling sharp edged parts, clearing turnings, objects which may pierce a foot or hand	deburring, removing turnings, assembling sharp parts	Special cut resistant gloves, penetration resistant shoes
Electrical	Direct or indirect contact with electricity	Electricity	Non-conductive safety shoes, hard hats, safety glasses, and gloves designed to reduce electrical shock and protect from sparks.

Types Of Personal Protective Equipment

Face and Eye	Welding Helmets	
Spectacles with No side shield Half side shield Full side shield Detachable side shield Non-removable lens Lift front Headband temple Cover goggles with No ventilation Indirect ventilation Face shield	Burning goggles Welding helmets with Stationary window Lift front window Hand held	Helmets by Type Type 1: Full brim 1.25" wide Type 2: No brim, forward peak Helmets by Class: **A** General service with limited voltage protection **B** Utility service with high voltage protection **C** Special service with no voltage protection **D** Firefighters full brim with ear flaps and chin strap Hair enclosures
Foot and Leg	Electrical*	Fall
Safety shoes or boots with Impact resistant toe Metal insoles Metatarsal guards Chemical resistance Electrical protection Cold weather protection Slip resistant soles Leggings Molten metal and welding	Insulating blankets Matting Covers Line hose Sleeves Gloves Hot stick * Must be capable of withstanding imposed voltage	Safety belts* Safety harness Lifelines Lanyards * No safety belts for fall protection after 1/1/98
Arm and Hand	Body Protection	
Types Gloves Hand pads Sleeves Wristlets	Types Vests Jackets Aprons Coveralls Full body suits	