



Department of

*Environmental
Safety,
Sustainability and Risk*

DIVISION OF ADMINISTRATIVE AFFAIRS

**PERSONAL
PROTECTIVE
EQUIPMENT
PROGRAM**

Approved as UM Policy – May 1999

Revised – January 2013

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Policy Statement

VI-19.00(A) UNIVERSITY OF MARYLAND POLICY ON PROTECTIVE EQUIPMENT PROGRAM

APPROVED BY THE PRESIDENT, January 19, 1999

I. POLICY STATEMENT

A. Purpose

The Personal Protective Equipment (PPE) Program has been developed to provide the University community with the necessary information to identify work situations that require the use of PPE, the proper selection and use of PPE, and documentation of this information. This information is important to help ensure the safety and health of all employees at the University of Maryland.

B. Scope

University employees who currently utilize PPE or have the potential to encounter hazards to the eyes, face, head, feet, hands, or who conduct work involving electrical or fall hazards, as identified during the Hazard Assessment of the workplace, will be required to participate in this PPE Program. PPE will be selected and used to protect employees from the hazards and potential hazards that are likely to be encountered. Respiratory and hearing protection are covered under separate programs.

PPE includes all clothing and work accessories designed to protect employees from workplace hazards. PPE should not be used as a substitute for engineering, work practices, and/or administrative controls to protect employees from workplace hazards. PPE should be used in conjunction with permanent protective measures, such as engineered guards, substitutions of less hazardous chemicals, and prudent work practices.

C. Applicable Regulation

OSHA Regulation 29 CFR Part 1910 Subpart I - Personal Protective Equipment.

D. Department of Environmental Safety, Sustainability & Risk (ESSR)

ESSR shall prepare a PPE manual and annually review and revise the manual to meet current OSHA regulations. ESSR will also annually distribute a memo to all Deans, Directors, Department Heads, and Compliance Officers as a reminder of all environmental health and safety policies and programs.

II. GLOSSARY OF TERMS

ANSI: American National Standard Institute, a nonprofit, voluntary membership organization that coordinates the U.S. Voluntary Consensus Standard System. Their standards have been adopted throughout government and industry for various types of personal protective equipment.

Competent Person: A person who, because of training and experience, is capable of identifying hazardous or dangerous conditions.

Hazard Assessment: Investigating the work environment for potential dangers which could result in injury or illness.

Personal Protective Equipment (PPE): Devices worn by the employees to protect against hazards in the environment. Examples include safety glasses, face shields, respirators, gloves, hard hats, steel-toe shoes, and hearing protection.

Permissible Exposure Limit (PEL): The PEL for a substance is the 8-hour timeweighted average or ceiling concentration above which workers may not be exposed.

Qualified Person: A person designated by the employer who is knowledgeable about and familiar with all relevant manufactures' specifications and recommendations; is capable of identifying existing or potential hazards in specific surroundings or working conditions which may be hazardous or dangerous to employees; and has been trained for the specific task assigned. When work is to be supervised by a qualified person, the qualified person shall have the necessary authority to carry out the assigned work responsibilities.

III. RESPONSIBILITY

A. Deans, Directors, and Department Heads

Designate and empower individuals who must participate in and who will be responsible for the preparation and implementation of the PPE Program.

Provide administrative and financial support for this program within individual departments.

Ensure the PPE Program is implemented and maintained within the department.

B. Supervisors

Implement all aspects of this program, including documentation of the hazard assessment and training. The supervisor has been designated this responsibility, as he/she is involved with employees on a daily basis.

Conduct hazard assessments and ensure that employees are informed, trained, and provided with appropriate PPE to be protected from potential hazards associated with job tasks.

Be familiar with the applicable government regulations, safety standards, and prudent safety practices to protect themselves and their fellow employees.

C. Employees

Comply with the guideline and any further safety recommendations provided by supervisors and/or ESSR regarding PPE.

Conduct assigned tasks in a safe manner and wear all assigned PPE.

Report any unsafe or unhealthy work conditions and job related injuries or illnesses to the supervisor immediately.

D. Department of Environmental Safety, Sustainability & Risk (ESSR)

Provide technical information and assist departments in implementing an effective PPE program in their workplace.

