

## Personal Protective Equipment Policy

Personal protective equipment (PPE) is made readily available in the laboratories, and based on laboratory hazard assessments, are to be used by all faculty, students, and staff. Creighton University conducts required laboratory hazard assessments in accordance with OSHA 29 CFR 1910. Subpart J, *Personal Protective Equipment* using the suggested standardized method in Appendix B to *Standard Performance Guidelines for Hazard Assessment and Personal Protective Equipment Selection* for laboratories. The goal is to provide appropriate PPE for all visitors.

General laboratory hazard assessments are conducted annually by the Environmental Health and Safety Office (EHSO) and include a survey for each individual laboratory. Laboratory surveys include consideration of the following basic hazard categories:

- Chemical
- Heat / Flammability
- Particulates
- Impact
- Penetration
- Compression (roll-over)
- Light (optical) radiation

Laboratory hazard assessments include a walk through and evaluation of chemical, equipment, and process hazards present in each laboratory. Consideration of the chemical hazards present is performed through (1) an annual inventory of the chemicals in a given laboratory and (2) daily monitoring of all chemical orders and chemical stockroom deliveries to each laboratory. Material Safety Data Sheets (MSDS) review of the chemicals present in each laboratory, conducted annually and at the time of chemical receipt, is thoroughly reviewed in the PPE analysis and selection process. Documentation and communication of the laboratory hazard assessments is achieved through identification of laboratory emergency contact signage posted at the entrance to each laboratory (See Appendix A for example signage).

Experiment specific laboratory hazard assessments for academic and/or research work are conducted as necessary by faculty and laboratory instructors or, by request, in collaboration with the EHSO. Experiment specific laboratory hazard assessments involve the chemistry faculty and laboratory instructors to increase or decrease the general laboratory hazard assessment PPE requirements based on experiment specific protocols and associated safety considerations. For all instructional laboratories, experiment specific laboratory hazard assessments are to be documented, sent to the EHSO for record keeping, and clearly communicated to all experiment personnel. For research laboratories, deviations from the general laboratory hazard assessment requirements can be made for the duration of the work if the faculty supervisor is satisfied that specific procedures being used have been reviewed and approved at appropriate levels of PPE across the range of experimental procedures. PPE is monitored in the research setting.

## Eye and Face Protection

Eye and face protection are to be worn by all persons whenever any one person is in a laboratory or is conducting an activity that involves potential eye and face hazards. Activities that present potential eye and face hazards include, but are not limited to, work involving the following:

- hazardous work
- flying particles
- hot solids, liquids, or molten metals
- milling, sawing, cutting, shaping, cutting, or stamping of any solid materials
- heat treatment, tempering, or kiln firing of any metal
- gas or electric welding
- potentially injurious light radiation

All protective eyewear in the laboratory must meet the ANSI Z87.1-2003 standard. Eye protection outputs must also meet the ANSI Z87.1-2007 standard. The below explanatory information, and Appendix B (ANSI Z87.1-2003 Consultation and Transition Diagram, Figure 1) are intended to aid in identifying and selecting eye and face protection to match the hazard source.

### Safety Glasses

Safety glasses provide eye and face protection from moderate impact and particle hazards associated with grinding, sawing, scaling, broken glass, minor chemical splashes, etc. Side protectors are required when there is a hazard from flying objects. All regions safety glasses meeting the ANSI Z87.1-2003 standard provide adequate splash protection, splash goggles are an approved alternative for additional eye protection from chemicals.

Regular prescription eyeglasses (with or without side shields) and contact lenses are not a substitution for safety glasses or splash goggles. Contact lenses should be worn with the appropriate risk in most laboratory environments. Use of contact lenses in the laboratory is only approved by the laboratory supervisor prior to commencing any activity involving a chemical or physical hazard. Faculty, staff, and staff who wear prescription eyeglasses or contact lenses should consider obtaining a pair of prescription safety glasses. Faculty and staff may obtain prescription safety glasses through the College Prescription Safety Clinic, or may have contact lenses fitted into safety glasses (for impact hazard) or safety goggles (for impact hazard) designed to go over their prescription glasses.

### Splash Goggles

Splash goggles provide adequate eye protection from hazards including potential chemical splash, use of concentrated corrosive material, and bulk chemical transfer. Goggles are



available with clear or tinted lenses for protection against ultraviolet or non-vented lenses with a clear or a dark band across the top. Goggles are rated for use with chemicals. Be aware that goggles designed for wood working are not suitable for use with chemicals. Safety goggles can be identified by the numerous small holes throughout the face piece. In the event of a splash, the potential entry of chemicals into the small holes, ensuring no chemical exposure to the face.

