

Storage of Chemicals in the Lab

This guideline contains safety and reference information for the storage of hazardous materials and is primarily written for faculty and staff who setting up a new lab. This should not be considered a substitute for referencing Safety Data Sheets (SDSs) and following regulatory guidelines.

Working in a lab requires at minimum, basic chemical knowledge AND knowing where to find the relevant safety information (Safety Data Sheets). Prior to working in a chemical lab, completion of WHMIS 2015 training and Chemical Handling & Spills training, at a minimum, is mandatory. Both are available on-line. Site-specific training is required for specific hazards within individual labs and must be provided by the supervisor of the area.

Keep in mind three things when it comes to lab safety:

1. Identification of hazards present
2. Risk assessment
3. Controls (Engineering/Administrative/PPE)

1. Determine the main hazards, look at the pictograms on the product label – Flammable? Corrosive? Reactive? **Read the SDS's**

2. Assess the risk – can organic solids be stored alphabetically? It may be a matter of gram amounts in plastic or glass containers. What is the likely hood of a spill? What is the potential risk? Is it reasonable, given the space of the lab and available shelving to store the chemicals this way?

3. Next review the hazard controls available in the lab – flammable cabinets/ flammables fridge/freezers/ acid and base cabinets etc. Include the containers in this as well – secondary containment, desiccators etc. Are the appropriate spill kits available and adequate lab ventilation? Are sand buckets and fire extinguishers available? Have all lab occupants been trained to use these things?

Basic hazards:

Solvents/flammable liquids – yellow (usually) flammables cabinet; large bottles on the bottom, small bottles on the top (shelves are adjustable!) No room? Look closely – chlorinated solvents are non-flammable and should be stored on a low shelf where they cannot be accidentally knocked over. Water doesn't need to be in the flammable liquid cabinets.

Acids– acid cabinets under hoods (generally) – separate inorganic acids (examples: sulfuric acid, hydrochloric acid) from organic acids (flammable – example: formic acid, acetic acid)

Bases – base cabinets (under hoods)

Solids

October 2020

Separate inorganic from organic solids and store alphabetically – away from sun and heat on shelves in lab preferably not above shoulder height

Chemicals with Strong Odours

Vented cabinets – sometimes found under fume hoods, or seal in clear, Ziploc bags

Higher Risk Chemicals:

Pyrophoric solids and liquids – sodium and lithium metals, t-butyllithium

Explosives – azides, perchlorates, picric acid, peroxide forming chemicals – See the following list:

Group A – spontaneously forms peroxides (deaths have been caused these): examples: isopropyl ether, potassium metal

Group B – forms peroxides upon concentration (bottle has been opened, has been sitting on the shelf for a while...): examples: acetaldehyde, THF

Group C – peroxide formation due to autopolymerization (in general, contain vinyl group): examples: vinyl acetate, vinyl chloride

It is highly suggested that you purchase [peroxide test strips](#) in the 1-100ppm range and check your chemicals every 3 months to ensure the safety of those working in your labs. Peroxide levels over 20ppm are considered explosive. The following are classifications taken from an article on [Peroxides and Peroxide Forming Compounds](#):

Although some of the above may only require testing if opened or after 12 months etc. we suggest **every 3 months to be safe**.

READ THE SDS's and Note Expiry Dates for All Chemicals

Pyrophoric solids and liquids should be stored separately according to their SDS. For example, sodium and lithium metals should be kept under oil in tight sealing jars. Some chemicals may need to be kept in desiccators or glove bags – under vacuum, under nitrogen, or dry and cool. If they need to be refrigerated, make sure you do so (often this indicates they will decompose at room temp).