PERSONAL PROTECTIVE EQUIPMENT (PPE)

Introduction

The following sections provide general guidelines and requirements for using personal protective equipment. This chapter covers the following:

For more detailed information and resources, please see EH&S's Personal Protective Equipment procedures.

Personal Protective Equipment Defined

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. PPE must always be in good condition. If it is compromised in any way, take it out of service. PPE can and should be replaced as needed. If the PPE is disposable, remove it as needed, placing it in the appropriate container for disposal.

IMPORTANT:

Always remove protective clothing before leaving the work area. Do not wear PPE in public elevators, classrooms, restrooms, break rooms, etc.

Arm and Hand Protection

Arms and hands are vulnerable to cuts, burns, bruises, electrical shock, chemical spills, and amputation. The following forms of hand protection are available for employees:

- Disposable exam gloves
- Rubber gloves
- Nitrile gloves
- Neoprene gloves
- Leather gloves
- Non-asbestos heat-resistant gloves
- Metal-mesh gloves for meat cutters
- Cotton gloves

Always wear the appropriate hand and arm protection. Double your hand protection by wearing multiple gloves when necessary, (e.g., two pairs of disposable gloves for work involving biological hazards). For arm protection, wear a long-sleeved shirt, a laboratory coat, chemical-resistant sleeves, or gauntlet-length gloves.

Follow these guidelines to ensure arm and hand safety:

- Inspect and test new gloves for defects.
- Always wash your hands before and after using gloves.
- Wash chemical-protective gloves with soap and water before removing them.
- Do not wear gloves near moving machinery; the gloves may become caught.
- Do not wear gloves with metal parts near electrical equipment.

IMPORTANT:
Gloves are easily contaminated. Avoid touching surfaces such as telephones, door knobs, etc. when wearing gloves.

Body Protection

Hazards that threaten the torso tend to threaten the entire body. A variety of protective clothing, including laboratory coats, long pants, rubber aprons, coveralls, and disposable body suits are available for specific work conditions.

- Rubber, neoprene, and plastic clothing protect employees from most acids and chemical splashes. Look for the words “Chemical Resistant”
- Laboratory coats, coveralls, and disposable body suits protect employees and everyday clothing from contamination.
- Welding aprons provide protection from sparks.
- Fire Retardant clothing provides protection for electricians, or others who may encounter sparks on the job.
- Fall Protection, such as a full body harness, may be appropriate in cases where employees work at heights greater than 12 feet on a surface that is not guarded and/or secure.

Launder reusable protective clothing separate from other clothing.

Ear and Hearing Protection

If you work in a high noise area, wear hearing protection. Most hearing protection devices have an assigned rating that indicates the amount of protection provided. Depending on your level of exposure, you may choose from the following devices:

- Disposable earplugs
- Reusable earplugs
- Headband plugs
- Sealed earmuffs

Earplugs may be better in hot, humid, or confined work areas. They may also be better for employees who wear other PPE, such as safety glasses or hats. Earmuffs, on the other hand, may be better for employees who move in and out of noisy areas, because the muffs are easier to remove. Before resorting to hearing protection, attempt to control noise levels through engineering or operational changes.

To avoid contamination, follow these guidelines when using earplugs:

- Wash your hands before inserting earplugs.
- Replace disposable earplugs after each use.
- Clean reusable earplugs after each use.

Refer to the Hearing Conservation section in the General Safety chapter, or for additional information see the Hearing Conservation Program page on the EH&S website.

Eye and Face Protection

Employees must wear protection if hazards exist that could cause eye or face injury. Eye and face protection should be used in conjunction with equipment guards, engineering controls, and safe practices.

NOTE:
Safety glasses or chemical splash goggles are required in laboratories.

Always wear adequate eye and face protection when performing tasks such as grinding, buffing, welding, chipping, cutting, or pouring chemicals. Safety glasses with side shields provide protection against impact and splashes, but safety goggles provide protection against impact, splashes, and hazardous atmospheres.

IMPORTANT:
Do not wear contact lenses in the laboratory or other areas where hazardous atmospheres may be present. Contact lenses do not provide eye protection and may reduce the effectiveness of emergency eyewash.

If you wear prescription glasses, wear goggles or other safety protection over the glasses. Safety glasses with side shields provide primary protection to eyes and are four times more resistant to impact injuries than prescription glasses.

Goggles protect against impacts, sparks, chemical splashes, dust, and irritating mist. Wear full goggles, not just safety glasses, when working with chemicals.

Eyecup welding goggles with filter lenses give protection from glare and sparks. A welding helmet protects from flash burn due to welding, soldering, or brazing, but does not provide primary eye protection; safety glasses or goggles should be worn with the helmet.

