

Biological Safety Personal Protective Equipment

Personal Protective Equipment (PPE) is used to protect the individual from coming in direct contact with biohazardous materials. Furthermore, effective use of PPE minimizes the chances of contaminating the research materials. The following list outlines various standard PPE recommended for laboratory workers. For more information and guidance, please see [Personal Protective Equipment and Clothing](#).

Eye Protection

Safety glasses with side shields that meet ANSI Standards must be worn when there is a potential splash of blood, body fluids or chemicals. If this potential for splashes of blood, body fluids, or chemicals is **significant**, splash goggles should be worn. Wearers of contact lenses should wear appropriate eye covering and face protection devices in a hazardous environment. At the discretion of the Principal Investigator (PI), chin-length face shields may substitute for safety glasses or splash goggles for some situations.

Face (Nose and Mouth) Protection

Surgical masks should be worn with protective eyewear if splashes, sprays or spatters are anticipated. **This type of mask does not protect against aerosols.** At the discretion of the PI, chin-length face shields may substitute for surgical masks.

Laboratory Clothing

Laboratory clothing consists of laboratory coats, aprons, scrub suits and gowns. A critical point to consider when selecting laboratory clothing is the length of the sleeve: a long sleeved garment is preferable to minimize contamination of the skin. Additionally, if splashes from liquids are anticipated, the appropriate water-resistant garments **should** be worn. If the garment is **not** disposable, it **must** be capable of withstanding sterilization in the event it becomes contaminated.

Laboratory clothing that has become contaminated with infectious material **must** be removed from the worker and kept in the laboratory area in such a way that contamination is contained. Additionally, all contaminated clothing **shall** be either discarded in the lab or laundered by the facility; personnel or students **must** never launder contaminated clothing at home.

Foot and leg wear

Closed-toe shoes and long pants **must** be worn at all times.

Gloves

Gloves **must** be worn when working with or around biohazardous materials. Appropriate glove selection should be based on the hazards involved. Latex gloves have fewer pores and lower in-use failure rates than vinyl gloves. However, latex allergies/sensitivities are real, thus non-latex, synthetic gloves such as nitrile or special washed latex gloves may be substituted.

Note, The National Institute for Occupational Safety & Health (NIOSH) warns workers and employers about dangers of latex exposure and possible allergic reactions such as skin rashes, hives, nasal symptoms, eye symptoms, sinus symptoms, asthma, and, rarely, shock. (If latex gloves are used, try powder-free low-protein latex gloves.)

Additionally, surgical latex gloves may be thicker and may have fewer holes than standard latex gloves.

Two pairs of gloves may be worn in higher risk areas such as HIV culture labs; one pair for general laboratory work, two pairs for work in a BSC. Some HIV research laboratories use three pairs: one pair

for BSL-2 laboratory work, another pair for BSL-3 laboratory work, and a third pair for work with cultures in a BSC in the BSL-3 lab. When work in the BSC is completed, the outer pair of gloves is removed.

In order to maximize protection when working with hazardous materials, the glove shall overlap the lower sleeve and cuff of the lab coat; a long sleeved glove or disposable arm-shield may be worn. Similarly, temperature resistant gloves shall be worn when handling hot material and dry ice.

Finally, gloves should be disposed of immediately if they have been contaminated. Never wear gloves outside the laboratory, nor should anyone attempt to reuse or wash disposable gloves. **Always consult with the PI or laboratory supervisor for assistance in selecting the appropriate type of glove.**

Respirators

Respirators provide additional protection against infectious aerosols. **Workers who are using respirators must be medically monitored and must be fitted to the individual and tested before being used in a potentially hazardous situation.**

NOTE: Surgical masks are not respirators and are not certified as such; they do not protect the user adequately from most inhalation exposures. Please contact the Industrial Hygiene/Asbestos Control Office within EH&S for details and information prior to purchasing any respiratory protection equipment.

Various kinds of respirators fall within two major groups: Air-purifying respirators and Atmosphere-supplying respirators.

- Air Purifying Respirators

Air-purifying respirators have filters, cartridges, or canisters that remove contaminants from the air by passing the ambient air through the air-purifying element before it reaches the user. Within this group exist three kinds of air-purifying respirators:

- Particulate respirators:

Particulate respirators capture particles in the air such as dusts, mists and fumes.

- Gas and vapor respirators:

Gas and vapor respirators are normally used when there are only gases and vapors in the air.

- Combination respirators:

Combination respirators are normally used in atmospheres that contain hazards of both particulates and gases or vapors.

- Atmosphere-supplying respirators

Atmosphere-supplying respirators, on the other hand, supply air directly from a clean source rather than from the potentially contaminated air surrounding the user. Three kinds of atmosphere-supplying respirators have been developed to meet varying needs:

- Air-supplied respirators:

Air-supplied respirators that make use of a hose to deliver clean, safe air from a stationary source of compressed air.

- Combination respirators:

Combination respirators that have an auxiliary self-contained air supply that can be used if the primary supply fails.

- Self-contained breathing respirators:

Self-contained breathing respirators that consist of a wearable, clean-air supply pack.