Chemical Storage Guide

Store chemicals on non-flammable shelving or cabinets. Avoid storing chemicals on top of cabinets and never within 18 inches of the ceiling in sprinklered areas. Label all chemical containers properly. Avoid storing chemicals on bench tops or in fume hoods. Store flammable chemicals in a Flammable Storage Cabinet (preferably a ventilated cabinet). Separate chemicals into organic and inorganic families and then into related and compatible groups. Separation of chemical groups can be by use of different shelves within the same cabinet if secondary spill containers are used. Do not store chemicals alphabetically except within a related and compatible group.

Storage Groups that are Related and Compatible

Inorganic Family

① Metals, hydrides
② Halides, sulfates, sulfites, thiosulfates, phosphates, halogens
③ Amides, nitrates (ammonium nitrate), nitrites, azides
④ Hydroxides, oxides, silicates, carbonates, carbon
⑤ Sulfides, selenides, phosphides, carbides, nitrides
⑥ Chlorates, perchlorates, perchloric acid, chlorites, hypochlorites, peroxides, hydrogen peroxide
⑦ Arsenates, cyanides, cyanates
⑧ Borates, chromates, manganates, permanganates
⑨ Nitric acid, other inorganic acids
⑩ Sulfur, phosphorus, arsenic, phosphorus pentoxide

Organic Family

① Acids, anhydrides, peracids
② Alcohols, glycols, amines, amides, imines, imides
③ Hydrocarbons, esters, aldehydes
④ Ethers, ketones, ketenes, halogenated hydrocarbons, ethylene oxide
⑤ Epoxy compounds, isocyanates
⑥ Peroxides, hydroperoxides, azides
⑦ Sulfides, polysulfides, sulfoxides, nitrites
⑧ Phenols, cresols

Chemical Compatibility Storage Guidelines

Guard against accidental mixing by segregating chemicals as follows:

① **Mineral (inorganic) acids -** Examples: boric acid, hydrobromic acid, hydrochloric acid, phosphoric acid, sulfuric acid.

② **Oxidizers** - Examples: bromic acid, chromic acid, perchloric acid, nitric acid, bromine, chlorine, fluorine, silver nitrate, permanganates and many perchlorates.

Note: Do not store oxidizers directly on wooden shelves or on paper shelf liners! Spilled material may react with the organic contents of wood/paper and ignite spontaneously.

Perchloric acid presents special hazards; give special consideration to isolating it from oxidizable materials and dehydrating agents.

Hypochlorite solutions (such as bleach) are oxidizers; however, they will release chlorine gas on contact with acids, so store them separately.

③ **Bases/Caustics -** Examples: Aqueous ammonia, ammonium hydroxide, potassium hydroxide, sodium hydroxide.

④ **Organic Solvents/Acids** - Examples: acetic acid, acetone, benzene, carbon tetrachloride, citric acid, isopropyl ether, methanol, methylene chloride, tetrahydrofuran.

Note: If space is limited, separate flammable and non-flammable organic liquids in flammable storage cabinets.

⑤ **Highly Toxic/Carcinogenic** - Examples: acrolein, acrylamide, arsenic pentoxide, botulinum toxin, hydrazine, methyl isocyanate, pentachlorophenol, phorbol esters, sodium azide.

⑥ **Pyrophoric Materials** - Examples: diethyl aluminum chloride, lithium, white or yellow phosphorus, trimethyl aluminum.

⑦ **General "Dry" Lab Chemicals** - Examples: Most of the relatively innocuous and unreactive materials commonly found in laboratories.

⑧ **Gases** - Segregate by hazard class. Acutely toxic and toxic gases should be stored in gas cabinets or fume hoods. Cylinders should be double chained or double strapped to substantial fixed surfaces. Cylinders should be turned off at the cylinder valve when not in use and should be capped when stored.

⑨ **Water Reactives** - Examples: acid anhydrides, aluminum tribromide, calcium, calcium oxide, metal hydrides, potassium, sodium.

⑩ **Controlled Substances** - Narcotics and other controlled substances must be stored in a secure locked location such as a drawer or safe.