Provide training for PPE instruction, as needed.

Review and revise the PPE program, as needed for compliance with applicable regulations.

IV. HAZARD ASSESSMENT

A hazard assessment is a formalization of what is done whenever personal protective equipment is selected based on the hazards of the job. When conducting a hazard assessment, a task is investigated and the hazards and the potential hazards associated with the task are determined. This allows selection of personal protective equipment that will protect the employee from the identified hazards.

A hazard assessment may be conducted of a single employee, of a single task, or a group of employees if all the employees perform an identical task. For example, if all employees in a group are exposed to ultraviolet radiation during one type of welding, the hazard assessment could include all of the welders conducting that task. Likewise, painters using similar types of materials or laboratory employees using similar types of chemicals could be grouped under the same assessment.

During the hazard assessment of each task, inspect the layout of the workplace and look for the following hazardous sources:

- A. High or low temperature that could result in burns, eye injury, ignition of equipment, heat/cold stress, frostbite, lack of coordination, etc.
- B. Chemical exposures, including airborne or skin contact, that would have the potential for splash on the skin or eyes, or the potential to breathe vapors or mists.
- C. Harmful dust or particulates.
- D. Light radiation, e.g., welding, arc lamps, heat treating, lasers, growth lights, etc.
- E. Sources of falling objects, potential for dropping objects, or rolling objects that could cause crush or pinch the feet.
- F. Sharp objects that may pierce the feet or cut the hands.
- G. Observe the layout of the workplace and the location of co-workers for the potential for collision with other personnel or objects.
- H. Electrical hazards.
- I. Any other identified potential hazard.

Where these hazards could cause injury to employees, personal protective equipment must be selected to substantially eliminate the injury potential. A Certification of Hazard Assessment and a Hazard Assessment Checklist must be completed by the supervisor to identify potential workplace hazards. (These forms are available on the ESSR web site at: <https://essr.umd.edu>).

CERTIFY A HAZARD ASSESSMENT

The Hazard Assessment forms must be signed by the supervisor to certify that this process has been performed as required by the regulation. The forms must be maintained with the departmental records.

V. TRAINING

Prior to conducting work requiring the use of personal protective equipment, employees must be trained to know:

When PPE is necessary;
What type is necessary;
How it is to be worn;
What its limitations are; and,
Proper care, maintenance, useful life, and disposal.

Upon completion of the training, the employee must be able to demonstrate the above mentioned information. Any type of training format can be used as long as a hands-on session is incorporated. Video tapes are available from ESSR to assist with employee PPE training. Documentation of training is required.

Information regarding eye, face, head, foot and hand protection is provided on the ESSR web site at: <https://essr.umd.edu>. Each section can be used as needed and be adapted to individual workplaces after the completion of a Hazard Assessment to select the proper PPE.

Whenever PPE is used, employee comfort should be considered. When PPE does not fit properly, employees will tend not to use it. Follow the manufacturer's recommendation for proper PPE usage.

VI. PPE SELECTION GUIDELINES

GENERAL CONDITIONS

Personal Protective Equipment (PPE) includes all clothing and work accessories designed to protect employees from workplace hazards. Protective equipment should not replace engineering, administrative, or procedural controls for safety. It should be used in conjunction with these controls. Employees must wear protective equipment as required and when instructed by a supervisor. For each hazard identified, select personal protective equipment that will protect the employee by creating a barrier against workplace hazards. Consider the likelihood of an accident and the seriousness of a potential accident.

Personal protective equipment must be selected to protect against any hazard that is likely to occur or has a serious injury impact if it does occur. It is important that employees become familiar with the potential hazards, the type of protective equipment that is available, and the level of protection that is provided by that equipment, i.e., splash protection, impact protection, etc.

The personal protective equipment selected must fit the employee it is intended to protect. Make certain that employees have the correct size of protective equipment. Whenever possible, select adjustable personal protective equipment.

Employee input in the selection process is critical. Employees will more likely wear personal protective equipment that fits properly and is comfortable. Damaged or defective protective equipment shall be immediately taken out of service to be repaired or replaced.

For proper selection of the PPE listed below, please refer to the ESSR website.

