BRIGHAM YOUNG UNIVERSITY – IDAHO

ENVIRONMENTAL, HEALTH & SAFETY

SAFETY DEPARTMENT

SELECTION OF
PERSONAL PROTECTIVE EQUIPMENT

EH-017-R02

Table of Contents

1.0 Overview

Any portion of the body that is exposed to a hazard must be protected. When considering how to protect individuals from a hazard, the first choice is elimination of the hazard. The second choice is the use of engineering controls. The third is use of administrative controls. The last choice is selection and use of personal protective equipment (PPE). Departments must use the first three choices to provide adequate protection for the individuals. When such controls cannot provide adequate protection then PPE is required to be used by all exposed to the hazard.

2.0 Policy

Each department must provide adequate protection for employees to help ensure a safe environment to work in. The following PPE shall be provided when required:

1. Hearing protection – ear muffs, ear plugs
2. Respiratory protection – dust/mist N95 masks, respirators
3. Hand protection – chemical resistant gloves, leather gloves, cotton gloves, etc.
4. Eye protection – Safety glasses, face shields, safety goggles
5. Foot protection – safety toed shoes/boots, metatarsal protectors, etc.
6. Head protection – safety hard hats, caps, hair nets
7. Body – coveralls, aprons, lab coats

3.0 Requirements

29 CFR 1910.95 Occupational Noise Exposure

29 CFR 1910.133 Eye and Face Protection

29 CFR 1910.135 Head Protection

29 CFR 1910.136 Occupational Foot Protection

29 CFR 1910.138 Hand Protection

BYUI-EH-016 Hearing Conservation

BYUI-EH-018 Respiratory Protection

4.0 Purpose

This procedure provides guidelines for making the proper selection of PPE when elimination, engineering, and administrative controls are not sufficient for the protection of the employee. Proper personal protection can be achieved by following the procedures outlined herein.

5.0 Scope

This procedure addresses eye, face, head, foot, hand, & body protection. Separate programs exist for respiratory and hearing protection since the need for participation in these programs is established based upon Industrial Hygiene exposure assessments and possibly exposure monitoring. When assessing a task, if you think that a respirator or hearing protection may be needed, please contact the Safety Office (496-3053).

6.0 Procedures

6.1 Create a Written List of Job Tasks / Operations

6.1.1 When developing a list of job tasks please keep in mind that it is useful to divide the work being performed into tasks/operations.

6.1.2 *Example: it would be a poor choice to group use of 48% Hydrofluoric acid and use of 10% Hydrochloric acid into the same task (i.e. "Use of Inorganic Acids") since both require the use of different personal protective equipment. It would be much better to divide the use of the acids into two different tasks.*

6.2 Hazard Determination

6.2.1 Document what hazards are present for each task being performed. Don't forget to consider the work environment - *For example, individuals entering a laboratory where other individuals are performing an acid distillation may be considered as having exposure to heated corrosive liquids.*

6.2.2 To create a list of hazards encountered while performing a task it is important to interview those workers who perform the task. Some hazards may not be readily apparent.

6.2.3 Hazards can be divided into the following categories:

6.2.3.a Impact (i.e. flying particles);

6.2.3.b Penetration (i.e. lacerating objects);

6.2.3.c Compression (i.e. crushing objects);

6.2.3.d Chemicals (i.e. corrosive/toxic solids, liquids, and gases);

6.2.3.e Temperature Extremes

6.2.3.f Potentially injurious light radiation (i.e. lasers, and UV light);

6.2.3.g Ionizing Radiation

6.2.3.h Electricity

6.2.3.i Noise / Vibration

6.2.3.j Biological

6.3 Determine Likelihood of Exposure

6.3.1 One of the factors influencing the decision to use PPE, and what type to use, is the likelihood of exposure.

6.3.2 Keep in mind that a high level of protection may be needed even if an exposure is not very likely. Suck is the case when exposure likelihood is low but the consequence of exposure can be moderate to severe in nature. *(Example: the use of concentrated corrosives.)*

