

Chemical Storage Guidelines

Proper chemical storage is a key component in laboratory safety. The following guidelines are taken from *Prudent Practices in the Laboratory* (NRC) and *Chemical Storage Plan for Laboratories* (College of American Pathologists).

General Rules of Storage :

Do

- ◁ Make certain all chemicals are labeled clearly to identify contents.
- ◁ Physically separate incompatible chemicals.
- ◁ Segregate by hazard class: Health Hazards (Toxins, Poisons, Carcinogens, etc.) , Corrosives, Reactives/Oxidizers, Flammables, and General Storage (e.g. salts and other routine dry chemicals - relatively modest hazards).
- ◁ Date when received and again when opened. (Dating containers is especially important for chemicals with a short shelf life like ethyl ether which, because of its explosion hazard, should not be kept for more than 12 months after being opened and must never be kept past its expiration date)
- ◁ Keep exits, passageways, areas under benches and desks, and emergency equipment free of stored equipment and materials.

Do not:

- ◁ Store chemicals on benches.
- ◁ Store chemicals in fume hoods or under sinks.
- ◁ Expose to heat or direct sunlight.
- ◁ Store hazardous materials above shoulder height of shortest person in lab.

Hazard specific storage rules:

Health Hazards:

- ◁ Separate toxins and poisons from other chemicals in a location labeled ☐Toxins☐ or ☐Poisons☐.

Corrosives:

- ◁ Store large bottles on a low shelf or in a corrosives cabinet.
- ◁ Segregate acid oxidizers from organic acids, flammable and combustible materials.
- ◁ Segregate acids from bases and active metals.
- ◁ Segregate acids from chemicals which can generate toxic gases on contact (e.g. sodium cyanide)
- ◁ Segregate perchloric acid from reducing agents and organics .
- ◁ Store in chemical resistant trays.

Reactives/Oxidizers:

- ◁ Store water-reactive chemicals in a cool and dry place.
- ◁ Store oxidizers away from flammables, combustibles, and reducing agents (zinc, alkaline metals, etc.).
- ◁ Store peroxide forming chemicals in an airtight container in a cool, dry, dark place.
- ◁ Peroxide forming chemicals should be disposed of within 12 months of opening, or by expiration date.
- ◁ Shock sensitive and detonatable materials should be stored in a secondary container, large enough to hold entire contents in case of breakage
- ◁ Store liquid organic peroxides at the lowest possible temperature consistent with solubility and/or freezing points.

Flammables/Combustibles:

- ◁ Store flammable liquids in flammable storage cabinet.
- ◁ Do not store flammable liquids in domestic refrigerators or freezers.
- ◁ Store away from ignition and heat sources.
- ◁ Stay within NFPA rules for volume of flammables:
 - Maximum for any lab is 120 gallons.
 - With flammable safety cabinet - 10 gal/100 sq ft unsprinkled or 20 gal/100 sq ft of sprinkled area.
 - Without flammable safety cabinet - 10 gallons in original container & 25 gallons in 2.5 gallon or smaller safety cans.

Gas Cylinders:

- ◁ Strap or chain securely to bench top or wall.
- ◁ Cap cylinders not in use.
- ◁ Separate incompatibles.
- ◁ Segregate empty cylinders from full ones.

Chemical manufacturers include storage information on the label. This may be done with a color code or pictogram to indicate hazards.

Proper chemical storage can prevent many common laboratory accidents. The time and effort required to segregate and store chemicals according to their hazard classes is repaid by increasing the overall safety in any lab.

Submitted by Dita Jean Geary