

# Personal Protective Equipment (PPE)

Last Revised: September 2021



**Research Safety**

*Office of Research*

**UNIVERSITY OF GEORGIA**

## **I. Purpose & Scope**

This document is meant to provide an overview of the University's requirements and recommendations for the use of personal protective equipment (PPE) while handling hazardous substances. Improper or negligent use of PPE could result in serious injury to yourself or others. Please refer to individual chemical safety data sheet (SDS) for appropriate PPE required for each process and always remember that PPE should not be relied on as the only protection against hazards. It should be used in conjunction with engineering controls (e.g., fume hoods) and administrative controls (e.g., using less hazardous alternatives).

## **II. Hazard Assessments**

Whether it is formal or informal, a hazard assessment is typically performed before starting any laboratory operation to determine what safety controls should be in place to protect personnel and property. These assessments can be done for either an entire area or lab, a particular job category, or for an individual. If lab users are unsure about the type of PPE necessary for a particular job class or area, it is highly recommended, that they perform a formal hazard assessment before starting any work. Appended to this document is a formal PPE hazard assessment template with instructions on how to use it. Once completed, a formal hazard assessment should be signed by the evaluator and kept on file within the lab. Labs can reach out to any of the departments listed in the Contacts section of this document if they have any questions or concerns about completing a hazard assessment.

## **III. Laboratory Attire**

Proper laboratory attire should be worn by all those working in the laboratory whether an individual is actively working with hazardous substances or not. Accidents involving experiments nearby can still inflict injury to those not actively working at lab benches or fume hoods. For this reason, anyone entering the lab space must be wearing at a minimum:

- Flat bottomed shoes that cover the tops of the feet, heels, and toes. No opened toe shoes, Crocs® or any other shoe that exposes part of the foot should be worn in the laboratory.

- Long pants completely covering the user to the ankle. No ripped jeans, shorts, capris, skirts, or pants with sheer panels should be worn in the lab.
- Shirts or tops worn in a lab must cover the user's torso and shoulders at a minimum. No tank tops, cropped shirts, or ripped shirts should be worn in the lab.

In addition to these requirements, the following recommendations are made regarding proper laboratory attire

- Choose clothing made of natural fibers such as cotton whenever possible as they are more fire resistant than synthetic fibers such as polyester or nylon.
- Wear clothing that accommodates lab coat use.
- Wear clothing that is loose enough to be easily removed in the case of any emergency. Tight clothing that adheres to the body can be difficult to remove in the event of a chemical exposure and can lead to more serious injury.
- Keeping a change of clothes or scrubs in the laboratory is recommended. This allows users to wear other types of clothing for classes or jobs outside of a laboratory setting. Additionally, users will have a backup set of clothing in case the clothing being worn becomes contaminated.

#### **IV. Eye Protection**

All employees and students who participate in or observe any of the following functions shall wear proper eye protection: chemical, physical, or combined chemical-physical operations involving caustic, toxic, irritant, or explosive materials, hot liquids or solids, injurious radiation, biohazards, or any dispensing of hazardous chemicals. Eyewear should be cleaned before being issued to a different user. It is recommended that contact lenses not be worn (even with additional eye protection) in environments involving chemical splash hazards or potential vapor exposure.

- A. Safety Glasses** – Safety glasses must meet the American National Standards Institute (ANSI) standard “Occupational and Educational Eye and Face Protection” Z87.1 –2015.
- B. Chemical Goggles** - Chemical splash goggles that have splash proof sides to fully protect the eyes shall be worn when participating in or observing procedures using liquid hazardous chemicals that are corrosive or highly toxic.
- C. Face Shield** - Face shields are required when there is need for protection of the entire face and neck area. Face shields must be worn over top of safety glasses or goggles, they are not an alternative to safety glasses or goggles.
- D. Specialty Eyewear** – If ultraviolet (UV) light or lasers are used in the lab, specialty eyewear is required to ensure adequate protection during each of these processes.

## V. **Splash Protection**

Lab coats and aprons must be donned before the handling of chemicals, biohazardous material, or radioactive substances. Lab coats and aprons must cover the user to the knees.

