CSHEMA

Campus Safety Health and
Environmental Management Association

Personal Protective Equipment (PPE)

Contact Chapman University EH&S
with any questions on university-specific practices

SAFETY
FIRST

Objectives

- Overview and definition of PPE
- Safety data sheets
- Types of PPE
- Appropriate selection and use

CSHEMA

Personal Protective Equipment (PPE)

- One line of defense for lab workers is personal protective equipment (PPE).
- Proper selection of PPE is crucial since one type of PPE will not work with all types of hazards.

CSHEMA

Overview

- Personal protective equipment can take many different forms.
- Personal protective equipment typically consists of safety glasses, goggles, lab coats, long pants, a long-sleeved shirt, closed-toe shoes, and gloves.
- Personal protective equipment presents a barrier between you and the hazardous substance or situation you may have to work with in a laboratory.

CSHEMA

Safety Data Sheet

- The SDS (Safety Data Sheet) for a particular hazardous material will cite general PPE requirements.
- Information on PPE compatibility with certain chemicals and/or breakthrough times may be found, in some cases, at the manufacturer's website.
- Always check that the PPE is in good condition before wearing it. Look for damage, wear/tear and compromised areas before donning.

CSHEMA

Eye Protection

- Safety glasses with side eye shields, splash goggles, and full-face shields offer varying degrees of protection against splattering chemicals and airborne objects.
- Eye and face protection is required to be American National Standards Institute (ANSI) approved.

CSHEMA

Goggles vs. Face Shield

- Wear safety glasses with side eye shields when there is a splash hazard with a small quantity of a hazardous chemical. Examples include, when opening or closing a bottle or popping open a microfuge tube.
- Wear goggles when you are handling a chemical that is highly caustic or in a larger volume, perhaps a liter or more.
- Wear face shield when you are handling a very large volume of a hazardous chemical or when you need to protect your face and your eyes.

CSHEMA

Hand Protection

- Proper protective gloves should be worn whenever working with chemicals.
- No gloves material is impermeable to all chemicals, therefore, the most effective practice in using protective gloves is to change them frequently and whenever they are contaminated.
- Inspect your gloves each time you put them on and look closely for holes.
- Different types of gloves are required for different hazards. Always make sure you are using the proper protection for the hazard.

CSHEMA

Choose the Correct Gloves

- Special gloves that provide a higher degree of resistance should be used when contact with hazardous chemicals is unavoidable, however, contact time should be limited.
- Ask for guidance from your safety program when selecting a glove type for handling chemicals that could cause adverse health effects through skin absorption.
- Always wash your hand thoroughly with soap and water before changing into fresh gloves, and after working with any hazardous substances.

CSHEMA

Glove Chart

Type	Advantages	Disadvantages	Use when handling
Natural rubber	Good physical properties, dexterity	Poor vs. oils, greases, organics	Bases, alcohols, dilute water solutions; fair vs. aldehydes, ketones
Natural rubber blends	Dexterity, better chemical resistance than natural rubber vs. some chemicals	Physical properties frequently inferior to natural rubber	Same as natural rubber
Polyvinyl chloride (PVC)	Very good physical properties, medium chemical resistance	Plasticizers can be stripped	Strong acids and bases, salts, other water solutions, alcohols
Neoprene	Medium chemical resistance, medium physical properties	N/A	Oxidizing acids, anilines, phenol, glycol ethers
Nitrile	Excellent physical properties, dexterity	Poor vs. benzene, methylene chloride, trichloroethylene, many ketones	Oils, greases, aliphatic chemicals, xylene, perchloroethylene, trichloroethane; fair vs. toluene
Butyl	Specialty glove, polar organics	Poor vs. hydrocarbons, chlorinated solvents	Glycol ethers, ketones, esters
Polyvinyl alcohol (PVA)	Specialty glove, resists a very broad range of organics, good physical properties	Water sensitive, poor vs. light alcohols	Aliphatics, aromatics, chlorinated solvents, ketones (except acetone), esters, ethers

CSHEMA

Skin and Body Protection

- Skin and body protection should include:
  - Laboratory coats
  - Long Pants
  - Loose-Long-sleeved shirt
  - Closed-toe shoes
  - Aprons (when handling acid)
  - Chemical resistant sleeves
  - Tyvek suits
  - Coveralls

CSHEMA

Lab Coat Selection Guide

CSHEMA

Fabric Type	Uses	Caution
Polyethylene	Liquid resistant for high-hazard biological materials such as BSL3, or if splash or large volume	Do not use with flammables or pyrophorics
100% Cotton	All-purpose	Heavy weight and weave preferred, liquids absorb
Polypropylene disposable	General bench work	Do not use with flammables or pyrophorics
Cotton/poly blend	General bench work	Do not use with flammables or pyrophorics
Fire-retardant	Pyrophoric or highly flammable materials	May need special laundering, wash and replace per manufacturer instruction
Neoprene apron and sleeves	Solvents, corrosives	Clean and dry to allow re-use, replace when damaged
Tyvek® spunbond olefin	Biological or particulate, clean rooms	Variable chemical resistance, consider Tychem® for heavy chemical contact

Reference Information

- For more resources in regards to glove selections for a specific chemical hazard, please review the CDC's - Protective Clothing guidance document.

CSHEMA