

Labeling and Storage of Chemicals in UVM's Laboratories



(802) 656 - 5400

This reference is based in part on *Prudent Practices in the Laboratory* which is available in the reference section of Bailey Howe, Dana & Cook libraries, or through ESF.

Labeling (*Prudent Practices chapter 4.D*)

Commercially Packaged Chemicals (4.D.3)

- Write the date received on the manufacturer's label, which should already have the chemical name, hazard & manufacturer.
- If chemicals are transferred, the new containers should be labeled with all essential information as on the original container.
- Replace deteriorating labels before information is lost or obscured.

Labeling Other Chemical Containers (4.D.4)

Identify the contents of all chemical containers, including flasks, beakers, reaction vessels, and process equipment. Proper identification for containers includes the following:

- chemical identification and identity of hazard component(s),
- appropriate hazard warnings,
- name of responsible party (including researcher), and
- Name of manufacturer if identified by tradename only.

Chemicals that will be used up within the day should be labeled at least with the name of the chemical contents.

Labeling Chemical Wastes

Chemical wastes need to be labeled with a completed hazardous waste tag or label. Either of these are available through the ESF. If information is lost, dispose of chemical as an unknown hazardous waste through the ESF.

Labeling Experimental Materials (4.D.5)

The following information should accompany experimental or archival materials:

- Originator: give the name and department of the person to contact for safe handling information.
- Identification: include, at least, the laboratory notebook reference and primary components that are known to be hazardous
- All the known or suspected potential hazards.
- Date that the material was placed in the container.

Groups of experimental chemicals can be stored together in a secondary container providing the individual materials are compatible. Only the secondary container needs to be labeled.

Chemical Storage (*Prudent Practices chapter 4.E*)

General Considerations (4.E)

- Store chemicals, especially liquids, below eye level. This limits chemicals from getting lost out of sight or put out of reach. It protects chemicals from being dropped and protects eyes and faces. Injuries can result from lifting material up too high.
- Store chemicals, including wastes, off the floor. Chemicals that must be stored on the floor need to have secondary containment.
- Use bins, trays or other secondary containers that will retain materials if a primary container breaks or leaks when prudent.
- Areas around exits, eye washes, safety showers, fire extinguishers and passageways or hallways are not acceptable for chemical storage.
- Avoid storing chemicals, including wastes, in the fume hood. Excess storage clutters the hood work space and inhibits the air flow needed for proper operation.
- Cabinets with doors or shelves with edge lips are proper chemical storage locations.
- Maintain at least 18 inches of clearance from sprinklers to allow proper water flow in an emergency.
- Close caps tightly and seal containers to minimize escape of vapors.
- Store chemicals only in active laboratories or supervised and secured storage rooms with ventilation and fire suppression systems. Teaching labs, closets or unused rooms are not appropriate for chemical storage.

Chemical Compatibility (4.E.1)

- *Corrosive* materials need to be stored in vented, non-metal cabinets. *Inorganic acids*, *oxidizing acids*, and *alkaline material* can be stored in the same cabinet **only** if they are in separate trays or other secondary storage containers. Limited amounts of *organic acids* can be stored with combustible materials or with corrosives if separated with secondary containment.
- *Oxidizing* chemicals cannot be stored with organic materials (including oxidizing and organic acids).
- Store *flammable and combustible* materials in flammable storage cabinets (see 4.E.3).
- *Odiferous and toxic* chemicals should be stored in a ventilated storage area (see 4.E.6).

Storing Flammable Liquids (4.E.3)

- Flammable liquids have a flashpoint < 100°F (38°C)
- **Flammable Storage Cabinets**
 - Store no more than 60 gallons of flammable liquids, including waste, in approved flammable storage cabinets (*VOSHA 1910.106*).
 - Cabinet must be labeled with the words **“Flammable Keep Fire Away”**
 - If cabinets are vented, ventilation materials must not reduce overall fire rating of cabinet.
 - Return containers to cabinet when not in use.
- **Storage Without Flammable Storage Cabinets**
 - Up to 4 gallons of flammable liquids, including waste, per 100 sq ft of lab floor space can be stored without an approved flammable storage cabinet. (*NFPA (1991c) 2-2*)
 - These flammables should be stored in vented and secured areas.
 - These areas must be labeled with the words **“Flammable, Keep Fire Away”**

Gas Cylinders (4.E.4)

- Label cylinders.
- Secure cylinders to a wall or bench top.
- When cylinders are no longer in use, shut the valves, remove the regulators, and cap the cylinders. Call distributor for cylinder pickup.

Chemical storage refrigerators (4.E.2)

- Do not store flammable liquids in a refrigerator unless it is designed not to spark inside. If refrigerated storage is needed inside a flammable storage room, use an explosion-proof refrigerator.
- Label these refrigerators with the words **No Food - Chemical Storage Only**
- Label all materials in the refrigerator.

Highly Reactive Substances (4.E.5)

- Write the date the container was opened on the label.
- Purge these chemicals from inventory **every 12 months** and purchase only the very smallest amounts possible.
- If special mechanical devices are needed to keep these materials stable (such as refrigeration or inert atmospheres), that needs to be clearly indicated on the label and a warning system or back up system should be installed in case of a failure of that safeguard (power outage, container breakage).
- *Organic peroxides* must be stored below their maximum safe storage temperature (MSST) or self accelerating decomposition temperature (SADT).
- *Perchloric acid and strong (>70%) nitric acid* should be kept separate from all other chemicals in a secondary storage container. This can be placed in a corrosive storage cabinet.
- *Pyrophoric chemicals* should be separated from other flammable liquids unless in flammable storage cabinet.
- *Water reactive chemicals and flammable solids* should be stored away from any source of water.

Storing Toxic Substances (4.E.6)

- Store highly toxic chemicals (including carcinogens, mutagens and teratogens) in unbreakable secondary containers and placed in ventilated storage with appropriate warnings, such as **“Teratogen”** or **“Carcinogen”**
- Keep a minimum working level of these compounds on hand and limit access to the area.

Chemical Hygiene Plan

In accordance with the OSHA Laboratory Standard, UVM has a chemical hygiene plan (CHP) that addresses many safety concerns that are found in our labs. This can be found on the world wide web at <http://esf.uvm.edu/> or by calling the ESF.

TABLE 4.3 Container Size for Storage of Flammable and Combustible Liquids	Flammable Liquids [fp < 100°F (38°C)]						Combustible Liquids [100°F < fp < 200°F]			
	fp < 73°F bp < 100°F		fp < 73°F bp ≥ 100°F		73°F < fp < 100°F (22°C < fp < 38°C)		100°F < fp < 140°F (38°C < fp < 60°C)		140°F < fp < 200°F (60°C < fp < 94°C)	
Container	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons
Glass*	0.5	0.12	1	0.25	4	1	4	1	4	1
Metal or approved plastic	4	1	20	5	20	5	20	5	20	5
Safety cans	7.5	2	20	5	20	5	20	5	20	5

fp = flash point bp = boiling point

Source: NFPA (1991c), Chapter 7-2.3 “Storage”

*Glass containers as large as 1 gallon can be used if needed and if the required purity would be adversely affected by storage in another container, or if the liquid would cause excessive corrosion or degradation of a metal or approved plastic container.