- A. **Aprons** - Aprons resistant to the chemical to be used shall be provided to workers when the potential for skin absorption exists.
- B. **Laboratory Coats** - Laboratory coats are intended to prevent contact with the minor chemical splashes and spills encountered in a laboratory. Laboratory coats which do not significantly resist penetration by organic liquids shall be removed immediately when they become contaminated. Laboratory coats shall be worn in the immediate areas where hazardous materials are actively being handled or used. Laboratory coats used during the handling of hazardous chemicals, biohazards, or radioactive substances should not be worn in other areas outside the laboratory such as offices, cafeterias, restrooms, or libraries.

## VI. **Hand Protection**

Protective gloves must be worn while using any hazardous material: chemicals, hot or cold liquids, objects that pose a risk of thermal burns, cryogenics, physical hazards, or equipment that may cause hand injury. The gloves must be appropriate for the material or process being used. Always check your gloves for physical damage such as tears or small pin holes, prior to use.

- A. **Chemical Resistant** – Nitrile gloves are the recommended choice when working with hazardous chemicals as they provide protection against a wide range of solvents. Chloroprene gloves provide protection against specific chemicals that other disposable gloves do not. Although nitrile gloves provide the broadest range of protection, other specialty gloves may be needed for the handling of certain substances (e.g., methylmercury compounds require the use of silver shield gloves). Double gloving should be exercised when working with highly toxic or corrosive substances. Additionally, special attention should be paid to the thickness of the gloves as some breakthrough can occur with certain chemicals if gloves are too thin. A general rule is to utilize nitrile gloves with a minimum thickness of 4-4.5mil when working with hazardous chemicals; if you can only find thinner gloves, then double-gloving is an acceptable alternative. Section 8 of a Safety Data Sheet provides PPE information for a chemical if you have questions about what should be used with a particular item. Some manufacturers and vendors will even suggest minimum glove thickness for the item in this section as well.
- B. **Cryogenic** – Cryogenic gloves offer protection against cryogenic liquids and extreme cold, such as liquid nitrogen.

- C. **Heat Resistant** – Heat resistant gloves should be worn to protect the user from hot surfaces such as ovens, autoclaves and microwaves.

## VII. **Respiratory Protection**

Contact either the Office of Research Safety (ORS) or the Environmental Safety Division (ESD) for advice regarding the purchase of respirators. All operations within a laboratory facility that involve the transfer or alteration of a hazardous chemical which may generate air contaminants at or above the appropriate occupational exposure levels shall be carried out in a chemical fume hood appropriate for the work being performed. If the use of a fume hood is not appropriate or practical, then respirators may be required. If respirators are to be used in the lab, all users must enroll in the UGA Respiratory Protection Program. Contact ESD for further information regarding the use of respiratory protection.

- A. **Air Purifying Respirators** – N95, Half Face APR (air purifying respirator), PAPR (powered, air-purifying respirator) and Full Face APR. These respirators are designed to filter out the airborne particles in the air. These are not meant for use in areas of oxygen deficiency and respirator cartridges should be appropriate for the contaminant being filtered.
- B. **Atmosphere Supplying Respirators** – Supplied Air (SA) or Air Line respirators and Self- Contained Breathing Apparatus (SCBA) supply the user with fresh breathable air in an immediately dangerous to life or health atmosphere.

## VIII. **Other Types of Hazards and Associated PPE**

Types of hazards that are not usually encountered in a laboratory setting include noise hazards and fall hazards. While rarely seen in traditional laboratories, UGA researchers may come across these hazards while conducting research either on campus or in the field. Each of these situations needs to be assessed for the types of risks and hazards presented by the task and then decisions about appropriate PPE should be made based on the risk assessment.

Areas and activities that may present noise hazards include mechanical rooms, machining, grinding, sanding, pneumatic equipment, grounds equipment, generators, motors, saws, jackhammers, and similar equipment. Work in these areas may require earmuffs or earplugs.

Areas and activities that may present fall hazards include working on a surface with an unprotected side that is more than four feet above a lower level, elevated platforms, tree trimming, or performing work on poles, roofs, or fixed ladders. Work in these areas may require a written Fall Protection Plan outlining the use of fall protection PPE.

Other types of hazards not addressed by this SOP may be encountered from time to time and researchers should contact either the Office of Research Safety or the Environmental Safety Division if they have questions about the appropriate PPE for any hazardous research area or activity.

