



Personal Protective Equipment Compliance

Compliance Requirements

The university is subject to federal, state, and local regulatory agency standards, as well as the requirements of funding agencies; the most explicit of these that have personal protective equipment (PPE) requirements include:

- National Institutes of Health (NIH) [Grants Policy Statement](#) section 4.1.12
- [General Guidelines](#) for Awards Funded by Department of Defense section 3
- Center for Disease Control and Prevention (CDC) “Biosafety in Microbiological and Biomedical Laboratories” ([BMBL](#))
- OSHA Laboratory Standard ([29 CFR 1910.1450](#))
- OSHA PPE standards ([29 CFR 1910.132-138](#))

PPE is equipment used to promote employee safety including but not limited to gloves, eyewear, boots or shoes, protective clothing, respiratory protection devices, and shields or barriers. PPE is required when hazardous materials (chemical, biological, or radiological materials) or physical hazards are present. Appropriate controls to minimize risk, including PPE, must ensure that OSHA permissible exposure limits are not exceeded.

The minimum attire required to enter a technical area at the University of Colorado Denver and the Anschutz Medical Campus shall include:

- Full-length pants (or skirt, dress, etc., equivalent to pants with respect to length)
- Closed-toe and closed-heel shoes so that skin between the pants (or equivalent) and shoes is not exposed

A technical area is a location where hazardous materials are present or physical hazards exist, including but not limited to: research laboratories, teaching laboratories, storage facilities, workshops, waste accumulation areas, remodeling or renovation projects, vivarium, and visual arts shops/studios. Additional PPE required shall be determined by laboratory-specific standard operating procedures (SOPs) for chemicals that are uniquely hazardous, and/or hazard assessment for the technical area.

Safety is a shared responsibility throughout the institution and each individual must fulfil their responsibilities to ensure that a culture of safety is fostered at the University of Colorado Denver | Anschutz Medical Campus.

Responsibilities

Environmental Health and Safety (EHS): Responsible for interpretation, clarification, and implementation of compliance with regulatory standards, including PPE. EHS will review and update this PPE compliance document as necessary, assist supervisors with hazard assessments, and develop or provide training and training resources. EHS has also developed and will maintain a [Chemical Hygiene Plan template](#), per 29 CFR 1910.1450, to minimize exposures and avoid underestimation of risk.

Supervisors: Responsible for complying with PPE requirements and ensuring that all workers in technical areas that fall under their supervision are notified regarding what PPE is required, receive training, and understand proper use of PPE (donning, doffing, storage, maintenance, etc.), in accordance with the University of Colorado Code of Conduct, [APS 2027](#). A supervisor is defined as someone who has hiring authority, evaluates worker performance, assigns work tasks, handles safety issues, or directs resources to rectify safety violations. This title may apply, but is not limited to the following roles: clinic manager,

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laboratory coordinator, laboratory manager, Principle Investigator (PI), Facilities Management supervisor, or project manager. In laboratory settings, the PI is the assumed supervisor, unless otherwise noted. Supervisors must ensure that PPE is appropriate for the work performed, update the hazard assessment if tasks, hazardous materials or physical hazards change, and inform employees if there are subsequent changes to required PPE. Supervisors must provide workers with the required PPE at no cost to the worker, with the exception of those items listed in 29 CFR 1910.132(b) and 29 CFR 1910.132(h) (refer to the [Personal Protective Equipment](#) requirements of 29 CFR 1910).

Workers: Responsible for completing required training, understanding required PPE in the technical areas in which they work, the limitations of PPE, maintenance of PPE, and how to properly wear such PPE, in accordance with [APS 2027](#). This applies to any individual who performs tasks with hazardous materials or physical hazards in a technical area(s), including but not limited to: employees (faculty, staff, temporary hires), interns, students, visiting researchers, visitors, or volunteers. Workers must report unsafe work conditions to their supervisor or EHS.

Requirements

1. Minimum attire

The minimum attire required in all technical areas includes full-length pants (or skirt, dress, etc., equivalent to pants with respect to length) and closed-toe and closed-heel shoes, so that skin between the pants (or equivalent) and shoes is not exposed. The minimum attire described here may only be modified by a laboratory specific chemical SOP or a hazard assessment, both of which must be approved by EHS. Some areas, including the animal research facilities, biosafety level (BSL) 2+ and BSL 3 labs, or spaces in which radioactive materials are used, may have additional minimum attire required for entry as well as specific PPE requirements; as such, when entering any technical area, adhere to any posted signage regarding attire required.

2. PPE in technical areas

A. Protective eyewear: Eye and/or face protection is required for all workers handling hazardous materials or working with physical hazards. Individuals working in a technical area adjacent to hazardous material or physical hazard-related work who have a potential for exposure are required to wear protective eyewear.

