

A. Flammables Storage Practices

1. Organic solvents¹ of all types shall not be stored on the floor or near spark sources.
2. Extremely flammable liquids (Class 1A)² shall be stored in flammable storage cabinets — regardless of storage limits for other flammables and combustibles.
3. Maximum storage of flammable liquids (outside of a flammable storage cabinet) in a non-sprinklered laboratory:
 - ◀ 10 gal for rooms >600 sq ft
 - ◀ 6 gal for rooms <600 sq ft
4. 5 gallon cans of flammable solvents shall be stored only in flammable storage cabinets³ or flammables storage room⁴
5. Flammable liquids (including waste) shall not be stored under or next to solvent distillation units.
6. Ethyl ether and other peroxide-forming⁵ chemicals shall have the date received marked on the container.
 - ◀ Discard within a year of the received date OR
 - ◀ Discard on or before manufacturer's expiration date, whichever is less.
7. Transfer of flammable liquids from metal containers >1 liter
 - ◀ Container must be grounded.
 - ◀ If receiving container is also metal, it must be bonded to the donor container.
 - ◀ Such transfers must be performed inside a fume hood or ventilated flammable storage room.
8. Flammable gas cylinders must be grounded when in use.
 - ◀ If receiving material is an instrument or metal container, it must be bonded to the flammable gas cylinder during transfer.
 - ◀ Oxygen and other oxidizing gases must be stored at least 20 ft away or separated by a fire wall.
9. Halogenated⁶ solvents shall not be stored with other organic flammable solvents. (forms phosgene gas when burning)
 - ◀ Flammable halogenated solvents may be stored separately or in a flammable storage cabinet in a separate secondary container tray.
 - ◀ Non-flammable halogenated solvents may be stored separately or in the same cabinet with corrosives or general chemicals when using secondary containment.
10. Flammable solids⁷, such as metal hydrides, must be stored separately from other chemicals, preferably in a metal or glass cabinet (never plastic) and protected from light and moisture.

¹ **Organic Solvent Examples:** hexane, methanol, methylene chloride, acetone, isopropyl alcohol

² **Extremely flammable liquids:** Chemicals classified as Class 1A or designated as NFPA 4 for flammability. Examples:

- acetaldehyde
- ethyl chloride
- ethyl ether
- ethylene oxide
- methyl ethyl ether
- pentane
- petroleum ether
- propylene oxide

³ **Flammables cabinet:** Storage cabinet designed to store flammable liquids that meets the design criteria of all applicable regulations i.e., OSHA, NFPA 30, & UFC 79

⁴ **Flammables storage room:** Room with spill containment and fire suppression system designated for storing flammable liquids.

⁵ **Peroxide formers:** Prone to forming potentially explosive peroxide crystals upon evaporation or distillation. Examples:

- diethyl ether
- isopropyl ether
- furan
- tetrahydrofuran (THF)
- cumene
- methyl-tert butyl ether (MTBE)



At left,
clamps for
Bonding and
Grounding

⁶ **Halogenated Solvents:** Absorb easily through skin and can be harmful or lethal to biological organisms in sufficient quantities. Halogenated solvents include organic compounds with fluorine (F), chlorine (Cl), bromine (Br), and iodine (I). Examples:

- methylene chloride
- chloroform
- tetrachloroethane
- carbon tetrachloride
- trichloroethylene
- dichloroethane (*Exception: Since it is flammable, should be stored in flammable storage cabinet*)

⁷ **Flammable Solids:** include alkali metals, magnesium metal, metallic hydrides, some organometallic compounds, and sulfur: lithium aluminum hydride (LAH). Most are extremely water and air reactive.