



Department of Environmental Health & Safety

Personal Protective Equipment Program

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OHIO
UNIVERSITY

Environmental Health & Safety Department

PERSONAL PROTECTIVE EQUIPMENT

1.0 Purpose

1.1 Ohio University shall furnish to each of its employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to our employees. Each Ohio University employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to the Ohio Public Employee's Risk Reduction Program (PERRP) which are applicable to his/her own actions and conduct. Therefore, Ohio University shall ensure that personal protective equipment (PPE) for eyes, face, head, and extremities are provided, used, and maintained in a sanitary and reliable condition whenever it is necessary by reason of workplace hazard, which may cause injury or impairment of body function through absorption, inhalation or physical contact. This program defines the safety requirements as they pertain to personal protective equipment. Ohio University's PPE program is written to comply with the OSHA Personal Protective Equipment Standard 29 CFR §1910.132-139 Subpart I and PERRP.

2.0 Scope

2.1 This PPE program applies to all University personnel and visitors in applicable University facilities and /or University operations. PPE is designed to protect the employee from health and safety hazards that cannot practically be removed from the work environment. It is the last means of defense. It should be used only when the hazards cannot be eliminated through engineering and/or administrative controls.

3.0 Definitions

3.1 Eyewear/Facewear

3.1.1 Absorptive Lens a filter lens whose physical properties are designed to attenuate the effects of glare, reflective, and stray light. In this program, it refers to shades 1.7 through 3.0 in Table 1 (Section 9.0 Appendix A).

3.1.2 Face Shield a device worn in front of the eyes and a portion of, or all of, the face. Its main function is to protect the eyes and face.

3.1.3 Filter Lens a removable disc in the eyecup of a goggle that absorbs varying

proportions of ultraviolet, visible, and infrared rays according to the composition and density of the lens.

3.1.4 Filter Plate a removable pane in the window of a helmet, hood, or goggle that absorbs varying proportions of ultraviolet, visible, and infrared rays according to the composition and density of the plate.

3.1.5 Goggle a device, with contour-shaped eyecups or facial contact with glass or plastic lenses, worn over the eyes for the protection of the eyes and eye sockets.

3.1.6 Hood a device that completely covers the head, neck, and, portions of the shoulders.

3.1.7 Radiant Energy or Radiation the energy of electromagnetic waves produced by the movement of molecules excited by the heat of an electric arc, or gas flame, or the passage of an electric current. Three kinds of radiant energy are pertinent to this program: (1) ultraviolet (2) visible light, and (3) infrared.

3.1.8 Shield a device to be held in the hand, or supported without the aid of the operator, whose predominant function is protection of the eyes and face.

3.1.9 Side Shield a device of metal, plastic, or other material hinged or fixed firmly to the frame of the safety glasses to protect the eye from side exposure.

3.2 Hardhats/Helmets

3.2.1 Helmet a rigid device that is worn to provide protection for the head, or portions thereof, against impact, flying particles, or electric shock, or any combination thereof; and which is held in place by a suitable suspension.

3.2.2 Suspension the internal cradle of the helmet which holds it in place on the head and is made up of the headband and crown straps.

3.3 Gloves

3.3.1 Abrasion Resistance the ability of the glove material to withstand the scuffing action on the substrate to which it is exposed.

3.3.2 Breakthrough Time the elapsed time between initial contact of the chemical on the glove surface and the analytical detection of the chemical on the inside of the glove.

3.3.3 Degradation Characteristics when the material of the glove itself begins to break down.

3.3.4 Laceration Resistance the ability of the glove material to resist cuts from sharp objects.

3.3.5 Penetration Resistance the ability of the glove material to resist puncture due to sharp objects.

3.3.6 Permeation the process by which a chemical moves through a protective clothing

material on a molecular level. It involves: (1) absorption of molecules of the chemical into the outside surface of the material; (2) diffusion of the sorbed molecules in the material; and (3) desorption of the molecules from the inside surface of the material into the collecting medium.

3.3.7 Tactile Dexterity the property of the glove material which enables its user to feel and allow freedom of movement.

3.4 General

3.4.1 Employee an employee for the purposes of the PPE program is any person who receives compensation for work performed at Ohio University.

3.4.2 Job Hazard Analysis (JHA) a job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment.

3.4.3 Personal Protective Equipment (PPE) equipment designed to protect individuals from workplace hazards, which may cause injury or impairment of body function through absorption, inhalation, or physical contact (e.g., gloves, eye protection, respirators, safety boots, head protection).