**IX. Contacts**

Office of Research Safety: 706-542-5288

Environmental Safety Division: 706-542-5801

ESD, Industrial Hygiene and Occupational Safety: 706-713-2728

**X. References**

Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, National Research Council, 2011.

Code of Federal Regulations, 29CFR 1910.134, Respiratory Protection Standard, Occupational Safety & Health Administration.



## **Personal Protective Equipment (PPE) Hazard Assessment**

### **Instructions:**

PPE use should be considered only as a last resort to minimize exposure to workplace hazards. PPE should always be used in combination with other control strategies, such as engineering controls and administrative controls.

This assessment addresses PPE use for the minimization of exposures to eye, face, head, hand, foot, torso, respiratory, noise, and fall hazards.

### **General Guidelines:**

The PPE Hazard Assessment can be conducted for an area, a job category or for an individual by selecting and filling in the appropriate box. The assigned evaluator should include their name, department/division being assessed, and the date. Completed assessments must be accessible to employees and EH&S inspectors. Assessments should be updated as needed to reflect current work tasks and procedures.

### **PPE HAZARD ASSESSMENT INSTRUCTIONS**

#### **STEP 1: INFORM AFFECTED EMPLOYEES OF THE PROCESS:**

Affected employees from each work area that is being assessed should be involved in the process. Discuss the reasons for the survey and the procedures being used for the assessment. Review the job procedures, potential hazards and the PPE currently in use.

#### **Step 2: Review data:**

Reports of work-related injuries or illnesses, near-miss events and reported safety concerns are sources of data that can provide helpful information for assessing hazards.

#### **Step 3: Conduct a walk-through survey:**

The purpose of the survey is to identify sources of hazards to employees. Observe the following: layout of the workplace, location of the employees, work operations, hazards and places where PPE is currently used including the device and reason for use. Using the form, check the type of hazard(s) present within each section (organized by body part). Further descriptions can be provided in the adjacent box. Consideration should be given to the following basic hazard categories:

1. Impact (falling/flying objects)
2. Penetration (sharp objects piercing foot/hand)
3. Compression (roll-over or pinching objects)
4. Chemical exposure (inhalation, ingestion, skin contact, eye contact or injection)
5. Temperature extremes (heat/cold)
6. Dust/flying debris (grinding, chipping, sanding, etc.)
7. Fall (slip/trip, scaffolds, elevated work)
8. Radiation (non-ionizing: UV/IR/light, welding, brazing, cutting, furnaces, etc.)
9. Noise (mechanical rooms, machines, cage washing, jackhammers, etc.)
10. Electrical (shock, short circuit, arcing, static)

**Step 4: Select PPE:**

After considering and/or planning for other controls, select the PPE which provides at least the minimum level of protection required to protect employees from the hazards. Using the form, note the appropriate PPE in the required PPE box. For help with proper PPE selection, contact ESD Industrial Hygiene & Occupational Safety (IHOS).

**Step 5: Make Document Accessible:**

Once completed, signed and dated, store the form either electronically or as a hard copy in a location easily accessible to employees and EH&S inspectors.

**Step 6: Revise Procedures:**




Update workplace procedures/SOPs with the new or modified PPE requirements if applicable. Attach or append this hazard assessment to any affected procedures.

**Step 7: Reassess the workplace as necessary by identifying and evaluating:**

1. New equipment and processes
2. Accident records
3. Suitability of previously selected PPE






Please contact ESD Industrial Hygiene and Occupational Safety (IHOS) by phone at 706-713-2728 or email at [ihos@uga.edu](mailto:ihos@uga.edu) for PPE selection guidance, resources and assistance.