6.4 Determine Consequences of Exposure

6.4.1 When determining consequences of exposure to a hazard it is important to consider not only physical injury but also what toxic or adverse health

effects may occur due to exposure. *(Example: hydrofluoric acid can not only corrode tissue but can also systemically poison anyone who receive a skin exposure.)*

6.4.2 In order to adequately and properly assess the consequences of exposure to a solid, liquid, or gaseous chemical the assessor must understand what adverse health effects may occur if exposed via inhalation, ingestion, absorption, and/or injection. It is helpful to review the Material Safety Data Sheet (MSDS) for the chemicals to which you or your students will be exposed. It is mandatory that all who may be exposed to hazardous chemicals, know whether or not any being used can be absorbed through the skin. *(Example: hydrofluoric acid, phenol, etc.)*

6.5 Determine What Part of the Body Will Be Exposed to Each Hazard

6.5.1 When considering PPE, the following areas should be considered:

- Application: What part of the body is being protected?
- Chemical Resistance: Will material maintain its structural integrity and protective qualities?
- Strength: Is the material resistant to punctures, tears, and abrasions?
- Flexibility: Do gloves provide the necessary dexterity?
- Thermal Limits: Does clothing maintain its mobility and protective capacity in temperature extremes?
- Cleanable: Can material be easily cleaned and reused?
- Longevity: Will clothing resist aging?

Contact the Safety Office for product recommendations.

6.5.2 Hand Protection

Hand protection should be worn when 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 type of hand protection used shall be based on 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.

With respect to selection of gloves for protection against chemical hazards:

- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;
- Generally, any "chemical resistant" glove can be used for dry powders;

- For mixtures and formulated products (unless specific test data are available), a glove shall be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and
- Employees shall be able to remove the gloves in such a manner as to prevent skin contamination.

6.5.3 Head Protection

Head protection shall be worn in areas where there is a potential for injury to the head from impact, flying or falling objects (e.g., working below other workers who are using tools and materials which could fall through grates), or electrical shock and burns.

Helmets for protection against impact and penetration of falling objects shall comply with the "American National Standard for Personal Protection - Protective Headwear for Industrial Workers Requirements" (ANSI) Z89.1. Helmets for protection against electrical shock and burns shall comply with ANSI Z89.2-1971.

6.5.4 Eye/Face Protection

Suitable eye protection or face protection shall be worn when there is the potential for exposure to the eyes or face from flying particles, molten metal, liquid chemicals, acid or caustic liquids, chemical gases or vapors or potentially injurious light radiation. Side protection is required when there is a hazard potential from flying objects. Detachable side protectors (e.g., clip-on or slide-on shields) meeting the pertinent requirements are acceptable.

Eye protection shall be durable, comfortable and easy to clean. Persons whose vision requires the use of corrective lenses and who by nature of their job duties require eye protection shall wear goggles or a full face shield that can be worn over the prescription lenses.

There are four general classes of eye and face protection: safety glasses, face shields, goggles and welding helmets. The type of protection required shall be determined by the type and degree of the hazard and shall comply with ANSI Z87.1-1989 "American National Standard Practice for Occupational and Educational Eye and Face Protection".

Safety glasses shall be worn at all times in the following locations:

- Academic laboratories;
- Physical Plant Shops (e.g., welding, carpentry, automotive);
- All areas where airborne materials are present; and
- Health Center when invasive patient related tasks are conducted.

6.5.5 Foot Protection

Foot protection shall be worn when there is the potential for injury to the feet from falling or rolling objects, objects piercing the sole of the foot, electrical hazards, hot surfaces and slippery surfaces.

Foot protection shall comply with ANSI Z-1991 "American National Standard for Personal Protection - Protective Footwear".