3.4.4 Personal Protective Equipment Plan a written program developed and implemented which sets forth procedures to provide, use and maintain PPE in a sanitary and reliable condition whenever it is necessary by reason of workplace hazard.

4.0 Responsibilities

4.1 Supervisors

4.1.1 Where feasible, Supervisors should work to develop engineering and/or administrative controls to reduce the dependence on Personal Protective Equipment (PPE).

4.1.2 Supervisors and the employee who performs the job shall evaluate anticipated work conditions, via a job hazard analysis (JHA) in their respective areas to determine what, if any, PPE is required to protect the worker while performing his/her job duties.

4.1.3 The JHA should be a common sense approach based on observation of existing work practices, hazards, and knowledge of PPE requirements. EHS Staff is available to provide technical assistance.

4.1.4 Identification of hazards includes consideration of the following basic hazard categories:

- 4.1.4.1 Impact
- 4.1.4.2 Penetration
- 4.1.4.3 Compression (pinch points)
- 4.1.4.4 Chemical
- 4.1.4.5 Heat
- 4.1.4.6 Harmful dusts
- 4.1.4.7 Radiant energy

4.1.4.8 Infectious Agents/Blood

4.1.5 Once work place hazards have been identified and consideration given to the nature of the hazards and potential for exposure to multiple hazards, the Supervisor shall make a decision concerning the type of PPE to be selected and purchase PPE accordingly.

4.1.5.1 Ohio University will not pay for PPE which is personal in nature, such as safety shoes and non-specialty safety glasses.

4.1.6 Jobs where exposure conditions have changed shall be re-evaluated by the Supervisor and the employee performing the job to determine PPE needs.

4.1.7 Supervisors must train employees in the proper use of PPE. *See Section 6.0 for specific training requirements.*

4.1.8 Supervisors must ensure that appropriate PPE is worn. The employee must be wearing the PPE and using it properly.

4.1.9 Supervisors must review how the PPE is issued and keep records to control equipment misuse, and any equipment deficiencies. Once PPE is found to be deficient, it must be taken out of service. Before the employee can resume work, he/she must be issued working PPE of equipment that is able to provide the minimum safety protection for the employee.

4.1.10 Supervisors will replace, at no charge to the employee, provided PPE which is defective or damaged in use.

4.1.11 Supervisors must administer the program and approve temporary deviations. These deviations must be approved, in writing, by the supervisor and the OSHA Coordinator or other competent person

4.2 Employees

4.2.1 Employees will be required to understand and properly wear the provided PPE when work assignment or operations present the risk of exposure to observed or potential hazards.

4.2.2 Employees are responsible to inspect the provided PPE each day before the start of their shift. Employees shall notify their Supervisor if, upon inspection, the provided PPE is found to be defective or damaged. Employees shall not perform any work duty that requires PPE until the defective or damaged PPE is replaced with properly working PPE.

4.2.3 Employees are responsible for the safekeeping and maintenance of the personal protective equipment.

4.2.4 Employees shall inform their supervisor whenever a need arises to use PPE for which the employee has not received training, or when a condition exists, where adequate PPE is not available.

4.3 Department of Environmental Health and Safety (EHS)

4.3.1 EHS is responsible for insuring that all job categories at Ohio University have been evaluated for PPE requirements.

4.3.2 EHS will provide technical consultation and assistance with choosing the proper PPE for work tasks.

4.3.3 EHS will manage the PPE program and other campus-wide EHS programs.

4.3.4 EHS will oversee JHA and PPE effort.

5.0 PPE Selection

5.1 Selection of PPE shall be based upon provision of a level of protection greater than the minimum required to protect the exposed employee from the potential or observed hazards.

5.2 Eye and Face Protection

5.2.1 Where eye and face protection are required the selected protection shall be adequate to protect against machines or operations, which create the risk of eye or face injuries due to physical, chemical and/or radiation agents.

5.2.2 Hazards associated with the potential for flying objects shall utilize eye protection with side shields.

5.2.2.1 Detachable side shields are permissible, but must meet ANSI Z87.1-1989 (R1998).

5.2.3 Personnel who are required to wear safety eyewear and need prescription lenses to conduct their work shall be provided with protective eyewear that can be worn over the employee's prescription lenses.

