Personal Protective Equipment

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Personal Protective Equipment

1.0 Purpose

The University provides all Facilities and Administrative Services' employees with the Personal Protective Equipment required to suit the task and known hazards. Personal Protective Equipment will only prevent accidents and injuries when used in conjunction with safe and conscientious work practices. Personal Protective Equipment (PPE) includes Personal Protective Equipment for the eyes, face, head, and extremities; protective clothing; respiratory devices; and protective shields and barriers. All FAS employees must utilize suitable Personal Protective Equipment to prevent serious injuries. Some Personal Protective Equipment is necessary only for particular types of operations, while other protective items are almost always appropriate.

2.0 Policy

Engineering controls shall be the primary method used to eliminate or minimize hazard exposure in the workplace. When such controls are not practical or applicable, Personal Protective Equipment shall be provided and used to reduce or eliminate personnel exposure to hazards.

3.0 Responsibilities

3.1 FAS Safety Managers will ensure proper conduct of the program through periodic audits, an annual review and will maintain all records and inspections results.

3.2 The FAS Training and Development Manager and Risk Management Office will maintain all training documentation.

3.3 Supervisors are responsible for promoting the safe work practices and procedures of the program, and ensuring compliance by each employee within their department.

3.4 Employees are responsible for complying with the provisions of this program.

4.0 Program Elements

The following is an outline of the areas covered within the Personal Protective Equipment Program:

4.1 Design
4.2 PPE Selection
4.3 Training
4.4 Eye and Face Protection
4.5 Head Protection
4.6 Foot Protection
4.7 Hand Protection
4.8 Hazard Assessment

4.1 Design

All Personal Protective Equipment and clothing will be of safe design and construction for the work to be performed. Only those items of Personal Protective Equipment and clothing that meet National Institute of Occupational Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards will be procured or accepted for use.

4.2 PPE Selection

4.2.1 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 work practices.

4.2.2 Selection Guidelines: The following procedures shall be utilized when selecting Personal Protective Equipment:

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

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

4.2.2.3 Select the Personal Protective Equipment, which ensures a level of protection greater than the minimum required to protect employees from the hazards.

4.2.2.4 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.

4.2.3 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.

4.2.4 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 when fitting devices for eye protection against dust and chemical splash to ensure that the devices are properly 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 chinstrap may be necessary to keep the helmet on an employee's head. Where manufacturer's instructions are available, they should be followed carefully.

4.3 Training

4.3.1 Training shall be provided on each type of Personal Protective Equipment that is to be utilized by employees. Completed training will be documented, including the names of all employees trained, the date of the training, and the specific subject of the particular training. The following areas will be covered during each training session:

4.3.1.1 When PPE is necessary.
4.3.1.2 What PPE is necessary?
4.3.1.3 How to properly don, remove, adjust, and wear PPE.
4.3.1.4 The limitations of the PPE.
4.3.1.5 The proper care, maintenance, useful life and disposal of the PPE.

4.3.2 Each employee shall be capable of demonstrating an understanding of the training and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE. Certification of training for PPE is required by OSHA and shall be accomplished by using a completed training attendance roster to verify that each affected employee has received the required PPE training. The instructor will evaluate each employee to certify that the employee fully understands the training and has the ability to use PPE properly.

4.3.3 Supervisors are responsible to retrain any employee when:

4.3.3.1 An employee does not understand the proper use of Personal Protective Equipment.
4.3.3.2 Previous training is obsolete.
4.3.3.3 There is a change in the type of Personal Protective Equipment being used.
4.3.3.4 An employee has not retained the understanding or skill necessary for using the specific Personal Protective Equipment.

4.4 Eye and Face Protection

4.4.1 The majority of occupational eye injuries can be prevented by the use of suitable/approved safety spectacles, goggles, or shields. Approved eye and face protection shall be worn when there is a reasonable possibility of personal injury.

4.4.2 Each employee shall use 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.

4.4.3 Each employee shall use eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors are acceptable.

4.4.4 Each employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

4.4.5 Eye and face Personal Protective Equipment shall be distinctly marked to facilitate identification of the manufacturer.

4.4.6 Each employee shall use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation.

4.4.7 Typical hazards that can cause eye and face injury include:

4.4.7.1 Splashes of toxic or corrosives chemicals, hot liquids, and molten metals.
4.4.7.2 Flying objects, such as chips of metal, wood, and other materials that can produce dangerous flying objects when cut, drilled, hammered, or worked with in another similar manner.
4.4.7.3 Fumes, gases, and mists of toxic or corrosive chemicals.
4.4.7.4 Aerosols and biological substances.

4.4.8 Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, contractors, or others passing through an identified eye hazard area. To provide protection for these personnel, supervisors shall ensure that a sufficient quantity of heavy-duty goggles and/or plastic eye protectors that afford the maximum amount of protection possible is available. If these personnel wear personal glasses, they shall be provided with a suitable eye protector to wear over them.

