Local, state, and federal regulations have specific requirements for the handling and storage of chemicals in laboratories and stockrooms. For example, radioactive materials, consumable alcohol, explosives, dual-use materials, and hazardous waste have requirements ranging from locked storage cabinets and controlled access to specified waste containers and regulated areas. Stringent requirements may also be placed on an institution by its insurance carriers.

This month’s Safety Gram will explore general recommendations for storage within a laboratory or a stockroom, storage by chemical compatibility. Here are a few general tips regarding chemical storage:

- Avoid storing materials and equipment on top of cabinets. With all stored items, maintain a clearance of at least 18 inches from the sprinkler heads to allow proper functioning of the sprinkler system.
- To make chemicals readily accessible and to reduce accidents caused by overreaching, do not store materials on shelves higher than 5 ft (~1.5 m). If retrieving materials stored above head level, use a step stool.
- Store heavy materials on lower shelves, particularly in areas where items may fall during an earthquake.
- Label all chemical containers appropriately to ensure that chemicals will be stored safely.
- To avoid clutter, avoid storing chemicals on benchtops, except for those chemicals being used currently. Utilize the acid or base cabinets within the lab.
- To avoid clutter and to maintain adequate airflow, avoid storing chemicals in chemical hoods, except for those chemicals in current use.
- Store volatile toxic or odoriferous chemicals in a ventilated cabinet.
- If a chemical does not require a ventilated cabinet, store it inside a closable cabinet or on a shelf that has a lip to prevent containers from sliding off in the event of a fire, serious accident, or earthquake.
- Do not expose stored chemicals to heat or direct sunlight
- Store flammable liquids in approved flammable-liquid storage cabinets.
Compatible Storage Groups

Separate chemicals into compatible groups when storing in order to prevent the mixture of incompatible chemicals.

A: Compatible Organic Bases
- Diethylamine
- Piperidine
- Triethanolamine
- Benzylamine
- Benzyltrimethylammonium hydroxide

B: Compatible Pyrophoric & Water-Reactive Materials
- Sodium borohydride
- Benzoyl chloride
- Zinc dust
- Alkyl lithium solutions such as methyl lithium in tetrahydrofuran
- Methanesulfonyl chloride
- Lithium aluminum hydride

C: Compatible Inorganic Bases
- Sodium hydroxide
- Ammonium hydroxide
- Lithium hydroxide
- Cesium hydroxide

D: Compatible Organic Acids
- Acetic acid
- Citric acid
- Maleic acid
- Propionic acid
- Benzoic acid

E: Compatible Oxidizers
Including Peroxides
- Nitric acid
- Perchloric acid
- Sodium hypochlorite
- Hydrogen peroxide
- 3-Chloroperoxybenzoic acid

F: Compatible Inorganic Acids
not including Oxidizers or Combustibles
- Hydrochloric acid
- Sulfuric acid
- Phosphoric acid
- Hydrogen fluoride solution

J: Poison Compressed Gases
- Sulfur dioxide
- Hexafluoropropylene

K: Compatible Explosives or Other Highly Unstable Materials
- Picric acid dry (<10% H2O)
- Nitroguanidine
- Tetrazole
- Urea nitrate

L: Nonreactive Flammables and Combustibles, Including Solvents
- Benzene
- Methanol
- Toluene
- Tetrahydrofuran

X: Incompatible with ALL Other Storage Groups
- Picric acid moist (10-40% H2O)
- Phosphorus
- Benzyl azide
- Sodium hydrogen sulfide