Head Protection

Eye and Face Protection

Ear Protection

Respiratory Protection

Foot Protection

Hand and Arm Protection

Additional information may also be obtained from:

ESSR and the manufacturers of PPE;

MSDS for chemicals; and

Product descriptions

Specific Guidance

EYE AND FACE PROTECTION

Eye and face protection must be used where a hazard exists due to any of the following:

- Flying objects or particles
- Molten metal
- Liquid chemicals
- Harmful contacts
- Exposures
- Acids or caustic chemicals
- Chemical gases or vapors
- Glare
- Air contaminants
- Radiation
- Electrical flash
- A combination of hazards

Eye and face protection is available for protection against a variety of hazards. The hazard must be identified prior to selecting the PPE to ensure the employee will be properly protected. Side shields are required when there is an impact hazard from flying objects or a chemical splash hazard present. Safety glasses and goggles can protect against impact hazards. Safety glasses are made of special materials to provide the necessary impact protection. All eye and face protection must meet the requirements of the ANSI (American National Standards Institute) Standard Z87.1-1989, entitled “American National Standard Practice for Occupational and Educational Eye and Face Protection.” Laser eyewear must meet the requirements of ANSI Z136.1, 136.2, and 136.3.

To comply with the Maryland Occupational Safety and Health Administration (MOSH) requirements for PPE, eye protection must:

- Provide adequate protection against the hazards for which it is designed
- Be reasonably comfortable under the conditions of use
- Fit securely without interfering with vision or movement
- Be durable
- Be kept clean and in good repair

Protective eyewear and face wear should be adjusted to provide maximum protection to the areas being protected. Eyeglasses should be worn close to the face to minimize gaps that would allow foreign materials to enter the eye. Eye and face protection should be kept clean based on recommendations from the manufacturer. When the protection becomes scratched or damaged, it should be replaced. Pits or scratches may affect the impact resistance. Workers should inspect eye and face protection before wearing and replace any defective equipment.

Goggles can be worn over spectacles and can be vented or non-vented. Goggles are available for splash and impact protection, depending on the hazard. Face shields are considered a secondary form of protection and must be used in combination with spectacles or goggles to offer the necessary impact protection to the eye.

Filter lens protection should be selected by starting 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 operation.

Eye Protection Selection Chart

Type of Work	Hazard	Minimum Eye Protection	Extended Exposure Protection
Chipping, drilling, riveting, hammering, woodworking, sanding, grinding	Flying particles	<ul style="list-style-type: none"> • Direct-vent goggles • Spectacles with sideshields 	<ul style="list-style-type: none"> • Face shield with clear lens worn with goggles or spectacles
Chemical handling	Liquid splash	<ul style="list-style-type: none"> • Indirect-vent goggles 	<ul style="list-style-type: none"> • Faceshield with goggles
Laboratory tasks	Chemical splash, glass breakage	<ul style="list-style-type: none"> • Indirect-vent goggles 	<ul style="list-style-type: none"> • Faceshield worn with goggles or spectacles
Clinical or medical jobs	Potentially Infectious material splash	<ul style="list-style-type: none"> • Spectacles with solid sideshields • Disposable or reusable Faceshield 	<ul style="list-style-type: none"> • Goggles with indirect ventilation • Double-crown faceshield
Tasks in ultraviolet (UV) light	Exposure to direct or reflected UV radiation in the 200 to 400 nm range	<ul style="list-style-type: none"> • For UV protection up to 380 nm: <ul style="list-style-type: none"> • spectacles or goggles with polycarbonate lens • For UV protection up to 405 nm: <ul style="list-style-type: none"> • Spectacles or goggles with polycarbonate lens and UV inhibiting spectacle frames • goggle bodies 	<ul style="list-style-type: none"> • UV resistant faceshield worn with spectacles goggles
Laser work	Reflected or direct beam impact	<ul style="list-style-type: none"> • Laser-specific spectacles goggles 	
Furnace operations, pouring and casting molten metal	Glare, heat, molten metals, hot sparks	<ul style="list-style-type: none"> • Indirect-vent goggles • Reflective faceshield worn with spectacles 	<ul style="list-style-type: none"> • Handshield or welding helmet (Shade 4 to 8)
Welding (electric arc)	Infrared radiation and sparks	<ul style="list-style-type: none"> • Welding helmet or shield (Shade 10 to 14) 	
Welding (gas)	Infrared radiation and sparks	<ul style="list-style-type: none"> • Welding goggles or hand shield (filter Shade 4 to 5) • Full face protection in applications requiring a lens shade greater than Shade 5 	
Cutting, brazing, soldering	Infrared radiation and sparks	<ul style="list-style-type: none"> • Filter lens spectacles or handshield: <ul style="list-style-type: none"> - Cutting (Shade 3 to 6) - Brazing (Shade 3 to 4) - Soldering (Shade 1.5 to 3) 	