4.4.9 Criteria for Eye and Face Protection: Eye and face protectors used by employees, contractors and visitors must conform to the following design and performance criteria:

4.4.9.1 Provide adequate protection against the particular hazards for which they are designed.
4.4.9.2 Fit properly and offer the least possible resistance to movement causing minimal discomfort while in use.
4.4.9.3 Be durable.
4.4.9.4 Be easily cleaned and/or disinfected by the wearer.
4.4.9.5 Be clearly marked to identify the manufacturer.
4.4.9.6 Persons who require corrective lenses for normal vision, and who are required to wear eye protection, must wear goggles or spectacles of one of the following types:

4.4.9.6.1 Spectacles with protective lenses, which provide optical correction.
4.4.9.6.2 Goggles that can be worn over spectacles without disturbing the adjustment of the spectacles.
4.4.9.6.3 Goggles that incorporate corrective lenses mounted behind the protective lenses.

4.4.10 Eye & Face Protector Use

4.4.10.1 **Safety Spectacles:** Protective eye glasses are made with safety frames, tempered glass or plastic lenses, temples and side shields which provide eye protection from moderate impact and particles encountered in job tasks such as carpentry, woodworking, grinding, chipping, etc.

4.4.10.2 **Single Lens Goggles:** Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. These goggles are available with clear or tinted lenses, perforated, port vented, or non-vented frames. Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to insure protection along with proper vision.

4.4.10.3 **Welder's Goggles:** These goggles are available in rigid and soft frames to accommodate single or two eyepiece lenses.

4.4.10.3.1 **Welder's goggles** provide protection from sparking, scaling or splashing metals and harmful light rays. Lenses are impact resistant and are available in graduated shades of filtration.

4.4.10.3.2 Chippers/grinders goggles provide eye protection from flying particles. The dual protective eyecups house impact resistant clear lenses with individual cover plates.

4.4.10.4 **Face Shields:** These normally consist of an adjustable headgear and face shield of tinted/transparent acetate or polycarbonate materials, or wire screen. Face shields are available in various sizes, tensile strength, impact/heat resistance and light ray filtering capacity. Face shields will be used in operations when the entire face needs protection and should be worn to protect eyes and face against flying particles, metal sparks, and chemical/ biological splash. Face shields must be worn in addition to safety glasses.

4.4.10.5 **Welding Shields:** These shield assemblies consist of vulcanized fiber or glass fiber body, a ratchet/button type adjustable headgear or cap attachment and a filter and cover plate holder. These shields will be provided to protect workers' eyes and face from infrared or radiant light burns, flying sparks, metal spatter and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding and oxyacetylene welding and cutting operations.

Welding & Cutting Filter Lenses for Protection Against Radiant Energy

Operation	Electrode Size 1/32 in	Arc Current	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
Torch Brazing			3
Torch Soldering			2

Employees who are required to utilize welding and cutting equipment will select the proper lens shade by starting with a shade that is too dark to see the weld and/or work zone. Then go to a lighter shade that gives sufficient view of the weld and/or work zone without going below the minimum.

Eye and Face Protective Equipment

Vented goggles shown above on the left provide protection against impact from projectile objects. The vent holes do not allow for splash protection.
Splash goggles shown on the right provide protection against chemical splashing. Most splash goggles also offer protection against impact from projectiles.

Face shields such as shown above provide protection to the face from projectiles. Face shields are not a substitute for eye protection. Face shields must always be worn at the same time as eye protection.

Selection Chart
for
Eye and Face Protection

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".

Source	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 shield protection, goggles, face shield. For severe exposure, use face shield with safety glasses or goggles.
HEAT-Boiler operation and arc welding.	Hot sparks.	Face shields, spectacles with side shields. For severe exposure use face shield.
CHEMICALS Pesticides, acid and chemical handling, degreasing, cleaning solvents.	Splash	Goggles, an eyecup and cover type. For severe exposure, use face shield.

Checklist
for
Eye & Face Protection

QUESTION	OPERATION / ACTIVITY	
Do employees perform tasks, or work near other employees who perform tasks that might produce airborne dust or flying particles?	Sawing, cutting, drilling, sanding Grinding, chipping, hammering, Chopping, etc.	YES / NO ☐ ☐
Do employees handle, or work near other employees who handle, hazardous liquid chemicals or hazardous materials?	Pouring, mixing, painting, cleaning, Siphoning, etc.	YES / NO ☐ ☐
Are employees exposed to potential physical or chemical eye hazards / irritants?	Battery charging, installing fiberglass Insulation, compressed air or gas Operations, etc.	YES / NO ☐ ☐
Are employees exposed to intense light or lasers?	Welding, cutting, laser operations, etc.	YES / NO ☐ ☐
Are employees exposed to extreme heat?	Welding, pouring molten metal, Stem plants, boilers	YES / NO ☐ ☐

4.5 Head Protection

4.5.1 Head protection will be furnished to, and used by, all employees engaged in construction and other miscellaneous work in areas where overhead hazards are present. Engineers, Inspectors, Contractors and Visitors will be required to wear head protection at work sites.

