



## Chemical Storage

### General Chemical Storage Guidelines

1. To avoid unwanted chemical reactions, materials must be segregated by the following hazard classes:
  - **Flammable liquids**
  - **Corrosives (acids separate from bases)**
  - **Oxidizers**
  - **Solid reagents**
  - **Water-reactive reagents**
2. Avoid storing chemicals of different hazard classes together in the same storage cabinet or work space. If separate storage cabinets are unavailable, use plastic pails or tubs as a means of secondary containment to segregate incompatible chemicals from one another.
3. Store solid chemical together on a shelf or inside a storage cabinet. Oxidizers (e.g. nitrates, nitrites, permanganates, etc.) must be segregated from all other chemicals either by storing them in a separate location or by placing them in secondary containment.
4. Minimize the amount of reagent or waste containers inside the chemical fume hood. Storing excessive containers or equipment may significantly reduce airflow inside the hood.
5. Dispose of – do not store – unneeded or outdated chemicals. Request a chemical waste pickup by submitting a [Chemical Waste Disposal Form](#) to Environmental Health and Safety (EHS).
6. Containers of liquid chemicals must not be stored above eye-level or on the floor. If floor-level storage is unavoidable, place containers in secondary containment to control spills in case of accidental breakage.
7. Secure compressed gas cylinders to the wall with a strap, unless is the cylinder is secured in a stand. Small lecture bottles of toxic compressed gases should be stored underneath the chemical fume hood.

### Flammable Liquids

Flammable liquids must be stored within approved fire-rated cabinets.

Because of the lack of fire separation structures in Anschutz Medical Campus laboratories, storage is limited to two gallons of flammable solvents (including waste) outside of an approved flammable storage cabinet. The total flammable liquid quantity allowed within an entire open laboratory floor is 450 gallons.

Store flammable liquids away from oxidizers and oxidizing acids such as nitric acid, chromic acid, and perchloric acid.

## Cold Storage of Flammable Liquids

Flammable liquids may not be stored in lab refrigerators<sup>1</sup>, unless:

- a. The refrigerator is specifically designated as a flammable materials storage refrigerator which complies with National Fire Protection Association (NFPA) 45, and is Underwriter's Laboratory (UL) listed, or
- b. The refrigerator is specially designed to be explosion-proof, and complies with OSHA 29 CFR 1910.307 and is UL listed for Class 1, Groups C and D hazardous locations.

Flammable liquids may not be stored or use in cold-rooms<sup>1</sup>, unless:

- a. The refrigerator is specially designed to be explosion-proof, and complies with OSHA 29 CFR 1910.307 and is UL listed for Class 1, Groups C and D hazardous locations.
- b. The room must be mechanically ventilated, providing 100 percent outside air, at an exhaust rate of at least 6 exchanges per hour at the point of use.

## Corrosives

Acids must be segregated from bases. Perchloric acid is explosively unstable at concentrations higher than 70 percent, and must be segregated from strong dehydrating agents such as concentrated sulfuric acid and phosphorus pentoxide.

If acids and bases must be stored together due to limited storage capacity, segregate containers by hazard class into separate plastic trays for secondary containment.

1. Segregate oxidizing acids from organic acids to prevent fires. Many organic acids are also classified as combustible liquids, so they must be stored inside fire-rated storage cabinets.
2. Do not store acids near chemicals containing cyanide or sulfide to prevent generation of highly toxic hydrogen cyanide or hydrogen sulfide gas.
3. Do not store concentrated acids next to household bleach to prevent generation of chlorine gas.
4. Do not store concentrated acids next to window cleaner or ammonium hydroxide to prevent generation of chlorinated amine gas.

## Oxidizers

Store oxidizers together in a cool area away from paper, combustibles, and all other chemicals. Oxidizing acids must be segregated from flammable liquids. Oxidizers must be placed in plastic trays marked clearly with an oxidizer label. Note that some oxidizers are incompatible with others.

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<sup>1</sup> A limited risk is associated with small-quantity storage of **ethyl, methyl, and isopropyl alcohols**. EHS will accept refrigerator or cold-room storage of these materials, with these conditions:

1. The amount in the container must not exceed 500 ml, and
2. The liquid is stored in a tightly sealed container, less than 75 percent filled to accommodate vapor expansion, and
3. These are placed in sealed, non-breakable secondary containment.
4. Only two containers are allowed per cold-storage area.

Secondary containment using sealed, hard-sided plastic containers is acceptable.

**Solid Chemicals**

Some solid chemicals may react when mixed with water or corrosives, generating either flammable or toxic gases. Do not store aqueous liquids or corrosives with water-reactive reagents to prevent generation of hazardous gases.

**Water-Reactive Flammable Reagents**

Water-reactive reagents generate flammable gases on contact with water and must be segregated from corrosives and aqueous liquids to prevent fires or explosions.

**Water-Reactive Toxic Reagents**

Water-soluble cyanides, sulfides and phosphides generate extremely toxic gases on contact with water or corrosives and must be segregated from corrosives and aqueous liquids to prevent fires or explosions.

**Secondary Containment**

Plastic pail or tub which acts to contain any unwanted spills of chemicals from an accidental breakage.