Getting a Grip Safety-Wise!

I. Safety Quiz!

Laboratory accidents involving hands can usually be classified under four main hazard types: abrasions, chemicals, cutting and heat. One glove does not fit all however!

Hand protection can be as critical in the laboratory or field when it comes to personal protective equipment use. OK – Let’s see what the reader knows about PPE hand protection!

1. OSHA does not have a standard that directly addresses hand protection. T or F?
2. Rubber gloves protect lab workers from all chemicals. T or F?
3. MSDS’s address the type of glove needed for a specific chemical. T or F?
4. No other glove type should be used unless someone is allergic to rubber or latex. T or F?
5. A small tear in the cuff of a glove will not compromise its use. T or F?

The answers are found in this article on hand protection in the laboratory. Let’s see how well you did.

II. OSHA’s Says!

The Occupational Safety & Health Administration directly addresses personal protective equipment (PPE) for hands under 29CFR 1910.138(a) – Hand Protection. The general requirements state that employers must select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. The standard further states that employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified. Basically, the employer must do a safety assessment to determine what issues must be addressed and how they are to be rectified relative to hand protection.

Additional reference to PPE are noted in the Hazard Communications Standard (29CFR 1910.1200) and the Laboratory Standard (29CFR 1910.1450). HazCom address PPE when working with hazardous chemicals. The Lab Standard requires standard operating procedures when working with hazardous chemicals, including PPE.

III. What Are The Important Hand PPE Questions?

The general OSHA requirements for PPE (29 CFR 1910.132) include the performance of a written hazard assessment, selection of the appropriate PPE to protect the employee and proper training and records noting appropriate employees have been trained. Five important questions science teachers should be asking are as follows relative to hand protection:

1. When is it necessary to use hand PPE?
2. What type of hand PPE is necessary?
3. How is hand PPE properly put on, worn, adjusted and removed?
4. What are the limitations of the hand PPE?
5. What is the appropriate care, life span, maintenance and disposal of hand PPE?

IV. What Kind of Exposures Warrant Hand PPE?

Gloves are to be used for Hand PPE if there is potential for the following exposure to laboratory hazards:

1. Abrasions – Appropriate leather or heavy cotton knit gloves are required in cases where abrasive materials or abrasive producing tools/equipment are used.
2. Cuts & Lacerations – Appropriate cut resistant gloves are required in cases where sharp objects are being used.
3. Electrical Shock – Appropriate rubber insulated gloves and leather glove protectors are required to protect employees from prescribed voltages.
4. Hazardous substances – Appropriate chemical resistant gloves are required to prevent chemical contact and skin absorption.
5. Temperature Extremes – Appropriate thermal protection via insulated gloves are required.

General types of hand protection include the following:

1. Metal mesh gloves - resist sharp edges and prevent cuts
2. Leather gloves - shield your hands from rough surfaces
3. Vinyl and neoprene gloves - protect your hands against toxic chemicals
4. Rubber gloves - protect you when working around electricity
5. Padded cloth gloves - protect your hands from sharp edges, slivers, dirt, and vibration
6. Heat resistant gloves - protect your hands from heat and flames
7. Latex disposable gloves - used to protect your hands from germs and bacteria
8. Lead-lined gloves - used to protect your hands from radiation sources

V. MSDS Information Critical!

OSHA required MSDS information must include appropriate PPE for each hazardous chemical. The MSDS section on PPE addresses not only hand protection but also may address other forms of PPE such as eye, face, body, respiratory, etc.

An example is the MSDS for Hydrochloric Acid. It reads as follows:

**Personal Protection for HCl:**

**Personal Respirators (NIOSH Approved):**
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.

**Eye Protection:**
Use chemical safety splash goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

In this case, skin protection includes rubber or neoprene gloves, plus other equipment to protect the body relative to skin contact.

VI. Chemical Hazards: Special Attention for Hand Protection!

The type of glove protection used in the laboratory is first determined by the nature of the substances involved. Commercial labeling on the container and MSDSs should be viewed prior to working with any hazardous chemical. Most often, glove type is provided for that specific hazardous chemical, as well as additional PPE.

Over time, all gloves will be permeated by the chemical. Try to determine the gloves characteristics relative to life span such as thickness and permeation rate. Gloves should have a scheduled replacement date which depends on how often they are used and the permeability to the substance(s) handled. Gloves being taken out of service should be cleaned of the contaminate material and then appropriately discarded.
VII. Getting Off The Gloves!

The Centers for Disease Control and Protection or CDC provides the following guidance in removing gloves:

To take off your gloves when you're done working, peel one glove off by holding the cuff. Then, with your ungloved hand, hold it wrong-side out as you peel off the other glove by the cuff.

When you're finished, both gloves will be wrong-side out and the contaminated surface will be on the inside.

VIII. Final Thoughts

In summary – consider the following items when the need for hand PPE is there:

1. Make sure the glove size fits and is comfortable.
2. Remove jewelry such as watches, rings that can puncture gloves.
3. Always inspect gloves before putting them on and when using them for signs of deterioration, holes, cuts, tears, etc.
4. Always replace worn or damaged gloves.
5. When the work is completed, make sure the gloves are disposed of in the correct waste container.
6. Always wash hands with soap and water before and after glove use.

PS: Answers in case any were missed!

1. OSHA does not have a standard that directly addresses hand protection. F!!
2. Rubber gloves protect lab workers from all chemicals. F!!
3. MSDS’s address the type of glove needed for a specific chemical. T!!
4. No other glove type should be used unless someone is allergic to rubber or latex. F!!
5. A small tear in the cuff of a glove will not compromise its use. F!!

Live Long & Prosper Safely!

Resources:


Occupation Safety & Health Administration: www.osha.gov/dsg/hazcom/ghs.html


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