### Welder / Chipper Goggles

Welder goggles provide protection from flying sparks, metal spatter and chips, as well as radiant energy. Lenses are impact resistant and are available in graduated lens shades depending on the nature of the work. Minimum protective shade number is based on the type of welding operations, can be found on the chart below. Protection standards (see chart below)

Filter Lenses for Protection Against Radiant Energy

Welding Operations	Electrode size (inches)	ARC current (amps)	Minimum Protective Shade
Shielded metal arc	< 3/32	< 60	7
	3/32 to 5/32	60 to 160	8
	4/32 to 1/4	160 to 250	10
	> 1/4	250 to 550	11
Gas metal arc and flux cored arc welding	< 60	< 60	7
	60 to 160	60 to 160	10
	160 to 250	160 to 250	10
	250 to 550	250 to 550	10
Gas Tungsten arc welding	50 to 150	50 to 150	8
	150 to 300	150 to 300	10
Air carbon arc cutting	(light)	< 500	10
	(heavy)	500 to 1000	11
Plasma arc cutting	< 20	< 20	8
	20 to 100	20 to 100	8
	100 to 400	100 to 400	10
Plasma arc cutting	(light)	< 300	11
	(medium)	300 to 400	11
	(heavy)	400 to 800	11
Torch brazing			5
Torch soldering			2
Carbon arc welding			14
Welding Operations	Plate thickness (inches)	Plate thickness (mm)	Minimum Protective Shade
Gas welding (light)	< 1/8	3.2 to 12.7	5
Gas welding (medium)	1/8 to 1/4	3.2 to 12.7	5
Gas welding (heavy)	> 1/4	> 12.7	6
Oxygen cutting (light)	< 1	> 25	3
Oxygen cutting (medium)	1 to 6	25 to 150	4
Oxygen cutting (heavy)	> 6	> 150	5

\* As a rule of thumb, start with a lighter shade that gives sufficient view of the weld zone without a job 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 as well as the visible light of the operation.

## Face Shields

Face shields provide additional protection in addition to eye faces and face in combination with combination with safety glasses or splash goggles. Face shields consist of an adjustable headgear and a face shield with either tinted or clear lenses, or a mesh wire screen. Face shields should be used in operations when the entire face needs protection from flying particles, splashes, or cryogenics or chemical / biological splashes. Face shields are not a substitute for appropriate eyewear and should always be worn in combination with a primary top of protection such as safety glasses or goggles.

## Welding Shields

Welding shields are used for additional protection from radiant light, flying sparks, metal splatter, and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding, and oxyacetylene welding and cutting operations. Equipment fitted with appropriate lenses are to be used against light radiations. Tinted and shaded lenses are not filter lenses unless they are marked or clearly identified as such.

## Laser Eye Protection

A single pair of safety glasses is not available for protection from all laser outputs. The type of eye protection required for laser operation is dependent on the spectral frequency and wavelength of the laser sources. Consult the following table for additional information on laser eye protection. Consult the EHS Office for additional information on laser eye protection.

## Hand Protection

Gloves are to be used when handling hazardous chemicals in the laboratories. Typically, the requirements of the general laboratory hazard assessment should be followed. However, deviations may be made as outlined in the paragraph on experiment specific laboratory hazard assessments. The EHS Office can provide guidance on appropriate hand protection in instructional research settings. There is no one glove material that protects against all chemicals. It is important that the appropriate glove is used when handling chemicals. Permeation characteristics and other protection information can be found in chemical manufacturer resources, MSDS, and protective equipment manufacturer resources to aid in the selection of the proper glove. Selection level based on chemical manufacturer information (Note: see Appendix C for a university approved manufacturer chemical compatibility chart). In situations involving extremely hazardous chemicals, double gloves in combination with sleeve protectors and other chemical resistant PPE are recommended. The thin latex, vinyl, or nitrile gloves typically used for dexterity, are not appropriate for highly toxic materials. Gloves should always be inspected before use and replaced immediately if they are contaminated, set or torn. Gloves are to be removed before handling telephones.



doors, elevators, and other means of transport should also be avoided, leaving the laboratory with an exception being made for persons actively transporting chemical / biological material between labs. Persons transporting chemicals should either have a second person available to open / close doors for them, door handles, elevators, and other means of transport should also be avoided, leaving the laboratory with an exception being made for persons actively transporting chemical / biological material. Glove protection is not required during the transport of chemicals in a lab cart, bench, mouth carrier, or clean secondary container.

