



Chemical Storage Groups



Improper storage of hazardous chemicals may result in degradation of chemical quality, deterioration of container labels, release of toxic gases, fire, or even explosion. As a result, local and state regulations require that chemicals be stored according to hazard class and compatibility. A significant amount of thought, planning, and research on the hazards associated with the chemicals being stored may be required; especially in the research laboratory environment. Many laboratory chemicals have multiple hazards making proper storage segregation a particularly difficult task.

The following hazard class hierarchy (based on DOT/GHS) is provided as a guide for prioritizing which hazard classes pose the greatest risks during storage, e.g., flammability is usually a more important consideration than toxicity. Contact the Chemical Hygiene Officer or EH&S for assistance.

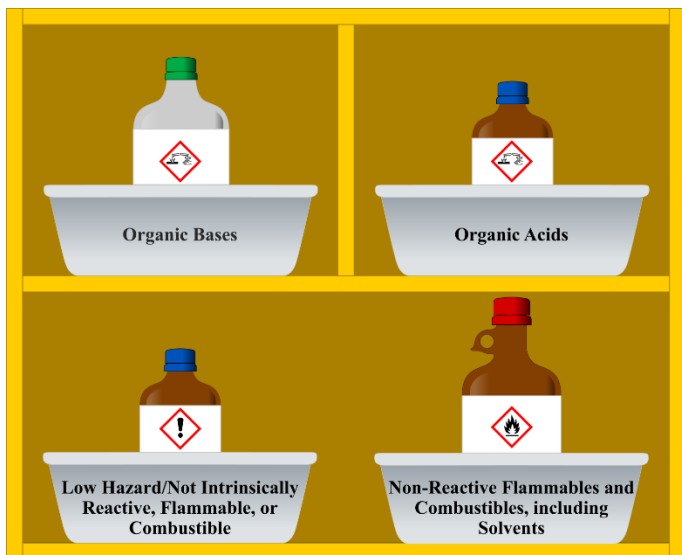
Pyrophoric > Explosive > Flammable Liquid > Corrosive Acid/Base > Water Reactive > Flammable Solid > Oxidizer > Combustible > Toxic

The table below is a general reference for identifying chemical hazard classes that should be kept separated. Contact EH&S regarding storage of radioactive material. Note the manufacturer hazard codes are not always a good indicator of chemical hazard class for segregation purposes, i.e., not all corrosives are compatible and therefore should not be stored together. *Store acetic acid with the flammables, even though it is an organic acid.*

