

have, at a minimum a legible label to identify the contents – even if it is water or benign material.

Hazardous chemical containers must have the following:

- Original manufacturer label with the date received written on it – OR-
- Printed label identifying the contents, concentration, primary hazards, owner and date prepared.

## **Personal Protective Equipment:**

Personal protective equipment (PPE) is a vital means of worker protection, but it should be used in combination with fume hoods, safety shields and work enclosures. Additional guidance on the use of PPE can be found in OSHA 29 CFR 1910.132 and in the Dartmouth College Personal Protective Equipment Policy.

**Eye/Face Protection:** Minimum protection for chemical work is impact resistant safety glasses, splash Goggles are required for handling toxic or corrosive liquids in larger quantities (>100ml) or in high risk systems (pressurized or aerosolized). Face shields may be used in conjunction with goggles or glasses for additional impact and splash protection. Contact EHS for help with specialty eyewear for UV light, lasers or welding. Look for the ANZI Z87 stamp on all protective eyewear.

**Hand Protection:** Minimum protection for lab scale chemical work is available from disposable nitrile gloves (4 mil thick). These gloves provide a barrier to exposure and are disposable (single use). High-risk work (toxics or high probability exposure scenarios) may require impervious reusable gloves, consult permeation guides to select the best glove. Specialty gloves (for handling cryogenic material/high heat applications, or cut protection) can be ordered. Contact EHS if you need assistance in selecting the proper type of gloves for the chemicals you handle.

**Protective Clothing:** Flame resistant lab coats for work with solvents, basic lab coats, chemically resistant aprons, coveralls and shoe covers are available in a variety of styles, both disposable and reusable. Contact EHS for help selecting the proper type and check out the stockrooms to see what they have.

**Respiratory Protection:** Respirators should not be used in the laboratory without prior approval of EHS. Laboratory supervisors are not authorized to select or recommend the use of respiratory protection, **regardless of the type**. Call EHS if you feel that you need respiratory protection. (The selection, fitting and use of respirators is referenced in OSHA standard 29 CFR 1910.134)

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## Safe Storage and Disposal of Hazardous Chemicals:

- Incompatible chemicals must be physically separated during storage. This means segregating chemicals by physical properties – flammables, oxidizers, acids, bases and storing them in appropriate cabinets or containment bins (bins are free from EHS). A segregation chart is available in the laboratory safety calendar and online.
- Fire code requires that flammable liquids be stored in rated storage cabinets when not in use. These are typically double walled metal cabinets stamped with the “FM” rating. They are designed to protect the flammables inside from small potentially self-extinguishing fires in the lab. The total amount of flammable material allowed in any lab is limited by code, never store more than you can fit in your rated cabinets. Small volumes (2 liters or less) can be stored in standard cabinets away from heat or ignition sources.
- Never store hazardous chemicals under sinks, over-head, on countertops or open shelves. Specially designed cabinets are best, but cabinets with doors will do. Use plastic bins (available from EHS) as secondary containment for liquids and to segregate incompatible materials. Contact EHS for assistance.

## Emergency Procedures:

**When you hear a fire alarm:** Shut off all open flames. Safely store hazardous materials if time permits. Leave your work location. Shut all doors behind you as you leave. Evacuate the building through the nearest FIRE EXIT. Do not use elevators.

You must exit your laboratory and the building during all fire alarms. Chemical spills may present insidious hazards you cannot smell or see, so don't rely on your nose – just get out. Failure to do so is illegal and can result in disciplinary action from the Police or the College.

## Chemical Spills:

Chemical spills are a simple fact of life in teaching and research laboratories. Controlling the extent of a chemical spill requires planning and a prompt response. Using shatter resistant primary and secondary containers can prevent many chemical spills.

## In the Event of A Chemical Spill

Small spills involving chemicals you are familiar with can be safely handled within the laboratory. All spilled material must be collected, labeled and stored for disposal by EHS.

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Every lab that uses hazardous chemicals should have a spill kit (contact us to request one). The kits contain inert absorbent pads that work on all spills, solvents, aqueous materials or acids/bases. The kits also contain bags and hazardous waste labels for packaging contaminated spill debris. Safely store spill debris in a chemical fume hood and contact EHS to request a waste pick up. All spills and near misses should be reported to EHS, simply email us and describe the incident so we can all learn from it.

**Leave the area, close all doors and call for assistance if any of the following occur...**

- ◆ For fire or potential for a fire – Pull nearest fire alarm pull station, evacuate the building and go to a safe location to dial 911.
- ◆ Serious injury or exposure to a hazardous material -- dial 911.
- ◆ Spill is beyond your ability to control.
- ◆ Spill has left the immediate area or threatens other areas.
- ◆ Unknown materials are involved.