A face shield is designed to protect the face from some splashes or projectiles, but does not eliminate exposure to vapors. A face shield should be worn with goggles or safety glasses.

Sunglasses are useful to prevent eyestrain from glare and to minimize ultraviolet light exposure.

Eye Wash Stations

Eye wash stations provide emergency eye treatment for people exposed to hazardous materials. There are three common types of eye wash stations:

Eye Wash Bowls

These stations are ANSI approved and are usually attached to emergency showers. They provide a continuous water flow and are recommended for laboratories and other locations with hazardous materials.

Drench Hoses at Sinks:

These stations provide a continuous water flow, but they are easily contaminated with sediment, and they do not allow the free use of both hands; the use of both hands may be necessary. ANSI Standard Z358.1-2009 states that drench hose units may supplement, but may not be used in place of, dedicated eyewash units. They are not preferred for laboratory usage. There are drench units that meet the provisions of the ANSI standard as both an eyewash and a drench hose. If you have a drench hose in your work area, flush the hose regularly to remove any sediment.

IMPORTANT:
If the eyes are exposed to hazardous materials or irritating elements, immediately flush the eyes with water for at least 15 minutes. Contact a physician, if necessary.

Foot Protection

To protect feet and legs from falling objects, moving machinery, sharp objects, hot materials, chemicals, or slippery surfaces, employees should wear closed-toed shoes, boots , foot guards, leggings, or safety shoes as appropriate. Safety shoes are designed to protect people from the most common causes of foot injuries: impact, compression, and puncture. Special foot protection is also available for protection against static electricity, sparks, live electricity, corrosive materials, and slipping. Protective footwear will follow the American National Standards Institute (ANSI) Z41-1999, "American National Standard for Personal Protection - Protective Footwear," which is incorporated by reference in § 1910.6, or ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear," which is incorporated by reference in § 1910.6.

NOTE:
Foot protection is particularly important in laboratory, agricultural, and construction work.

IMPORTANT:
Do not wear sandals or open-toed shoes in laboratories, shops, or other potentially hazardous areas.

Head Protection

Accidents that cause head injuries are difficult to anticipate or control. If hazards exist that could cause head injury, employees should try to eliminate the hazards, but they should also wear head protection.

Hard hats protect the head from impact, penetration, and electrical shock. Head protection is necessary if you work where there is a risk of injury from moving, falling, or flying objects, or if you work near high-voltage equipment. Hard hats will follow the American National Standards Institute (ANSI) Z89.1-2009, "American National Standard for Industrial Head Protection," incorporated by reference in § 1910.6 specifications.

Hard hats should be water resistant, flame resistant, and adjustable. Wear one of the following hard hats as appropriate for your work situation:

Class A - General Service, limited voltage protection
Class B - Utility service, high-voltage protection
Class C - Special service, no voltage protection

Follow these guidelines for head safety:

- Check the shell and suspension of your head ware for damage before each use. Look for cracks, dents, gouges, chalky appearance, and torn or broken suspension threads.
- Discard damaged hats or replace broken parts with replacements from the original manufacturer.

- Discard any hat that has been struck or dropped from a great height, even if there is no apparent damage.

- Do not wear a hard hat backwards, unless this is necessary to accommodate other protective equipment (e.g., welders face shield).
- Do not paint the plastic shell of a hard hat or alter it in any way.

Respiratory Protection Program

UT Arlington uses engineering, administrative, and procedural controls to protect individuals from dangerous atmospheres, including harmful mists, smoke, vapors, and oxygen-deficient atmospheres. When these controls cannot provide adequate protection against harmful atmospheres, respiratory protection is necessary.

The Environmental Health & Safety Office can provide training and fit testing for personnel who need respiratory protection. A copy of the Respiratory Protective Program is available from EH&S.

Usage Requirements

People who use respiratory protection must be physically capable of using and wearing the equipment. Before an employee or student uses a respirator, they must first pass a medical evaluation during which a physician will determine if the person is healthy enough to use a respirator. In addition, all individuals required to wear respirators must be formally trained and instructed in proper equipment usage. This training should include instruction on common respiratory hazards and symptoms of exposure.

Types of Respirators

It is important to select the right respirator for the job. There are many types of respirators and each type protects against different hazards. Respirators are classified according to these factors:

1. Air source: supplied air or ambient air
2. Pressure: positive or negative
3. Mask configuration: half-face, full-face, hood

The following describes various types of respirators:

Supply Air Respirators: Self-Contained Breathing Apparatus (SCBAs) use supplied air from a cylinder carried by the user.

