

Storage Quick Reference Guide

This quick reference guide highlights key storage requirements and guidelines for hazardous items commonly stored on campus. The information on this guide is compiled from many EH&S resources already available. The highlighted headers are hyperlinks to available to the EH&S resources pertaining to that topic.

Physical Storage

- Keep floors, exits, and aisles unobstructed.
- Ensure items storage are 18” below any fire sprinkler heads.
- Shelves should be level, stable, and secured to the wall or floor.
- Place heavier objects on the lower level of storage units.
- Store long or top heavy items on their side or secure them to prevent tip over.

[Battery Storage](#)

- Keep batteries at room temperature when possible. Do not charge them at temperatures below 32°F (0°C) or above 105°F (40°C).
- Store in the original packaging or a purchased battery storage option.
- Do not store rechargeable batteries on the charger. Once fully charged, remove it from the charger.
- Charge batteries in a designated area with ventilation.

[Chemicals/Corrosives](#)

- Segregate storage of acids from bases.
- Segregate storage of inorganic and organic acids.
- Segregate storage of oxidizing acids (such as: nitric, perchloric, and chromic) from all other materials and from each other.
- Store corrosives in secondary containment.

[Potentially Explosive Chemicals](#)

- Purchase the minimum amount needed.
- Identify all explosive and potentially explosive chemicals in your inventory.
- Ensure containers are properly labeled and closed when not in use.
- Mark container labels with date received and date opened. PEC labels are available from ISU EH&S, ISU Chemistry Stores or Ames Laboratory ESH&A.
- Keep potentially explosive chemicals away from all ignition sources.
- Consider designating a special area for potentially explosive chemicals use. Store in an explosive magazine or approved flammable safety cabinet and inspect areas weekly.
- Follow these additional storage requirements for peroxide forming chemicals:
 - Ethers should be under a blanket of inert gas or over a reducing agent to inhibit formation of peroxides.
 - Store in amber bottles or other opaque containers and away from light sources.
 - Fully utilize or dispose prior to the expiration date or other time-sensitive information.
 - Dispose within 6 months of opening or when peroxide concentration is >100 ppm.
 - Use extreme caution before concentrating or purifying any mixture that may contain peroxides.
 - A regular semi-annual testing schedule for peroxidizable chemicals should be established.

- Periodically check containers of chemicals that could become over-pressurized, like highly concentrated formic acid. Note: DO NOT release the pressure. Contact ISU EH&S or Ames Laboratory ESH&A immediately for assistance.

Flammables Storage

- Store flammable liquids in UL-listed safety cans if the container quantity exceeds four liters (~ 1 gallon).
- Store flammable liquids in a flammable storage cabinet. This is required when total quantity in a laboratory exceeds 40 liters (~10 gallons).
- Store flammable liquids requiring cool/cold storage in refrigerators/freezers manufactured for that purpose. Modification of general-purpose (domestic) refrigerators or freezers for flammable liquid storage is NOT permitted.
- Use flammable liquids in a fume hood, when possible, to prevent buildup of ignitable vapor/air mixtures.
- Avoid placing ignition sources (hot materials, flames, or sparking equipment) in the general vicinity of these liquids. If possible, replace open flames by electrical heating.
- Ground and bond equipment that is likely to produce a static spark and when dispensing between primary and secondary storage containers.
- Implement additional safety precautions when flammable and combustible liquids are heated to or above their flash points.

Compressed Gas Cylinders

Store gas cylinders:

- In an upright position.
- Within a well-ventilated area.
- Separate from empty cylinders.
- In the order in which they are received.
- With a chain or appropriate belt above the midpoint, but below the shoulder. Cylinders less than 18 inches tall may be secured by approved stands or wall brackets.
- With the cap on when not in use.
- So gases with the same hazard class are stored in the same area. Inert gases are compatible with all other gases and may be stored together.
- At least 20 feet away from all flammable, combustible, or incompatible substances. Storage areas that have a noncombustible wall at least 5 feet in height and with a fire resistance rating of at least 30 minutes may be used to segregate gases of different hazard classes in close proximity to each other.
- Lecture cylinders must be returned to atmospheric pressure.

Do not store gas cylinders:

- In exits or egress routes.
- In damp areas; near salt, corrosive chemicals, fumes, heat; or exposed to the weather without a roof housing.
- Longer than one year without use.