Laboratory Chemical Storage Scheme Table – UNC-Charlotte

Group	Properties	Important Notes	Storage	Examples
Group I **Flammables and Combustibles** 	Flammable liquids have a flashpoint (FP) below 100 F (38 C) Combustible liquids have a FP above 100 F. FP is the lowest temperature at which a liquid gives adequate vapor to ignite.	The MSDS provides the flashpoint (FP) for flammable/combustible liquids. Combustible liquids with FP>140 F do not require storage in flammable cabinets. Ignition sources include sparks from outlets and static electricity.	Flashpoint(FP) < 140F, store in a metal flammable cabinet with no vents, slots, holes. Never store in cold rooms or refrigerators that are not explosion proof. Do not store with oxidizers or inorganic acids.	All alcohols: butanol, isopropanol, methanol, etc. Acetone, acetaldehyde, acetonitrile, amyl acetate, benzene, cyclohexane, dioxane, ether, ethyl acetate, hexane, hydrazine, methyl butane, picolene, pyridine, tetrahydrofuran (THF), toluene, xylene, etc.
Peroxide-formers (Generally Group I) 	Highly flammable, low-power explosives are very sensitive to shock, sparks, light, strong oxidizers / reducers, friction, high temperatures.	Distillation, evaporation, or other concentration can present a high risk of explosion. Expired peroxide formers should be disposed unless peroxide testing is conducted.	Store with flammables. Date when received and opened. Dispose of as hazardous waste within 6 months.	Ether (diethyl and isopropyl), THF acetaldehyde, etc.
Group II (volatile) and VII (non-volatile) Toxics -poisons, halogenated solvents, carcinogens, mutagens, teratogens 	Chronic exposure is a health hazard. Avoid exposure to skin, inhalation. Many toxic solvents are highly volatile. Non-flammable (some combustible) Halogenated Organics	Chloroform stabilized with amylene can become unstable over time. Date chloroform bottle when it is received and discard as hazardous waste after one year. Commonly mistaken for a flammable liquid.	OK to store with flammables in flammable cabinet in unbreakable containers. Alternative: Any enclosed cabinet or shelf to protect from breakage below bench level. Do not store with bases.	Volatile toxics: carbon tetrachloride, chloroform, dimethyl sulfate, formaldehyde, halothane, mercaptoethanol, methylene chloride, phenol Non-volatile toxics: acrylamide solutions, ethidium bromide, triethanolamine
Group III (oxidizing acids and Inorganic/Mineral Acids) 	**Oxidizing acids are highly reactive and may react with each other.**	**Concentrated (>70%) perchloric acid reacts with wood and paper and may ignite. Never store on wood shelves.**	**Oxidizing acids should be separated from each other by use of plastic tubs. Oxidizing acids can be stored with mineral acids but not organic acids.**	**Oxidizing Inorganic Acids: Nitric, sulfuric, perchloric, chromic** **Non-oxidizing inorganic acids: hydrochloric, phosphoric, hydrofluoric**
Group IV (Organic Acids) 	**Corrosive burns to skin and eyes.**	**Acid mist escapes from closed bottles and builds up inside unvented cabinets causing corrosion.**	**Store in a vented cabinet under fume hood.** **Do not store with bases. Keep Hydrofluoric in a separate tub or tray.**	**Organic Acids: acetic, acrylic, acetic anhydride, butyric, formic, glacial acetic, isobutyric, trichloroacetic anhydride, trifluoroacetic, etc.**

Group	Properties	Important Notes	Storage	Examples
Group V – Inorganic Liquid Bases / Alkaline 	Corrosive burns to skin and eyes.	Avoid contact with any acids and volatile toxics.	Store in separate cabinet below eye level. Alternative: Store with other chemicals and keep in separate tray. Do not store with inorganic acids or halogenated organics (volatile toxics).	Sodium hydroxide, ammonium hydroxide, calcium hydroxide, potassium hydroxide, aqueous ammonia
Group VI Oxidizing Liquids (Excluding Oxidizing Acids) 	**Provides oxygen that feeds fires and makes fires difficult to extinguish.**	**The oxidizer symbol may be mistaken for the flammable symbol.**	**Store on a separate shelf.** **If stored near any other chemicals, including oxidizers, keep in separate tub/tray.** **Do not store with flammables.**	**Perchlorates, Persulfates, Hydrogen Peroxide ≥30%**
Group VIII – Pyrophorics and Water Reactives 	**Ignite spontaneously in air. Water reactives can react with moisture in the air to produce a flammable gas.** **Metal hyrides react violently with water, some in the air.**	**These reactive chemicals require a standard operating procedure that includes storage practices and safe use.**	**Waterproof double containment (shipping container may be appropriate second container).** **Isolate from other chemicals. OK to store with dry chemicals.** **Do NOT store with liquid chemicals.**	**Pyrophorics: borane, diborane, lithium, phosphorus, diethyl aluminum chloride, trimethyl aluminum, etc.** **Water Reactives: aluminum chloride anhydrous, calcium carbide, acetyl chloride, chlorosulonic acid, sodium, potassium, calcium oxide, acid anhydrides, metal hydrides**
Group IX Dry solids	**Varies. May have different properties depending on the material.**	**Keep dry.** **Indicate where the more toxic materials are located.**	**Cabinets are suggested, but shelves are O.K. Store above liquids.**	**Benzidine, cyanogens, bromide, oxalic acid, potassium hydroxide**

Basic Rules

- Minimize chemicals purchased, especially flammables and reactives with limited shelf life
- Label all storage areas
- Consult Safety Data Sheets and chemical specific SOP's for recommendations on:
    - Chemical specific storage practices – This chart is a general guide and is not all encompassing
    - Personal Protective Equipment (PPE) requirements
    - Accidental Spill Measures
- Ensure that SDS sheets are readily available at all times by laboratory members
- Do not store stock chemicals in a fume hood

****Note: These are general guidelines and not a substitute for referring to SDS sheets for storage guidance****