5.2.4 Where radiant energy is a hazard, properly shaded lenses shall be selected for use. Such hazards may include but are not limited to: welding (gas or electric), ultraviolet light, and heat treat furnaces. *See Section 9.0 – Appendix A for help determining proper filter lenses for protection against radiant energy.*

5.2.5 Employees desiring eye and face protection and who are not normally assigned to activities that necessitate eye protection, will be provided with suitable eye protection where hazards are present.

5.2.6 Eye and face equipment purchased after July 5, 1994 must comply with ANSI Z87.1-1989 (R1998).

5.3 Respiratory Protection

5.3.1 Refer to the Ohio University Respiratory Protection Program.

5.4 Head Protection

5.4.1 Employees working in areas where there is the possible danger of head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards will be protected by protective hard hats.

5.4.2 All head protection shall comply with the specifications contained in ANSI Z89.1-1997.

5.4.3 ANSI Z89.1-1997 breaks protective headwear into the following classes:

5.4.3.1 Class A helmets provide impact, penetration resistance and electrical protection up to 2,200 Volts.

5.4.3.2 Class B helmets provide impact, penetration resistance and electrical protection up to 20,000 Volts.

5.4.3.3 Class C helmets provide only impact and penetration resistance.

5.4.4 Bump caps are not recognized by ANSI or Ohio University for general exposure and are not a valid form of head protection under this program.

5.4.5 Hard hats may not be altered in a way that will reduce their efficiency. Typical prohibited alterations include: painting, drilling holes in the shell, application of metal jewelry, etc. Hats with these alterations or excessive scratches will be replaced.

5.5 Foot Protection

5.5.1 Employees who are exposed to hazards that may cause foot injuries due to falling or rolling objects, objects piercing the sole, extreme cold, wetness, slipping, electrical shock, or any other hazard identified by the JHA, shall be required to use safety footwear.

5.5.2 All protective footwear shall comply with ANSI Z41-1999.

5.6 Hand Protection

5.6.1 Hand protection must be selected, provided and worn when employees are exposed to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, or any other hazard identified by the JHA.

5.6.2 Glove selection shall include consideration of the following factors:

5.6.2.1 Whether or not the glove will be reused.

5.6.2.2 Length of time that the glove may be worn.

5.6.2.3 The specific chemical or chemicals to which the glove will be exposed.

5.6.2.4 The ability of the chemical to be skin absorbed.

5.6.2.5 Permeation characteristics of the glove fabric.

5.6.2.6 Degradation characteristics of the glove fabric.

5.6.2.7 Chemical breakthrough times of the glove fabric.

5.6.2.8 Abrasion resistance.

5.6.2.9 Penetration resistance.

5.6.2.10 Laceration resistance.

- 5.6.2.11 Tactile dexterity.
- 5.6.2.12 Glove fit and ergonomic issues.
- 5.6.2.13 Heat resistance.
- 5.6.2.14 Vibration damping.
- 5.6.2.15 Electrical shock resistance.
- 5.6.2.16 Whether or not the gloves need to be sterile or sanitary.
- 5.6.2.17 Applicability to work with infectious agents.
- 5.6.2.18 Protection during extreme weather/temperatures.

5.6.3 In certain cases it may be necessary to provide two pair of gloves to provide the protective traits, which neither pair possesses by itself.

5.6.4 A properly fitted glove is important to the wearer's comfort. Tight-fitting gloves can cause fatigue while loose fitting gloves can be hazardous. *See Section 9.0 - Appendix B for help determining proper glove size.*

5.6.5 Supervisors and employees must be cautious of allergic reactions to natural rubber latex in the workplace. Whenever necessary, supervisors should provide employees with non-latex gloves. If latex gloves are chosen, supervisors should provide reduced protein, powder-free latex gloves to reduce exposure to allergy-causing proteins.

5.7 Hearing Protection

5.7.1 Refer to the Ohio University Noise Control And Hearing Conservation Program.

6.0 Training

6.1 The Supervisor shall provide training/retraining to each employee who is required to use PPE for his/her job function.

6.1.1 Each employee shall be trained to know and understand the following:

- 6.1.1.1 When is PPE necessary?
- 6.1.1.2 What PPE is necessary?
- 6.1.1.3 How to don or put on the PPE.
- 6.1.1.4 How to doff or remove the PPE.
- 6.1.1.5 Limitations of the PPE.
- 6.1.1.6 Proper care and maintenance of PPE.
- 6.1.1.7 Useful life of PPE.
- 6.1.1.8 Proper disposal of PPE.