Workers are required to wear eye protection if exposed to:

- Biohazards: blood borne pathogens, human blood, body fluids, cell lines, rDNA, viral work, etc.
- Chemicals: acids, bases, flammables, oxidizers, toxics, reactive materials, and/or compressed gases or vapors
- Radioactive material: liquid or solid
- Live animals
- Flying particles
- Potentially harmful light radiation

There are several forms of eye and face protection including safety glasses, goggles, glasses with side shields, and face shields. As noted in the [OSHA PPE Guide](#), there are also specific types of eye protection for radiant light, such as welding or laser work. For further information on laser safety, please refer to the EHS Laser Safety Guidelines.

Several factors contribute to selecting the proper eye and face protection including the hazards being worked with, function of other PPE required (e.g., a respirator), ability provide unrestricted vision and movement (e.g., be compatible with prescription lenses/eye wear), and be durable and cleanable. OSHA has an [eye and face protection tool](#) online and provides general recommendations for eye protection in

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the eye protection per 1910 Subpart I, [Appendix B](#). Eye and face protection devices must comply with American National Standards Institute (ANSI) standard Z87.1-1968.

B. Hand protection: Gloves are required for work with hazardous materials or physical hazards. The type of gloves must be appropriate for the material or process performed, taking into account hazardous materials and/or physical hazards, the area requiring protection, size and comfort, and the duration and nature of contact (incidental or extended). Incidental contact involves little or no direct contact with the hazardous material, such as accidental splashes, overspray from a dispensing device, or handling agents that require barrier protection. Extended contact includes handling highly contaminated materials, submerging hands in a hazardous material, or the need for physical protection from temperature extremes or physical hazards.

There are several resources to aid in selecting proper hand protection; always refer to the Safety Data Sheet (SDS), the manufacturer's glove index or glove selection guide for additional information on glove compatibility. The [OSHA PPE Guide](#) highlights several of the broad classes of glove types including:

- Leather, canvas, or metal mesh gloves for protection against cuts, burns, heat, and animal bites
- Fabric or coated fabric gloves for abrasion protection, slip resistance, and/or chemical exposure
- Chemical and liquid resistant gloves such as butyl, latex, neoprene, or nitrile gloves

As a reminder, always check the SDS and manufacturer's glove index before selecting a glove type, as well as the manufacturer's instructions on use (e.g., whether gloves are reusable or not).

Some additional general rules regarding glove use include:

- Gloves must fit properly – purchase gloves in the correct size for each worker
- Check gloves for physical damage BEFORE using them
- Disposable gloves should never be reused; always follow the manufacturer instructions
- Gloves must be removed before touching door handles, sink handles, elevator buttons, etc.
- Remove gloves carefully – avoid contact between the contaminated exterior of the glove and the skin
- Dispose of contaminated gloves properly
- Wash hands after removing gloves

C. Laboratory coats: OSHA has adopted the “Prudent Practices” document written by the National Research Council regarding chemical hygiene in laboratories and included it as [Appendix A](#) to the Laboratory Standard (29 CFR 1910.1450). Compliance with OSHA regulations, including the Laboratory Standard, is required for institutions receiving National Institutes of Health (NIH) funding. The guidance given, which EHS supports, is “laboratory coats and gloves should be worn when working with hazardous materials in the laboratory.” Moreover, the BMBL recommends laboratory coats beginning at the lowest biosafety level, BSL-1, and requires them at BSL-2 and higher safety levels. Other protective clothing may suffice in place of a laboratory coat, if laboratory coats are not feasible; for example, gowns, smocks, etc. (including disposable laboratory coats or covers) may be possible options, so long as the protection provided by the alternative protective clothing is at the same level of that provided by a standard laboratory coat.

Contact EHS for questions regarding skin protection and assistance in developing a laboratory coat program.

D. Respiratory protection: When required, respirators shall only be used by individuals who are enrolled in the Respiratory Protection Program through EHS and are medically cleared by the Occupational Health clinic. The requirements for program participants and voluntary users (voluntary use is permitted under specific conditions) are set based on the OSHA Respiratory Protection Standard (29 CFR 1910.134). The requirements ensure an employee's physical fitness to wear a respirator and the proper respiratory

protection is selected. For information on the respiratory protection program, review the university [Respiratory Protection Policy](#) and [website](#).

E. Hearing protection: Based on EHS noise monitoring, several areas (equipment and/or task-specific) have been identified within which where hearing protection is required. Subsequently, the University of Colorado Denver | Anschutz Medical Campus Hearing Conservation Program was developed, in accordance with the OSHA Occupational Noise Exposure standard ([29 CFR 1910.95](#)).