6.5.6 Respirators

Use of respirators shall be done in accordance with the Respiratory Protection Program

6.5.7 Body Protection

Full body protection shall be worn when there is a potential for contamination or exposure to other parts of the body (e.g., legs, arms, back, chest) from heat, splashes from hot metals and liquids, impacts, cuts, chemicals and radiation.

Body protection includes the following:

- Lab coats;
- Boot covers;
- Aprons;
- Bouffant caps;
- Tyvek suits; and
- Coveralls.

6.5.8 Electrical Protective Devices

Rubber insulating equipment should be used/worn to protect employees from shocks/burns while working on "live" electrical systems.

Rubber insulating equipment shall comply with the following American Society for Testing and Materials (ASTM) standards:

- Specification for Rubber Insulating Gloves (D120-87);
- Specification for Rubber Insulating Matting (ASTM D178-93 or D178-88);
- Specification for Rubber Insulating Blankets (ASTM D1048-93 or D1048-88a);
- Specification for Rubber Insulating Covers (ASTM D1049-93 or D1049-88);
- Specification for Rubber Insulating Line Hose (ASTM D1050-90); and

- Specification for Rubber Insulating Sleeves (ASTM D1051-87).

All electrical protective equipment shall be subjected to periodic electrical tests conducted in accordance with appropriate voltages identified by ASTM standards to reliably indicate whether the insulating equipment can withstand the voltage involved. Insulating equipment failing to pass inspections or electrical tests shall NOT be used by employees.

Rubber insulating equipment test intervals shall occur as follows:

- Rubber insulating line hoses shall be tested upon indication that the insulating valve is suspect;
- Rubber insulating covers shall be tested upon indication that the insulating valve is suspect;
- Rubber insulating blankets shall be tested before first issue and every twelve months thereafter;
- Rubber insulating gloves shall be tested before first issue and every six months thereafter; and
- Rubber insulating sleeves shall be tested before first issue and every twelve months thereafter.

Note: If the insulating equipment has been electrically tested but not issued for service, it shall not be placed into service unless it has been electrically tested within the previous twelve months.

All departments using rubber insulating equipment shall make the appropriate arrangements for testing of such equipment.

7.0 Responsibilities

7.1 Maintenance Schedules

Personal protective equipment shall be inspected, cleaned and maintained at regular intervals so that the personal protective equipment can be discarded, changed and/or decontaminated as deemed necessary. At a minimum, all personal protective equipment shall be discarded when it has become contaminated, worn, torn or has other integrity problems.

Personal protective equipment provides the requisite protection. It is important to ensure that contaminated personal protective equipment which cannot be decontaminated is disposed in a manner that protects employees from exposure to hazards.

[Note*:* Inspect personal protective equipment before each use for tears, punctures, holes, cuts, cracks, embedded foreign objects and texture changes (e.g., swelling, softening, hardening, becoming sticky or inelastic).]

8.0 Training

8.1 *Initial Training*

Initial training shall be provided by the university Safety Office or the appropriate department for each employee who is required to use personal protective equipment. Each employee shall be trained in at least the following:

- When personal protective equipment is necessary;
- What personal protective equipment is necessary;
- How to properly don, doff, adjust, and wear personal protective equipment;
- The limitations of the personal protective equipment; and
- The proper care, maintenance, useful life and disposal of the personal protective equipment.

Each affected employee shall demonstrate an understanding of the aforementioned training and the ability to use personal protective equipment properly before being allowed to perform work requiring the use of personal protective equipment.

8.2 Retraining

When there is reason to believe that any affected employee who has already been trained does not have the understanding and skill as required above, the pertinent department shall make arrangements with the university safety office and insure that each such employee is adequately retrained. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete;
- Changes in the types of personal protective equipment to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned personal protective equipment indicate that the employee has not retained the requisite understanding or skill.

9.0 Monitoring

Department supervisors and/or the university Safety Office shall verify that each affected employee has received and understood the required training through written documentation containing the name of each employee trained, the date(s) of training and the subject of the certification.

10.0 Appendixes

(Reserved)