## PPE Hazard Assessment

<b>I am reviewing (check the appropriate box):</b>	<input type="checkbox"/> A worksite	Location:	
	<input type="checkbox"/> A single employee's job description	Name of employee:	
	<input type="checkbox"/> A job description for a class of employees	Position Title:	
		Position Titles:	
		Location:	
<b>Your Name:</b>		<b>Department/Division:</b>	<b>Date:</b>
	<b>EYE HAZARDS:</b> Tasks that can cause eye injury include: working with chemicals or acids; UV lights; chipping, sanding, or grinding; welding; furnace operations; and metal and wood working.		
	<b>Check the appropriate box for each hazard:</b>	<b>Description of hazard(s):</b>	<b>Required PPE</b>
	Chemical Exposure <input type="checkbox"/>		
	High Heat/Cold <input type="checkbox"/>		
	Dust/Flying Debris <input type="checkbox"/>		
	Impact <input type="checkbox"/>		
	UV/IR Radiation <input type="checkbox"/>		
	Other: <input type="checkbox"/>		
	<b>HEAD/NECK/FACE HAZARDS:</b> Tasks that can cause head/neck/face injury include: working below other workers who are using tools or materials that could fall, working on energized electrical equipment or utilities, and working in trenches or confined spaces.		
	<b>Check the appropriate box for each hazard:</b>	<b>Description of hazard(s):</b>	<b>Required PPE</b>
	Chemical Exposure <input type="checkbox"/>		
	Dust/Flying Debris <input type="checkbox"/>		
	Impact <input type="checkbox"/>		
	UV/IR Radiation <input type="checkbox"/>		
	Electrical Shock <input type="checkbox"/>		
	Other: <input type="checkbox"/>		
	<b>FOOT HAZARDS:</b> Tasks that can cause foot injury include: exposure to chemicals or acids, welding or cutting, materials handling, renovation or construction, and electrical work.		
	<b>Check the appropriate box for each hazard:</b>	<b>Description of hazard(s):</b>	<b>Required PPE</b>
	Chemical Exposure <input type="checkbox"/>		
	High Heat/Cold <input type="checkbox"/>		
	Impact/Compression <input type="checkbox"/>		
	Electrical <input type="checkbox"/>		
	Puncture <input type="checkbox"/>		
	Slippery/Wet Surfaces <input type="checkbox"/>		
Other: <input type="checkbox"/>			



## PPE Hazard Assessment

	<b>HAND HAZARDS:</b> Hand injury can be caused by: work with chemicals or acids, exposure to cut or abrasion hazards (for example, during demolition, renovation, woodworking, or food service preparation), work with very hot or cold objects or materials, and exposure to sharps.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Required PPE
	Chemical Exposure <input type="checkbox"/>		
	High Heat/Cold <input type="checkbox"/>		
	UV/IR Radiation <input type="checkbox"/>		
	Electrical Shock <input type="checkbox"/>		
	Puncture <input type="checkbox"/>		
Cuts/Abrasion <input type="checkbox"/>			
Other: <input type="text"/>			
	<b>BODY HAZARDS:</b> Injury of the body (torso, arms, or legs) can occur during: exposure to chemicals, acids, or other hazardous materials; abrasive blasting; welding, cutting, or brazing; chipping, sanding, or grinding; use of chainsaws or similar equipment; and work around electrical arcs.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Required PPE
	Chemical Exposure <input type="checkbox"/>		
	High Heat/Cold <input type="checkbox"/>		
	Impact/Compression <input type="checkbox"/>		
	Electrical Arc <input type="checkbox"/>		
	Cuts/Abrasion <input type="checkbox"/>		
Other: <input type="text"/>			
	<b>FALL HAZARDS:</b> Personnel may be exposed to fall hazards when performing work on a surface with an unprotected side or edge that is 4 feet or more above a lower level, or 10 feet or more on scaffolds. Fall protection may also be required when using vehicle man lifts, elevated platforms, tree trimming, performing work on poles, roofs, or fixed ladders.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Required PPE
	Fall hazard <input type="checkbox"/>		
	<b>NOISE HAZARDS:</b> Personnel may be exposed to noise hazards when working in mechanical rooms; machining; grinding; sanding; cage washing; dish washing; working around pneumatic equipment, grounds equipment, generators, chillers, motors, saws, jackhammers, or similar equipment.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Required PPE
	Noise hazard <input type="checkbox"/>		
	<b>RESPIRATORY HAZARDS:</b> Personnel may be exposed to respiratory hazards that require the use of respirators: during emergency response, when using certain chemicals outside of a chemical fume hood; when working with hazardous powders; when entering fume hood plenums, when working with animals; when applying paints or chemicals in confined spaces; when welding, cutting, or brazing on certain metals; and when disturbing asbestos, lead, silica, or other particulate hazards.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Required PPE
	Chemical exposure <input type="checkbox"/>		
	Particulate exposure <input type="checkbox"/>		
	Other: <input type="text"/>		
I certify that the above hazard assessment was performed to the best of my knowledge and ability, based on the hazards present on this date. _____ (signature)			