Inspection and Maintenance

Lenses of eye protectors must be kept clean. Continuous vision through dirty lenses can cause eyestrain - often an excuse for not wearing the eye protection. Daily inspection and cleaning of eye protectors with soap and warm water, or with a cleaning solution and tissues, is recommended.

Pitted and scratched lenses can also be a source of reduced vision and compromised protection. Excessively pitted or scratched or otherwise damaged eye and face protection must be replaced.

If safety glasses are to be worn with hearing protection, they must be compatible. If earmuffs are worn, the temple piece of the glasses must not break the seal of the muff. Thin temple piece glasses must be selected to avoid compromising the noise reduction capabilities of the muff.

Cleaning and Disinfection Procedure for Shared Use Eyewear

Safety eyewear should be regularly cleaned and disinfected. Eyewear issued for the exclusive use of one worker may be cleaned as often as necessary. Weekly or monthly cleaning is usually adequate but more frequent cleaning may be necessary. When eyewear is shared it must be cleaned and disinfected before use by a different employee. To clean and disinfect eyewear use the following procedure:

- a) Check lenses for scratches. Check head straps for tears or loss of elasticity. Discard and replace any defective parts.
- b) Wash in warm (43° C [110° F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt, taking care to not scratch the lenses
- c) When the cleaner used does not contain a disinfecting agent, eyewear should be immersed for two minutes in one of the following:
 - i. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43° C (110° F); or,
 - ii. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43° C (110° F); or,
 - iii. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved as a disinfectant by the EPA.
- d) Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of plastic and elastic parts if not completely removed.
- e) Eyewear should be hand-dried with a clean lint-free cloth or air-dried.

HEAD PROTECTION

Head protection is available to protect the head from falling objects (impact and penetration), electrical hazards, and bump hazards. Protective headwear must comply with ANSI-Z89.1-1986 or 1997, entitled "American National Standards for Personal Protection - Protective Headwear for Industrial Workers." Hard hats must be labeled with the ANSI Certification. ANSI reissued the Standard in 1997, adding two types of helmets:

- Type 1** - Helmets providing crown impact protection
- Type 2** - Helmets providing lateral impact protection.

There are three classes of headwear addressed in the ANSI Standard. Classes A and B are for helmets listed to the 1986 Standard. Classes G and E are helmets listed to the 1997 Standard.

Class A or G Helmet - will reduce the force of impact/penetration of falling objects and, are built to reduce the danger of contact with exposed “low voltage” conductors.

Class B or E Helmet - will also reduce the force of impact/penetration of falling objects and are built to reduce the danger of contact with exposed “high voltage” conductors.

Class C Helmet - offers the same type of impact/penetration protection as Class A and B helmets, but offers no protection from electrical hazards. Must not be used except where it has been determined that the use of other types of protective helmets is impractical, such as where chemical reaction will cause deterioration of other types of head protection.

Where Required

Protective helmets are required where falling object hazards are present. 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 process which might cause material or objects to fall; and working on exposed energized conductors.

Hair enclosures are required for long hair (longer than four inches), which can be drawn into machine parts such as chains, belts rotating devices, suction devices, and blowers. Hair may even be drawn into machines guarded with mesh. It may also present an ignition risk in areas near open flames or welding. Employees with long hair must cover and protect their hair with a hat, cap, net, or bandana. These items must fit so as to not present a hazard either with machinery, ignition sources, or interference with other PPE.

