UCSC EH&S

Chemical Storage and Classification Matrix

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[1]) 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).

Radioactive ⇒ 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. Note the manufacturer hazard codes (i.e. Fisher Code) are not always a good indicator of chemical hazard class for segregation purposes (i.e., not all corrosives, code white, are compatible and therefore should not be stored together).

Storage Hazard Classes	Examples	Definitions Discussion	UCSC Storage Group[2]
RADIOACTIVE	Tritium; Phosphorus 32; Iodine 125; Carbon 14, Sulfur 35	All radioactive materials must be stored in accordance with license and use restrictions. Contact the Campus Radiation Safety Officer for specific information 9-3911	None
REACTIVES:	*Water Reactives, Air Reactives, Shock Sensitive Organic Peroxides*	*Segregate reactive chemicals compatibly with regard to specific hazards.*	B
Pyrophoric Materials	Phosphorus; Titanium Dichloride; Tributylaluminum; Lithium Hydride; Sodium metal	Liquids or solids that spontaneously ignite upon contact with air or water.	B
Explosives	TNT (Trinitrotoluene); dry Picric Acid; Nitroglycerin; Lead Azide; Mercury Fulminate	Explosives are chemical compounds, that may contain nitrogen and that may detonate upon shock or heating.	K
Peroxide Formers	Benzoyl Peroxide; old Ethers (e.g., Ethyl, Methyl; Isopropyl); Tetrahydrofuran; Dioxanes	All peroxide forming compounds must be dated and handled in accordance with campus policy; Liquids may be very flammable and should be stored in flammable storage cabinets	E
FLAMMABLES:			L
Flammable and Combustible Liquids	Acetone, Ethyl Ether, Petroleum Ether, Ethyl Acetate	Organic acids and non-flammable halogenated solvents can generally be stored with flammable and combustible liquids (flash point > 200°F)	L
Flammable Solids	Picric Acid powder; Sodium; Calcium Carbide	Flammable Solids may also be Reactives; think carefully prior to placing in storage location.	L
CORROSIVES:		Separate acids from bases and organic acids from mineral and oxidizing acids	
Inorganic Acids	Hydrochloric, Perchloric, Sulfuric, Phosphoric, Nitric, Hydrofluoric	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.	F
Organic Acids	Glacial Acetic Acid, Acetic Acid, Formic Acid	May be stored with flammable and combustible liquids. **DO NOT** store with oxidizers or mineral and oxidizing acids	D
Bases	Sodium Hydroxide, Potassium Hydroxide, Ammonium Hydroxide	Caustic liquids and solids with pH ≥ 12.5	C
OXIDIZERS	Nitrates, Nitrites, Permangenates, Perchlorates, Chlorates, Chlorites	**DO NOT STORE** near organics	E
HIGHLY TOXIC	Teratogens, Carcinogens, Cyanides, Formaldehyde, Methyl-nitrosourea, Acrylamide	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.	A C D
LOW TOXICITY	Agars, Sodium Chloride, Potassium Chloride, Glycerine, Amino Acids	Materials commonly used with no special hazards	G

[1] Contact the Chemical Hygiene Coordinator or EH&S if you require further assistance.
[2] UCSC Storage Groups Classification is available at: http://ehs.ucsc.edu/programs/research-safety/documents/UCSC-chemstorage2.png