Airline respirators require a compressor or cylinder(s) and an airline hose to the user. Supply air respirators are necessary in oxygen deficient atmospheres. When using a supply air respirator, have a back-up person with a SCBA standing nearby.

Air-Purifying Respirators: Air purifying respirators use ambient air and cannot be used in oxygen deficient atmospheres, IDLH atmospheres, or areas where the identity or concentration of a contaminant is unknown. Ambient air is purified by a chemical cartridge, canister, or particulate filter.
-Users must select the proper cartridge/canister/filter.
-Cartridges and canisters must be replaced if the user notices an odor, taste, or throat irritation. Wet, damaged, and grossly contaminated cartridges/canisters must also be replaced.

Powered air-purifying respirators use filtered ambient air in a positive-pressure continuous flow mode.

Disposable or single-use respirators are made of cloth or paper and are primarily used for nuisance dusts. If donned properly, disposable masks such as N-95 or P-95 filter out 95% of the dust particulate. It is important to remember that these are intended for limited use.

All filters (HEPA, dust pads, and disposable respirators) must be replaced if any of the following conditions occur:

- Breathing becomes difficult.
- Filter or dust respirator becomes damaged, visibly dirty, wet, or contaminated on the inside.

Mask Types:

Full face mask covers the face from the hairline to below the chin. This type of mask provides eye protection.

Half-face mask covers the face from above the nose to below the chin.

The following table highlights various respirators and their ability to protect against different hazards:

RESPIRATOR TYPE	**PROTECTION**	**NO PROTECTION**
Filter Respirator (HEPA cartridge)	Dust Fumes Smoke Mist Microorganisms Asbestos	Chemical vapors or gases Oxygen deficiency
Chemical Cartridge/ Canister Respirators	Certain gases and vapors up to a particular concentration	Oxygen deficiency Particulate matter
Air Supply Respirator	Depending on type: Particulates Chemical vapors and gases Oxygen deficiency	

NOTE:
Only use respirators that are approved by NIOSH/MSHA or the Department of Interior-Bureau of Mines.

Selecting a Respirator

When selecting a respirator, consider the following factors:

- Type of hazards
- Identity and concentration of the contaminant
- Time constraints
- Activity of the person wearing the respirator
- Degree of protection provided by each type of respirator

Follow these guidelines to select the correct respirator:

Use a HEPA filtered respirator: If the contaminant is biological hazard.

Use a supply air respirator: If the identity and/or concentration of the contaminant is not known. If an oxygen deficient atmosphere is known or suspected. If an IDLH condition exists.

Use a SCBA instead of an airline respirator: If an airline respirator could be damaged by work or conditions within the area.

IMPORTANT:

Respirators are available in different sizes. Always fit test a respirator to select the correct size for you. If you lose or gain weight or have major dental work, you may need to be fit-tested again.

Using Respirators Safely

Follow these guidelines to ensure safe respirator usage:

- Make sure you have the correct respirator for the job. EH&S will assist in determining this.
- Inspect respirators before each use.
- Shave facial hair and put in dentures (if applicable) to ensure a good seal with the facemask.
- If you are working in a dangerous area, have another person present.
- Remember that contaminants can harm the body as well as the respiratory tract; wear protective clothing as appropriate.
- Return to fresh air and remove the respirator in the following conditions:
    - You feel nauseous, dizzy, or ill.
    - You have difficulty breathing.
    - The canister, cartridge, or filter needs to be replaced.
    - Properly clean and store all reusable respirators.

In addition to the guidelines above, follow these instructions when using a respirator:

- Do not use a respirator unless you have been formally trained and have
- been fit-tested for the respirator you plan on using.
- Do not mistakenly use a filter respirator for protection against gases or vapors.
- Never remove a respirator in a contaminated atmosphere.
- Do not talk unnecessarily or chew gum while wearing a respirator.
- Do not wear contact lenses while wearing a respirator.
- Do not allow your hair or eyeglass frames to interfere with the face mask seal.

Showers

Emergency safety showers provide emergency treatment for people exposed to harmful materials. If a person is contaminated with harmful chemicals, the emergency shower provides an instant deluge to protect the person from further exposure. UT Arlington uses ANSI standards for shower locations, travel distance, testing, and function.

Emergency showers must be located to ensure accessibility within 10 seconds. Travel distance between a shower and potential hazards may not exceed 100 feet.

The area surrounding the shower must also be kept clear to allow immediate access. The Clear Floor Space Requirements are designated as 48 inches (front) by 30 inches (sides).

IMPORTANT:

Emergency showers are for emergencies only. If a chemical spill occurs that involves personal exposure, pull the cord and remove affected clothing immediately. Stay in the shower for at least 15 minutes.

The Environmental Health & Safety Office tests emergency showers twice annually.