Proper Usage of Protective Helmets

The shell is the rigid part of the hat and the suspension is the inner portion that cradles the head. The suspension performs two functions. First it orients and keeps the helmet on the head. It is adjustable to maintain a snug and comfortable fit. The second and most important function of the suspension is to absorb and distribute the impact of a falling object. This is the reason for the space between the suspension and the shell. Never apply paints or solvents to the helmet; it could damage the strength and dielectric properties.

Accessories are available for head protection such as, hearing protection, faceshields, sweat bands, and winter liners. Always follow the manufacturer’s direction for proper usage of accessories.

Inspection and Maintenance

Inspect the shell and the suspension before each use. Look for cracks, chips, dents, or deterioration or any other signs that would indicate the need to replace the shell immediately. Look for cracks, tears or broken straps in the suspension and replace as necessary. Never mix suspensions and shells from different manufacturers.

Use warm soap and water to clean the helmet as necessary.

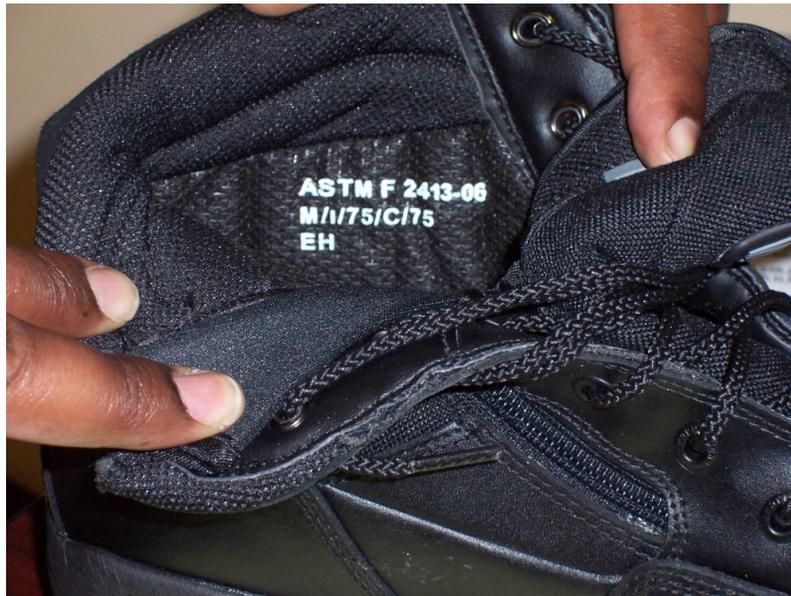
FOOT PROTECTION

Foot protection is necessary when hazards exist that could result in impact and compression, electrical, conductive, or metatarsal injuries. Foot protection must comply with the requirements of ANSI Z41-1991, “American National Standard for Personal Protection - Protective Footwear.”

Selection and Maintenance

Keep protective footwear clean and polished, they will last longer. Replace broken or frayed laces. Be attentive to the wear and tear on the entire shoe or boot.

Code Designations in Safety Shoes



The first line of the marking will indicate ASTM designation (e.g., “ASTM F2413-05”)

The second line of the marking indicates specifications concerning the footwear.

- M or F = male or female
- I/(75 or 50) = Impact resistance (75 or 50 foot-pounds)
- C/(75 or 50) = Compression resistance (2500 or 1750 psi)
- Mt/(75 or 50) = Metatarsal Protection (75 or 50 foot-pounds)
- EH = electric shock resistance

HAND PROTECTION

Hand protection is available to protect against cut/punctures, abrasions, thermal burns, vibration, chemical exposures, and electrical shock. There is not a single glove that will protect from all hazards. Selection of gloves must be based on the hazards that are present, the job task, work conditions, and the duration of use. Gloves to be used to protect against the effects of chemical use should be selected based on each manufacturer's glove selection charts. Do not assume that the protection offered by one manufacturer's glove will apply to all types of similar gloves. The protection of each glove is based on the manufacturing processes and glove thickness.