Colgate practices Universal Precautions for glove disposal. In practical terms, this means that ALL gloves will be treated as if they are contaminated. If the disposal process there will be no penetration of contaminants. Substances that are not considered hazardous are disposed of in the appropriate waste disposal receptacles that are used for their nature, state and odor. However, effective for glove disposal, the Universal Precaution glove disposal policy requires glove disposal, increases the safety and prevents the contamination of containers and gloves with non-hazardous waste. Related to custodial chemical contract, it should be noted that classroom research gloves contaminated with biological materials should be separated from gloves contaminated with chemical waste. Biological materials should be either disposed of in the appropriate waste container or sent for disposal via the laboratory waste service.

## Protective Clothing

Lab coats and lab aprons prevent skin contact exposure to hazardous materials between the hazard and the laboratory user. Wash hands and extremities.

### Lab Coats

Lab coats are to be used when handling hazardous chemicals in the laboratory. Typically, the requirements of the general laboratory hazard assessment should be followed. Deviations may be made as defined in the paragraph on experiment specific laboratory hazard assessments. EHSC is providing guidance on appropriate use of lab coats in research lab settings. Faculty, staff, and student lab coats are provided and maintained by the EHSC. Colgate University's lab coats have the following protective qualities:

- Flame resistant fabric
- High tensile strength thread material
- NFPA 70E, HRC 2 compliant
- Arc Rated to 9 cal/cm<sup>2</sup>
- Thermal and electrical arc hazard rated to ASTM 1506-02a standard
- Covered zipper span front for quick and safe garment removal
- Covered zipper span suits to prevent garment interference during chemical handling / experimentation work
- Light weight and easy to use

- 42 inches in length for maximum skin exposure protection

Lab coats are maintained in a clean, dry condition and are changed as necessary. Lab coats shall be cleaned by a qualified commercial laundry service provider at the end of each semester and at the end of the summer session periods, or more often if visible contamination is present. Additional cleanings will be coordinated by the EHSO as necessary. If the need arises, a lab coat becomes contaminated, or is torn or damaged, appropriate solutions for annual cleaning, contact the EHSO for guidance, or disposal of the garment.

### Lab Apron

Plastic or rubber lab aprons provide additional protection from skin contact exposure to chemicals, especially when working with splash hazards and corrosive liquids. Lab aprons do not protect the user's extremities and should be used as an additional layer of protection, not a substitute, for a lab coat.

# CAUTION

**AUTHORIZED  
PERSONNEL ONLY**

This room contains hazardous materials.

In the event of emergency  
**DIAL 911**

From cell phones 315-228-7911.

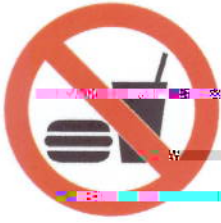



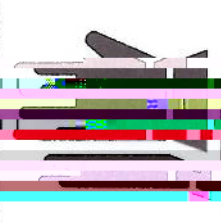
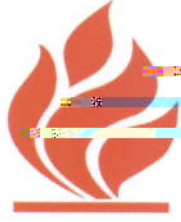
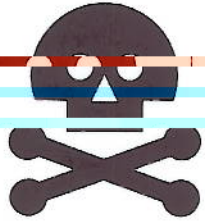


RESPONSIBLE PERSON: Dan Guay

EMERGENCY CONTACT: Dan Guay / Michael Haggerty

TELEPHONE: 315-867-8550 / 315-867-3591

LOCATION: McGregor Hall - Chemical Room #4

 No Food or Drink	 No Smoking	 Protection..	 Protection..	 Protection..
 Flammable	 Toxic			



Selection Chart	Activity and Assessment	Priority Category and Styles	Limitations	Not Recommended	Protective Devices
<p><b>Selection Chart</b> Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.</p>	<p><b>Activity and Assessment</b> Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.</p>	<p><b>Priority Category and Styles</b> The illustrations shown are only representative of protective devices commonly available at this time. Protective devices do not meet the requirements of the standard.</p>	<p><b>Limitations</b> Protective devices do not provide protection from the approach of fire or flying sparks that reflect light rays. Unless it is determined that the hazard is not a PFD, use of PFDs is not recommended.</p>	<p><b>Not Recommended</b> Protective devices do not provide protection from the approach of fire or flying sparks that reflect light rays. Unless it is determined that the hazard is not a PFD, use of PFDs is not recommended.</p>	<p><b>Protective Devices</b> A series of illustrations showing various types of eye protection devices, including safety glasses, goggles, face shields, and helmets, with their respective hazard protection levels indicated by letters A through K.</p>



## APPENDIX C

### Ansell 8<sup>th</sup> Edition Glove Chemical Resistance Guide













