



Revision: 2.0 September 5, 2023	Subject: Chemical Storage Procedures	

1.0 Introduction (5 of 0)

Queen's University Environmental Health & Safety



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Chemicals must be segregated and stored according to chemical compatibility. **Never** store chemicals alphabetically, except within a compatible group.

Table 1 identifies 9 groups into which chemicals should be segregated. Identify the primary or most hazardous class. Often chemicals have multiple hazards and an informed decision must be made as to which storage location would be most appropriate.

Each group of chemicals must be stored away from the other groups by one or more of the following methods:

1. Chemically resistant physical barrier (Cabinet dividers, shelves with spill containment, etc.)
2. Secondary containment (Separate bins, trays, buckets etc, large enough to contain the material should a spill occur)
3. Distance (store incompatible chemicals far enough away to ensure no mixing could occur)



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6.0 Specialized Storage

Certain categories of chemicals must follow further requirements to ensure safe storage.

6.1 Flammable and Combustible Liquids

Refer to ***SOP-Chem-02, Laboratory Flammable & Combustible Liquids handling Procedures*** and ***SOP-Chem-03 General Flammable & Combustible Liquid Handling Procedures***. These procedure outline strict limits which are set on the total amount of liquid that can be stored in a “fire compartment” while defining cabinet and bench-top storage requirements as well as allowable container sizes.

6.2 Refrigerated Chemicals

All refrigerators and freezers containing chemicals must contain a “Caution no food” sticker which can be obtained from EH&S. Non-explosion proof refrigerators/freezers used to store non-flammable or non-combustible chemicals must contain a sticker stating “Not Explosion proof”

6.3 Refrigerated Flammable and Combustible Liquids

Approved and labeled “Laboratory Safe” or “Explosion/ Intrinsically Safe” refrigerators/freezers **MUST** be used for the storage of 20% solutions of flammable and combustible liquids. Refer to ***SOP-Chem-02, Laboratory Flammable & Combustible Liquids handling Procedures***.

6.4 Controlled substances or extremely toxic or reactive materials

These materials shall be stored in separate locations preferably within a locked cabinet. Laboratory doors must remain closed and locked when not in immediate use.

6.5 Gas Cylinders

Storage of gas cylinders must comply with section 5.6 *Compressed Gas Cylinders* of the Ontario Fire Code. Due to the extensive requirements of the section, please consult the Ontario Fire code directly or please contact EH&S for assistance.
<https://www.ontario.ca/laws/regulation/r01315>.

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Chemical Storage Guide

1. **Know the hazards!** Consult your MSDS to obtain the physical and chemical properties of your chemical. Identify the primary and if applicable secondary hazard class and determine the appropriate storage group listed in Table 1.
2. Ensure the chemical is stored in an appropriate primary container
3. Ensure the container is labeled and tightly sealed.
4. Use the appropriate secondary containment such as trays, separators or distance.
5. Place the container in the appropriate and labeled storage location ensuring that bottles are not crowded or close to the edge of a shelf where they can be knocked or pushed off.

Table 1. Chemical storage groups

The following table should only be used as a guideline. The ultimate responsibility for segregation and compatibility is the MSDS provided by the supplier of the product. It is your responsibility to ensure it is consulted and understood prior to making decisions about the storage and handling of hazardous chemicals. The chemicals listed in the “Examples” and “Storage Requirements” section represent only a small portion of the chemicals that must be properly segregated. Consult your MSDS in all cases to ensure incompatible materials are not stored together.

Hazard Description	Storage Group	Examples	Storage Requirements
Acids Oxidizing, inorganic	A1	Sulfuric Acid, Nitric Acid, Chromic Acid, Perchloric Acid	Store in a dedicated cabinet of non-combustible, ideally non-metallic material, s

Flammable & Combustible Liquids	D	Ethanol, methanol, hexane, diethyl ether, xylene, toluene, formalin Dimethylsulfoxide	See Section 6.1 for storage requirements, total volumes, bottle sizes permitted and other restrictions. See section 6.3 for storage in refrigerators Flammables Can be Stored in: 1. Flammable storage cabinet 2. Open bench top, shelving 3. OFC Approved containers. I.e. 20L Flammable storage container with flame arrestor.
Organic Acids		Acetic Acid, Formic Acid, Butyric Acid	Store away from heat, open flames and sparks.
Non-Flammable Solvents		Carbon Tetrachloride, Ethylene Glycol	Keep segregated from Group E
Oxidizers	E	Sodium hypochlorite, benzoyl peroxide, potassium permanganate, potassium chlorate, potassium dichromate.,	Store in cabinet or shelving, separate from combustible and flammable materials and other reducing agents .
Gas Cylinders/Compressed Gases	F		Store in cool, dry area, away from gasses of other incompatible groups as outlined in the MSDS and this table. Securely strap or chain large cylinders to a wall or bench top. See section 6.5
Specials (Water reactive, air reactive, highly toxic etc.)	G	Sodium Metal, potassium metal. Lithium metal, lithium aluminum hydride, thiocyanates ferrocyanates, cyanide, mercury etc	Store in cabinet, separate from all other chemicals, especially oxidizers, aqueous solutions and any sources of water or moisture. See MSDS for storage requirements. Ensure bottles are well sealed.
Explosives	H	Picric Acid (less than <10%), Ammonium Nitrate, Nitro Urea, , Trinitrobenze and derivatives, Trinitrophenol,, Trinitrotoluene, etc.	Store separately in a locked cabinet segregated from each other.