**Reporting a Chemical Spill:**

Notify everyone in the room (or area) that a spill has occurred.

*If needed provide immediate first aid.*

Eliminate potential sources of ignition, such as lights, motors or open flames.

Leave the room (or area) immediately and close the door behind you.

Secure the area and prevent others from entering.

If a fire, potential fire or medical emergency is **not** involved, call **646-1762** to report the spill to Dartmouth College EHS. On weekends and after hours follow the paging instructions.

*Remain near the phone and keep the line clear. Please state your name, exact location, the chemical spilled and any special circumstances. Be ready to provide the telephone number of the location you are calling from to EHS. Remain nearby until help arrives.*

Do not re-enter the area until the appropriate authorities determine that the area is safe.

**First Aid for Chemical Contamination:**

\*Go to the nearest eyewash station or safety shower.

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- \*Flush the contaminated area with large volumes of water.
- \*While flushing, remove any clothing that may have been contaminated.
- \*Continue flushing until the fire department arrives.
- \* Provide the MSDS/SDS(s) of spilled chemical(s) to EMS/emergency room personnel.

### **Procedures for Power Outages or Service interruptions:**

If the power in your lab should be interrupted for any reason immediately stop all work, seal all chemical containers, shut off or unplug equipment and lower all chemical fume hood sashes. Your local ventilation will not work or may be diminished so if there is potential for the generation of toxic airborne contaminants immediately exit the lab and contact EHS. The building should have emergency power for a few essential services but this is not intended to allow continued use of the lab. For your own safety secure all reactions, containers and equipment, close the doors and leave the lab.

Take special care with potentially unstable reactions that require cooling water and with any work involving a glove box, pyrophoric/water reactive or temperature sensitive chemicals. Contact EHS if you have concerns about potentially long term power interruptions and the stability of your chemical inventory or reactions.

### **Air Monitoring & Exposures to Hazardous Chemicals:**

Local exhaust ventilation systems such as chemical fume hoods, engineered enclosures and glove boxes are the preferred and primary method of controlling exposures to hazardous chemicals in the laboratory. Assuming that the fume hoods and other appropriate methods of containment are used properly the need for routine monitoring of airborne contaminants in the laboratory is unnecessary and impractical.

When a concern does arise over potential exposure to a laboratory chemical, assistance is available from EHS. Contact EHS at 646-1762 for assistance. As required by the laboratory standard, exposures to OSHA regulated chemicals in the laboratory must *not* exceed the Permissible Exposure Limits (PELs) or the recommended Threshold Limit Values (TLVs) when there is no PEL.

### **Special Note on Pregnancy:**

Personnel who are pregnant or considering becoming pregnant may have special concerns about working with chemicals that have potential reproductive hazards. Such concerns can be discussed with their supervisor and EHS. All inquiries are confidential. Disclosure of pregnancy is not mandatory but EHS does encourage early consultation with a medical professional, as the first trimester is an important phase in pregnancy.

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## Medical Consultation:

Medical consultation and evaluation are available to Dartmouth College employees upon request. Contact EHS to discuss potential occupational exposures or to request a consultation with a doctor through the Occupational/Employee Health Program located at Dartmouth-Hitchcock Medical Center (DHMC) or through Alice Peck Day.

In general, medical follow-up is required:

- In the event of a spill or an event that results in an acute chemical exposure.
- When signs or symptoms develop that may be associated with potential exposure(s) to chemicals used in the laboratory.
- When chemical exposure monitoring data reveals an exposure at or above the action level for an OSHA regulated substance.

## Services Provided by EHS:

Periodic audits of laboratories are conducted by EHS to ensure compliance with the requirements of the College's Chemical Hygiene Plan. A lab safety checklist for staff and researchers can be found in Appendix B. Training and information are also provided on an on-going basis to promote and increase awareness. Annually, EHS hires a third party to inspect each chemical fume hood to ensure that it is working and being used properly.

## Services Provided by Facilities:

- Repair and preventive maintenance of chemical fume hoods and other local exhaust systems.
- Repair of electrical or other physical hazards in your facilities.
- Inspection of fire extinguishers
- Periodic testing of safety showers.

## Working With Particularly Hazardous Substances:

These substances include "select" carcinogens, reproductive toxins and chemicals that have a high degree of acute or chronic toxicity. Acute toxicity can be defined with LD<sup>50</sup> data (the dose which is lethal to 50% of the test population), any substance with a published LD<sup>50</sup> < 50mg/kg (any route of exposure) should be considered highly toxic. Substance specific information is available in Appendix H and through the EHS Office (646-1762).

The laboratory supervisor is responsible for ensuring that appropriate additional precautions are taken when working with such chemicals.

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