4.5.2 Hardhats: Hardhats have been designed and manufactured to provide workers protection from impact, heat, electrical and fire hazards. These protective devices for the head consist of the shell and the suspension, which are combined as a single protective system. Safety hard hats and bump caps used by University employees will be of nonconductive, fire and water-resistant materials. Bump caps or skull guards are constructed of lightweight materials and are designed to provide minimal protection against hazards when working in congested areas.

4.5.2.1 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).

4.5.2.2 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).

4.5.2.3 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.

4.5.2.4 Hard hats must be worn where falling object hazards are present. Some examples include: working below other workers who are using tools and materials which could fall; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

4.5.3 Bump Caps: Bump caps/skull guards will be issued to and worn for protection against scalp lacerations from contact with sharp objects. They will not be worn as a substitute for hard hats because they do not afford protection from high impact forces or penetration by falling objects.

4.5.4 Selection Guidelines for Head Protection: Supervisors are responsible to ensure that the employees wear appropriate head protection as designated by the Hazard Assessment (see paragraph 4.8). Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important.

4.6 Foot Protection

4.6.1 All Physical Plant employees who have been identified to wear reinforced foot protection by the job hazard assessment are required to wear reinforced foot protection at all times.

4.6.2 The minimum required protective footwear is leather (or equivalent) work type boot with ankle support. Impact resistant toe and puncture resistant soles are required at all times. All employees' Protective footwear shall comply with ANSI Z41, "American National Standard for Personal Protection-Protective Footwear".

4.6.3 Selection Guidelines for Foot Protection**:** Safety shoes and boots provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection shall be required, and in other special situations electrical conductive or insulating safety shoes shall be required. Safety shoes or boots with impact protection will 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 will be required for work activities involving skid trucks (manual material handling carts) around bulk materials and containers (such as 55 gallon drums) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection will 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.

4.7 Hand Protection

4.7.1 Hand protection is required when employees' hands are exposed to hazards such as skin absorption of harmful substances; cuts or lacerations; abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

4.7.2 Skin contact is a potential source of exposure to toxic materials; it is important that the proper steps be taken to prevent such contact. Gloves should be selected on the basis of the material being handled, the particular hazard involved, and their suitability for the operation being conducted. One type of glove will not work in all situations.

4.7.3 Most accidents involving hands and arms can be classified under four main hazard categories: hazardous chemical contact, abrasions, cuts, and burns. There are gloves available that can protect workers from any of these individual hazards or combination of hazards.

4.7.4 Gloves should be replaced periodically, depending on frequency of use and permeability to the substances handled. Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The types of glove materials to be used in these situations include leather, welder's gloves, aluminum-backed gloves, and other types of insulated glove materials.

4.7.5 Careful attention must be given to protecting your hands when working with tools and machinery. Power tools and machinery must have guards installed or incorporated into their design that prevent the hands from contacting the point of operation, power train, or other moving parts. To protect the hands from injury due to contact with moving parts, it is important to:

4.7.5.1 Ensure that guards are always in place and utilized.
4.7.5.2 Always lock out machines or tools and disconnect the power before making repairs.
4.7.5.3 Treat a machine without a guard as inoperative.
4.7.5.4 Do not wear gloves around moving machinery, such as drill presses, mills, lathes, and grinders.

4.7.6 **Selection Guidelines for Hand Protection:**
Selection of PPE for the hands shall be based on an evaluation of the performance characteristics of the hand protection relative to the tasks being performed, conditions present, duration of use, and the hazards and potential hazards identified. 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. There is no glove that provides 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; i.e., chemical hazards, cut hazards, flame hazards, etc. The supervisor will review all purchase orders to ensure that gloves meet the appropriate test standards for the hazards anticipated.

4.7.7 Other factors to be considered for glove selection include:

4.7.7.1 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.

4.7.7.2 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.

4.7.8 Selection of Gloves for Chemical Hazards: The first consideration in the selection of gloves for use against chemicals is to determine the exact nature of the substances to be encountered. Read instructions and warnings on chemical container labels and MSDS before working with any chemical. Recommended glove types are often listed in the section for Personal Protective Equipment.

4.7.8.1 Chemicals eventually permeate all glove materials. However, they can be used safely for limited time periods if specific use and glove characteristics (i.e., thickness and permeation rate and time) are known. Considerations for glove selection include:

4.7.8.1.1 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.

4.7.8.1.2 Generally, any "chemical resistant" glove can be used for dry powders;

4.7.8.1.3 For mixtures and (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.

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

4.8 Certification of Hazard Assessment

A hazard assessment was performed on March 30, 2001 by Compliance Environmental International, Inc., for and under the direction of American University Facilities Administrative Services Department.

The assessment is presented as a table on the following pages.

Appendix 1 Personal Protective Equipment Hazard Assessment