A GUIDE TO PERSONAL PROTECTIVE EQUIPMENT AND GLOVE SELECTION

Personal Protective Equipment (PPE)

Hazardous materials may enter the body through inhalation, ingestion or skin/eye contact. All staff must wear proper PPE in order to prevent injuries and illnesses caused by known workplace hazards. Wearing proper PPE is everyone’s responsibility. Substituting or eliminating hazardous chemicals should be considered first, but when that is not feasible PPE should be used. PPE is often used concurrently with engineering controls for maximum protection. In order to determine the appropriate PPE, the hazards and reduction methods must be evaluated and selection made based on the risks identified from the initial evaluation.

Evaluation

- Survey areas and identify potential hazards.
- Evaluate the exposure risk to individuals performing the tasks.
- Evaluate alternate means of reducing the hazard (substitution, engineering controls, or administrative controls). If not possible, then PPE is necessary.

Hazard Reduction

- Substitution: some materials may be substituted with a less hazardous alternative. This is always a primary means of addressing a risk.
- Engineering Controls: substitution is not feasible, then engineering controls must be evaluated. These include ventilation, local exhaust ventilation, and chemical fume hoods.
- Administrative Controls: if substitution and engineering controls are not adequate to reduce a risk, then administrative controls must be assessed. These include reducing the amount of time an individual performs a task, or changing the person’s job duties.
Personal Protective Equipment: if substitution, engineering controls or administrative controls do not reduce the risk, then PPE must be used.

Selection

- Select PPE based on the identified hazards, the specific task, the duration of exposure, regulatory exposure limits, and the individual worker.
- PPE should be appropriate for the particular hazard.

Types of PPE Available

- Hand protection (gloves).
- Eye and face protection (safety goggles, face shields, and splash-guards).
- Skin protection (lab coats, scrubs, aprons, tyvek suits, etc.).
- Respiratory protection (half-face or full-face respirators, personal air-purifying respirators).

For more detailed information, refer to your Environmental Health and Safety Manual or Chemical Hygiene Plan, or call your Chemical Hygiene Officer.

Choosing the Right Glove

Gloves are used to protect your skin from contact with hazardous materials. There are a variety of glove materials (e.g., latex, nitrile, and neoprene) that offer different levels of protection depending on the chemicals that you use in the course of your work. There is no universal glove that is appropriate for all chemicals, and all chemicals eventually penetrate all common glove materials. A glove you are wearing may appear to be intact even when it is not. Therefore, it is important to choose the right type of glove to wear when using a particular substance so you will not be unknowingly exposed to a hazardous material.

Glove manufacturers rate their gloves for use with specific chemicals. These ratings are based on breakthrough or permeability tests that determine the amount of time it takes for a chemical to penetrate the glove. A breakthrough test is generally a worst-case scenario, involving full exposure of the glove material to the chemical. A “chemical compatibility chart” is generated as a result (see example).

Glove Materials

- **Butyl Rubber**: good choice for aldehydes, ketones, and esters
- **Latex**: good choice for biological materials
- **Natural Rubber**: resists acids and caustics
- **Nitrile**: wide range of resistance to solvents, acids, caustics, and alcohols
- **Nitrile**: good choice for biological materials, as well as a wide range of applications along with puncture and abrasion resistance
- **Poly-Vinyl Chloride (PVC)**: resists acids but not petroleum solvents
- **Viton**: excellent resistance to chlorinated and aromatic solvents

Things to Consider When Choosing a Glove

- What substance(s) will be used?
- How long will you be in contact with a substance (e.g., minutes vs. hours)?
- Will your contact with a substance be intermittent or constant (light vs. heavy exposure)?
- Is dexterity important for your work (thin vs. thick gloves)?

How to Choose the Best Glove

- Review the manufacturer’s chemical compatibility chart for specific glove types
- Refer to the attached permeability chart
- Refer to the glove recommendations in your Chemical Hygiene Plan
- Check the Material Safety Data Sheet for the chemical
- Contact your laboratory Safety Officer or your EH&S Office

Some substances do not have a glove that offers a high level of protection. Examples are chloroform and methylene chloride. In the case where glove choices are limited, you may need to wear two pairs of gloves and/or change your gloves frequently.

As always, when performing work in a laboratory environment, be sure to adhere to safe laboratory practices including wearing lab coats, goggles, and gloves at all times, changing gloves frequently, no eating or drinking in the laboratory, and washing hands whenever leaving the area.

If you have any questions, please contact your laboratory Safety Officer or your Environmental Health and Safety Office.