Use and Maintenance

Gloves that are torn or damaged should not be used. There is potential for the glove to be caught in machinery or other equipment. Consideration of the following items is necessary when using gloves to protect against chemical hazards:

- **Penetration** - This when a chemical passes through a physical defect in the glove, such as a pinhole or tear. Inspect gloves prior to each use.
- **Degradation**- This occurs when the chemical has some noticeable effect on the glove. The glove may appear wrinkled, dimpled, or cracked. Dispose of gloves if any of these signs appear. Never use defective gloves.
- **Permeation** - Permeation is the movement of a chemical through the glove. The vapor as well as the liquid phase of chemical can pass through the glove material. This is more difficult to detect than the previous types of warning signs. This is why it is very important to utilize the glove selection guides that are provided by the manufacturer. Refer to the ESSR Glove information page at <https://essr.umd.edu> for assistance in glove selection.

Assure that the glove will provide adequate protection for the chemical to be encountered. If multiple chemical hazards exist, base the effectiveness of the glove on the chemical with the fastest breakthrough time. Inspect gloves prior to each use. If gloves are to be reused, follow the manufacturer's instructions for proper decontamination and storage. It is important to note the expected service life of the glove as well, to plan for expected disposal times.

Hand Protection Selection Chart

Hazard	Degree of Hazard	Protective Measure
Abrasion	Severe	Reinforced heavy rubber, staple reinforced heavy leather
	Less Severe	Rubber, plastic, leather, polyester, nylon, cotton
Sharp Edges	Severe	Metal mesh, staple-reinforced heavy leather, Kevlar aramid-steel mesh
	Less Severe	Leather, terry cloth (aramid fiber)
	Mild with delicate work	Lightweight leather, polyester, nylon, cotton
Chemicals		Refer to ESSR website: https://essr.umd.edu
Cold	Severe	Cryo-gloves, Zetex – not for immersion in liquid nitrogen
	Less severe	Leather, insulated plastic or rubber, wool, cotton
Electricity		Rubber-insulated gloves tested to appropriate voltage meeting ANSI/ASTM D120-87e1
Heat	High temperatures (over 350 deg C)	Zetex high temperature
	Medium high (up to 350 deg C)	Nomex, Kevlar, heat resistant leather with linings
	Warm (up to 200 deg C)	Nomex, Kevlar, heat-resistant leather, terry cloth (aramid fiber)
	Less warm (up to 100 deg C)	Chrome-tanned leather, terry cloth
General Duty		Cotton, terry cloth, leather
Product Contamination		Thin film plastic, lightweight leather, cotton, polyester, nylon



Appendix I

**UNIVERSITY OF MARYLAND, COLLEGE PARK
PERSONAL PROTECTIVE EQUIPMENT GUIDELINE
CERTIFICATION OF HAZARD ASSESSMENT FORM**

Job Title:	Date:
Department:	Analysis by:
Location:	Supervisor:
Employee(s):	Signature:

Tasks	Potential Hazard	PPE	Opt	Req

- Opt.** - Wearing the personal protective equipment indicated is an option of the employee
Req. - Wearing the personal protective equipment indicated is a requirement of employment.

Personal Protective Equipment Training Certification

I certify that I have received and understand Personal Protective Equipment (PPE) Training on the equipment listed in the Hazard Assessment. I understand the types of PPE to be worn, when the PPE is necessary, how to properly don, doff, adjust and wear PPE, the limitation of PPE and the proper care, maintenance, useful life and disposal of the PPE.

Employee Signature: _____ Date: _____

I certify that Personal Protective Equipment (PPE) Training has been provided and that the employee has demonstrated an understanding of the above and an ability to use the PPE properly.

Supervisor Signature: _____ Date: _____

Appendix II

**University of Maryland
Personal Protective Equipment Training Record**

I _____ certify that the following affected employees
(print full name)
have received and understood personal protective equipment (PPE) training, which included the following: when PPE is necessary; what PPE is necessary; how to properly don, doff, adjust, and wear PPE; the limitations of the PPE; and the proper care, maintenance, useful life and disposal of the PPE.

Each of the affected employees has demonstrated an understanding of the above and an ability to use the PPE properly. This training is in compliance with 29 CFR 1910.132 (f).

Name	University ID	Equipment Type	Date of Training

(signature) _____ (date) _____

Note to signer: maintain this certification with your permanent departmental records.