Per that program, EHS will:

- Facilitate and/or perform noise monitoring
- Assist and/or participate in noise hazard identification and evaluation
- Implement the Hearing Conservation Program, including recommendations for controls
- Evaluate the program to determine effectiveness
- Provide or coordinate training and training materials

F. Foot protection: The minimum attire requirement for footwear (closed-toe and closed-heel shoes) is sufficient for most technical areas. However, some areas may have additional hazards – such as falling or rolling objects, crushing or penetrating materials, or exposure to heat – for which specific protective footwear (e.g., steel toe boots, nonconductive shoes, etc.) is necessary. Safety footwear in these unique areas must meet ANSI standards as outlined in ANSI Z41-1991. Contact EHS for a Hazard Assessment related to foot protection requirements.

G. Storage and Maintenance of PPE

Clean, properly maintained PPE is important to ensure its effectiveness. All PPE must be stored in a clean, dry place away from chemical contact and sunlight. Prior to each use, inspect PPE to ensure that there is no damage and it has not expired, as some PPE has an expiration date (e.g., gloves, respirator cartridges).

Other issues to look for include:

- Is there any evidence of discoloration?
- Symmetry: does each side look like a mirror image of the other, or is one side distorted?
- Are there any broken, bent, frayed, or torn pieces?
- Are the lenses (for glasses, goggles, and respirators) scratched or discolored so they are hard to see through?
- Is the elastic still springy or is it stretched out?

If PPE is reusable, clean it after each use, following the manufacturer's instructions. In general, do not use solvents or abrasives to clean PPE; however, in some infectious laboratory settings, there are specific cleaning and disinfection agents required. Be sure to replace reusable PPE according to the manufacturer's recommendations. Replace any defective parts with parts made by the same manufacturer and do not make makeshift repairs. If PPE cannot be repaired, it must be replaced.

3. Risk Assessment

While EHS has developed a [library](#) of SOP templates, for chemicals that present risk(s) not addressed by an SOP or for a hazard that is not chemical in nature (e.g., physical or process-based in nature), the RSIH division of EHS will perform a risk assessment for those activities involving additional risk that may warrant additional controls. Controls may include PPE, administrative controls, and/or engineering controls.

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Administrative controls: work practice controls, such as written policies or procedures that limit exposure to hazards by adjusting work tasks or schedules; other examples include warning signs, training, and job rotation.

Engineering controls: physical or design modifications that reduce exposure to the source; examples include biosafety cabinets, chemical fume hoods, general dilution ventilation, or enclosing the process.

Refer to the University [Chemical Hygiene Plan](#) for additional information. EHS shall document the findings on the Risk Assessment form, and provide feedback from the Risk Assessment to the laboratory. The laboratory will be responsible for addressing the hazard and implementing controls required by EHS. The laboratory shall notify EHS as work tasks, materials, and/or space change so that the Risk Assessment can be updated accordingly.

4. Training and Recordkeeping

Training is required for anyone working in the laboratory, including employees, volunteers, non-paid interns, and any other non-employee laboratory members. Training is a requirement of regulatory and funding agencies and institutional regulatory committees, such as the NIH, Colorado Department of Public Health and Environment (CDPHE), OSHA, and the Committee on Ionizing Radiation. EHS trainings are available online via Skillssoft.

The most common courses required for laboratory staff are listed below; however, additional training may be required for specific work (e.g., laser safety, radiation safety, respiratory protection, formaldehyde training, shop safety, etc.):

- **Lab Safety:** Required one time, for all laboratory workers.
- **Bloodborne Pathogens:** Required annually for anyone with potential exposure to infectious agents, bloodborne pathogens, cell culture, recombinant DNA, or other potentially infectious materials, or individual who attend to patients in a clinical setting.
- **Chemical Waste Management:** Required annually for anyone who generates or handles chemical waste, works in an area where chemical waste is generated, or supervises anyone who generates or handles chemical waste.
- **Regulated Medical Waste:** Required every 3 years for anyone who generates regulated medical waste.

EHS can accommodate individuals who do not have access to Skillssoft by facilitating training through [Moodle](#), or by providing hard copy versions of the training courses and quiz material(s).

Some schools and departments, such as the School of Dental Medicine and Facilities Management, have developed specific training content; check with your supervisor to ensure that you complete the correct training courses. Supervisors must give new workers in-person, on-the-job training, and document that training on the EHS [On-the-Job Training form](#); this record must be kept in the laboratory for three years after the individual has left the laboratory. Contact EHS for information on which training courses are required for your work.

5. Teaching Laboratories

These PPE requirements should serve as the basis for PPE required during teaching activities. EHS can provide guidance to professors and/or teaching assistants on appropriate PPE for teaching laboratory activities. While some teaching laboratories may have additional requirements beyond those outlined above, at a minimum any teaching laboratory that serves as the physical space in which laboratory research is performed (e.g., teaching laboratories that also serve as a research laboratory) should follow with these requirements.