6.2 Each employee required to wear PPE shall demonstrate his/her understanding of the training elements listed above, before being allowed to perform work requiring the use of PPE.

6.2.1 The Supervisor shall provide training during the following situations:

- 6.2.1.1 Upon an employee's initial assignment to a work area or activity that requires PPE.
- 6.2.1.2 When changes in the workplace render previous PPE training obsolete.
- 6.2.1.3 When there are changes to the selected types of PPE, which render previous training obsolete.

6.2.1.4 When Employees no longer demonstrate proficiency with their assigned PPE.

7.0 Recordkeeping

7.1 The Supervisor or designate shall verify through written certification that all areas under his/her jurisdiction have been assessed for hazards requiring PPE. This certification shall contain the location of the assessment, the date, and the job title of the job assessed.

7.2 The Supervisor or designate shall verify that each employee, who is required to wear PPE, has received and understood the required training listed in Section 6.0.

7.2.1 Records shall be maintained which indicate that training has been completed and the employee has demonstrated competency in the use of the PPE.

7.2.2 Training Records shall include:

7.2.2.1 Date of the training session.

7.2.2.2 A brief summary of the session's subject matter.

7.2.2.3 Name, social security number, and job title of all attendees.

7.2.2.4 Name and qualifications of persons conducting training.

7.2.3 Training records shall be maintained for at least 3 years by the affected department.

8.0 References

8.1 References for this program include:

8.1.1 U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Personal Protective Equipment Standard, 29 CFR §1910.132-139 Subpart I.

8.1.2 OSHA, STD 01-06-006 - STD 1-6.6 - Inspection Guidelines for 29 CFR 1910. Subpart I, the revised Personal Protective Equipment Standards for General Industry.

8.1.3 OSHA, Job Hazard Analysis, OSHA 3071, 2002 (Revised).

8.1.4 American National Standard Institute (ANSI) Z41-1999: Personal Protection-Protective Footwear.

8.1.5 ANSI Z87.1-1989 (R1998): Practice for Occupational and Educational Eye and Face Protection.

8.1.6 ANSI Z89.1-1997: Industrial Head Protection

9.0 Appendices

9.1 Appendix A - Filter Lens Determination

TABLE 1

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.....	0-160.....	8
	5-8.....	60-250.....	10
	More than 8.....	250-550.....	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

Operations	Plate thickness- inches	Plate thickness-mm	Minimum* Protective Shade

Plasma arc cutting	(light)**.....	less than 300....	8
	(medium)**....	300-400.....	9
	(heavy)**.....	400-800.....	10

Torch brazing		3
Torch soldering		2
Carbon arc welding		14

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

Oxygen cutting:			

Light	Under 1.....	Under 25.....	3
Medium	1 to 6.....	25 to 150.....	4
Heavy	Over 6.....	Over 150.....	5

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 oxy-fuel 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.

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 work piece.

9.2 Appendix B – Glove Size Determination

To determine glove size use a tape measure to find the circumference of the hand around the palm area. This measurement in inches is closest to the actual glove size.

TABLE 2

GLOVE SIZE	XS	S	M	L	XL
HAND SIZE (in.)	6-7	7-8	8-9	9-10	10-11

9.3 Appendix C – Hazard Control Hierarchy

Information obtained from a job hazard analysis is useless unless hazard control measures recommended in the analysis are incorporated into the tasks. Supervisors should recognize that not all hazard controls are equal. Some are more effective than others at reducing risk.

The order of precedence and effectiveness of hazard control is the following:

1. Engineering Controls.
2. Administrative Controls.
3. Personal Protective Equipment.

Engineering Controls include the following:

- Elimination/minimization of the hazard—designing the facility, equipment, or process to remove the hazard, or substituting processes, equipment, materials, or other factors to lessen the hazard;
- Enclosure of the hazard using enclosed cabs, enclosures for noisy equipment, or other means;
- Isolation of the hazard with interlocks, machine guards, blast shields, welding curtains, or other means; and
- Removal or redirection of the hazard such as with local and exhaust ventilation.

Administrative Controls include the following:

- Written operating procedures, work permits, and safe work practices;
- Exposure time limitations (used most commonly to control temperature extremes and ergonomic hazards);
- Monitoring the use of highly hazardous materials;
- Alarms, signs, and warnings;
- Training.

