



The specific Safety Data Sheet (SDS) should always be consulted when doubts arise concerning chemical properties and associated hazards. Always wear appropriate personal protective equipment (e.g., laboratory coat, safety glasses, gloves, safety goggles, apron) when handling hazardous chemicals. Be aware of the locations of the safety showers and emergency eyewash stations.

## Chemical Safety Storage Priorities

Keep in mind that most chemicals have multiple hazards and a decision must be made as to which storage area would be most appropriate for each specific chemical. First you have to determine your priorities:

1. **Flammability.** When establishing a storage scheme, the number one consideration should be the flammability characteristics of the material. If the material is flammable, it should be stored in a flammable cabinet.
2. **Isolate.** If the material will contribute significantly to a fire (e.g., oxidizers), it should be isolated from the flammables. If there were a fire in the laboratory and response to the fire with water would exaggerate the situation, isolate the water reactive material away from contact with water.
3. **Corrosivity.** Next look at the corrosivity of the material, and store accordingly.
4. **Toxicity.** Finally, consider the toxicity of the material, with particular attention paid to regulated materials. In some cases, this may mean that certain chemicals will be isolated within a storage area. For example, a material that is an extreme poison but is also flammable, should be locked away in the flammable storage cabinet to protect it against accidental release.

## Basic Rules for Hazardous Chemical Storage

- Date all chemicals on receipt.
- Maintain a permanent inventory that is verified annually.
- Establish a separate and secure storage area for chemicals.
- Do not store chemicals in fume hoods or work areas.
- Label storage areas and cabinets to identify the hazardous nature of products stored within.
- Properly identify all unlabeled products before storing.
- Never store flammable chemicals in a standard domestic refrigerator.
- The maximum total quantity of flammable and combustible liquids must not exceed **60 gallons** within a flammable storage cabinet. The maximum quantity allowed to be kept outside a flammable storage cabinet, safety can, or approved refrigerator/freezer is **10 gallons**.
- Use secondary containment when storing chemicals on the floor.
- Chemicals should not be stored above eye level so that storage circumstances can always be easily evaluated (corroded containers or deteriorating container).
- Lips or seismic restraints on storage shelves should be in place to prevent bottles from falling off.
- Chemical storage should be away from heavily traveled areas.
- Stored chemicals should be in a cool and dry location with caps and lids tightly closed; no chemical should be on the outside of the container.
- Stored chemicals should be arranged in compatible families rather than in alphabetical order. Extremely hazardous chemicals should be purchased in as small a quantities are possible.

[Click here for the WSU Emergency Procedures Posting](#) to post in/near chemical storage areas.

## **Incompatible Chemicals**

Table 1 contains a list of incompatible chemicals. Per row, the chemicals listed in the left column should not be used with chemicals listed in the right column, except under specially controlled conditions. Per row, chemicals in the left column should not be stored in the immediate area with chemicals in the right column. Incompatible chemicals should always be handled, stored or packed so that they cannot accidentally come into contact with one another. This list is representative of chemical incompatibilities and is not complete, nor are all incompatibilities shown.

<b>Table 1 - Incompatible Chemicals</b>	
<b>Chemical</b>	<b>Keep Out of Contact with</b>
Alkaline metals, such as powdered aluminum, magnesium, sodium, potassium, etc.	Carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide and water
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides and permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver and mercury
Ammonia	Mercury, chlorine, calcium hypochlorite, iodine, bromine and hydrofluoric acid
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Carbon, activated	Calcium hypochlorite
Copper	Acetylene and hydrogen peroxide
Chromic acid	Acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol and flammable liquids
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane, hydrogen, sodium carbide, turpentine, benzene and finely divided metals
Cyanides	Acids - organic or inorganic
Hydrogen peroxide	Copper, chromium, iron, most metals, alcohols, acetone, organic materials, aniline, nitromethane, flammable liquids and combustible materials
Hydrogen sulfide	Fuming nitric acid and oxidizing gases
Hydrocarbons (butane, propane, benzene, gasoline, turpentine etc.)	Fluorine, chlorine, bromine, chromic acid and sodium peroxide
Iodine	Acetylene, ammonia and hydrogen
Nitric acid	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass and any heavy metals
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, ether, oils and grease
Phosphorous	Oxidizing agents, oxygen, strong bases
Potassium chlorate	Sulfuric and other acids
Potassium permanganate	Glycerin, ethylene glycol, benzaldehyde and sulfuric acid
Sodium	Carbon tetrachloride, carbon dioxide and water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate and furfural
Sulfides, inorganic	Acids Sulfuric acid Potassium chlorate, potassium perchlorate and potassium permanganate

## **Special Segregation of Incompatible Chemicals**

Table 2 contains examples of dangerously incompatible substances. Per row, the chemicals listed in the left column are dangerously incompatible with chemicals listed in the right column. Per row, chemicals in the left column must be stored away from chemicals in the right column so that accidental mixing will not occur.

<b>Table 2 – Dangerously Incompatible Substances</b>	
<b>Chemical</b>	<b>Keep out of contact with</b>
Chlorine	Acetylene
Chromic acid	Ethyl alcohol
Oxygen (compressed, liquefied)	Propane
Sodium	Chloroform and aqueous solutions
Nitrocellulose (wet, dry)	Phosphorous
Potassium permanganate	Sulfuric acid
Perchloric acid	Acetic acid
Sodium chlorate	Sulfur in bulk

Table 3 contains examples of incompatible oxidizing and reducing agents. Every chemical in the left column is incompatible with every chemical on the right. These must be stored completely separate from each other.

<b>Table 3 – Incompatible Oxidizing Agents and Reducing Agents</b>	
<b>Oxidizing Agents</b>	<b>Reducing Agents</b>
Chlorates	Ammonia
Chromates	Carbon
Dichromates	Metals
Chromium trioxide	Metal hydrides
Halogens	Nitrates
Halogenating agents	Organic Compounds
Hydrogen peroxide	Phosphorus
Nitric acid	Silicon
Nitrates	Sulfur
Perchlorates	
Peroxides	
Permanganates	
Persulfates	

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