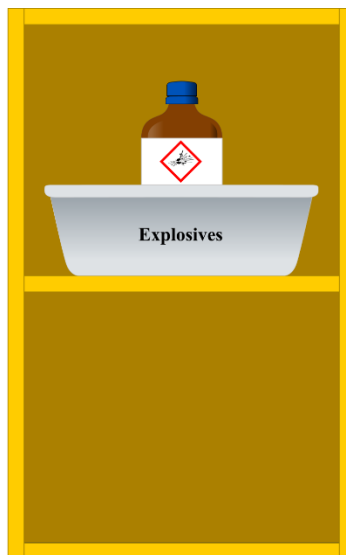
Hazard Class	Pictogram	Information	Examples
Reactives			
Pyrophoric Materials		Liquids or solids that spontaneously ignite upon contact with air or water.	Phosphorus; Titanium Dichloride; Tributylaluminum; Lithium Hydride; Sodium metal
Explosives		Explosives are chemical compounds, that may contain nitrogen and that may detonate upon shock or heating.	TNT (Trinitrotoluene); dry Picric Acid; Nitroglycerin; Lead Azide; Mercury Fulminate
Organic Peroxides	Varies	All peroxide forming compounds must be dated and handled in accordance with campus policy; Storage location is determined by the GHS Hazard Classification	Benzoyl Peroxide; old Ethers (e.g., Ethyl, Methyl; Isopropyl); Tetrahydrofuran; Dioxane
Flammables			
Flammable and Combustible Liquids		Organic acids and non-flammable halogenated solvents can generally be stored with flammable and combustible liquids (flash point > 200° F)	Acetone, Ethyl Ether, Petroleum Ether, Ethyl Acetate
Flammable Solids		Flammable solids may also be reactives; think carefully prior to placing in storage location.	Picric Acid powder; Sodium; Calcium Carbide
Corrosives			
Inorganic Acids		Oxidizing and Mineral acids (pH is usually ≤ 2) (DOES NOT include organic acids). Perchloric acid should be stored inside a glass or porcelain secondary container.	Hydrochloric, Perchloric, Sulfuric, Phosphoric, Nitric Acid
Inorganic Bases		Caustic liquids and solids with pH ≥ 12.5	Sodium Hydroxide, Potassium Hydroxide, Ammonium Hydroxide
Organic Acids		May be stored with flammable and combustible liquids. DO NOT store with oxidizers or mineral and oxidizing acids	Propionic Acid, Formic Acid, p-Toluenesulfonic acid
Organic Bases		May be stored with flammable and combustible liquids. DO NOT store with oxidizers or mineral bases	Triethylamine, Diisopropylethylamine,
Oxidizers		DO NOT STORE near organics	Nitrates, Nitrites, Permanganates, Perchlorates, Chlorates, Chlorites
Highly Toxic		May be included in other storage classes but kept separate from low hazard materials. These materials should be easy to identify as highly toxic. Included in this class are chemicals on the "Select Carcinogen List" and those with specific regulatory requirements.	Teratogens, Carcinogens, Cyanides, Formaldehyde, Methyl-nitrosourea, Acrylamide
Low Hazard		Materials commonly used with no special hazards	Agars, Sodium Chloride, Potassium Chloride, Glycerine, Amino Acids

Storage Group Examples

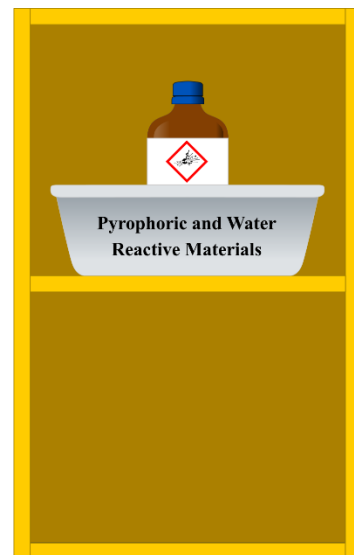
When space allows, storage groups should be kept in individual cabinets. The following scheme can be used when cabinet space is limited.



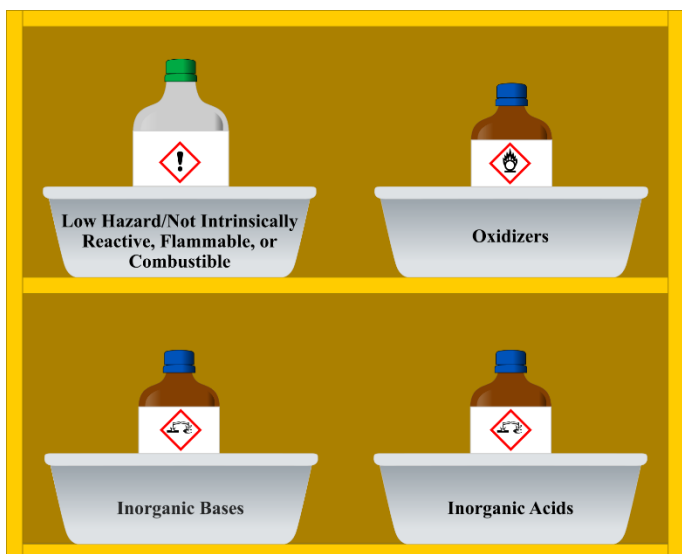
Shared Cabinet



Separate Cabinet



Separate Cabinet



Shared Cabinet



May be stored with other storage classes

Please contact EH&S ehs.ucmerced.edu for storage of:

- Poison compressed gas
- Explosives
- Highly unstable materials
- Cal/OSHA regulated carcinogens
<https://www.dir.ca.gov/title8/5209.html>