Personal Protective Equipment—such as respirators, hearing protection, protective clothing, safety glasses, and hardhats—is acceptable as a control method in the following circumstances:

- When engineering controls are not feasible or do not totally eliminate the hazard;
- While engineering controls are being developed;
- When safe work practices do not provide sufficient additional protection; and
- During emergencies when engineering controls may not be feasible.

Use of one hazard control method over another higher in the control precedence may be appropriate for providing interim protection until the hazard is abated permanently. In reality, if the hazard cannot be eliminated entirely, the adopted control measures will likely be a combination of all three items instituted simultaneously.

9.4 Appendix D – Common Hazards & Descriptions

9.4.1 Chemical (Toxic) A chemical that exposes a person by absorption through the skin, inhalation, or through the blood stream that causes illness, disease, or death. The amount of chemical exposure is critical in determining hazardous effects. Check Material Safety Data Sheets (MSDS), and/or OSHA 1910.1000 for chemical hazard information.

9.4.2 Chemical (Flammable) A chemical that, when exposed to a heat ignition source, results in combustion. Typically, the lower a chemical's flash point and boiling point, the more flammable the chemical. Check MSDS for flammability information.

9.4.3 Chemical (Corrosive) A chemical that, when it comes into contact with skin, metal, or other materials, damages the materials. Acids and bases are examples of corrosives.

9.4.4 Explosion (Over-Pressurization) Sudden and violent release of a large amount of gas/energy due to a significant pressure difference such as rupture in a boiler or compressed gas cylinder.

9.4.5 Electrical (Shock/Short Circuit) Contact with exposed conductors or a device that is incorrectly or inadvertently grounded, such as when a metal ladder comes into contact with power lines. 60Hz alternating current (common house current) is very dangerous because it can stop the heart.

9.4.6 Electrical (Fire) Use of electrical power that results in electrical overheating or arcing to the point of combustion or ignition of flammables, or electrical component damage.

9.4.7 Electrical (Static/ESD) The moving or rubbing of wool, nylon, other synthetic fibers, and even flowing liquids can generate static electricity. This creates an excess or

deficiency of electrons on the surface of material that discharges (spark) to the ground resulting in the ignition of flammables or damage to electronics or the body's nervous system.

9.4.8 Electrical (Loss of Power) Safety-critical equipment failure as a result of loss of power.

9.4.9 Ergonomics (Strain) Damage of tissue due to overexertion (sprains and strains) or repetitive motion.

9.4.10 Ergonomics (Human Error) A system design, procedure, or equipment that is error-provocative. (A switch goes up to turn something off).

9.4.11 Excavation (Collapse) Soil collapse in a trench or excavation as a result of improper or inadequate shoring. Soil type is critical in determining the hazard likelihood.

9.4.12 Fall (Slips, Trip) Conditions that result in falls (impacts) from height or traditional walking surfaces (such as slippery floors, poor housekeeping, uneven walking surfaces, exposed ledges, etc.).

9.4.13 Fire/Heat Temperatures that can cause burns to the skin or damage to other organs. Fires require a heat source, fuel, and oxygen.

9.4.14 Mechanical/Vibration (Chaffing/Fatigue) Vibration that can cause damage to nerve endings, or material fatigue that results in a safety-critical failure. (Examples are abraded slings and ropes, weakened hoses and belts.)

9.4.15 Mechanical Skin, muscle, or body part exposed to crushing, caught-between, cutting, tearing, shearing items or equipment.

9.4.16 Noise Noise levels (>85 dBA 8 hr TWA) that result in hearing damage or inability to communicate safety-critical information.

9.4.17 Radiation (Ionizing) Alpha, Beta, Gamma, neutral particles, and X-rays that cause injury (tissue damage) by ionization of cellular components.

9.4.18 Radiation (Non-Ionizing) Ultraviolet, visible light, infrared, and microwaves that cause injury to tissue by thermal or photochemical means.

9.4.19 Struck By (Mass Acceleration) Accelerated mass that strikes the body causing injury or death. (Examples are falling objects and projectiles.)

9.4.20 Struck Against Injury to a body part as a result of coming into contact with a surface in which action was initiated by the person. (An example is when a screwdriver slips.)

9.4.21 Temperature Extreme (Heat/Cold) Temperatures that result in heat stress, exhaustion, or metabolic slow down such as hypothermia.

9.4.22 Visibility Lack of lighting or obstructed vision that results in an error or other hazard.

9.5 Appendix E – Ohio University Job Hazard Analysis & PPE Checklist Form