



LAB REFRIGERATORS & FREEZERS

Use this guide to select the correct type of refrigerator or freezer for labs using flammable liquids.

INTRODUCTION

It is unsafe to store flammable liquids in a domestic refrigerator or freezer. Explosions, injuries and costly laboratory fires have resulted from this dangerous practice.

There are two types of refrigerators used in campus laboratories to prevent the ignition of flammable vapors labeled:

1. "Laboratory-safe" or "flammable material"
2. "Explosion-proof"

Flammable material units are much more common to UW laboratories. If you are unsure what type of refrigerator you have in your laboratory or what type you should purchase, contact Environmental Health & Safety (EH&S) at (206) 685-3993.

PURCHASING

When purchasing new refrigerators and freezers through the UW Procurement system, they are considered an "exception item" and you may be asked to certify you have reviewed the information on the EH&S website and this focus sheet.

This will not delay your order. Simply check the box indicating you have read this material and will contact EH&S for the appropriate labels as outlined below.

FLAMMABLE MATERIAL UNITS

Flammable material refrigerators and freezers are designed to **prevent ignition of flammable vapors inside** the storage compartment. This type should be purchased whenever a refrigerator is needed to store flammable liquid (having a flash point of less than 100 °F/38°C). Examples are on page 2.

All the electrical components in this type of refrigerator are outside the refrigerator, and the compressor is sealed or located at the top of the unit. Flammable material refrigerators also may incorporate design features such as thresholds, self-closing doors, magnetic door gaskets, and special inner shell materials that control or limit the damage should a reaction occur within the storage compartment.

- A label stating "**Flammable Materials Refrigerator: Keep fire away**" can identify such refrigerators.
- The refrigerators must be U.L. listed as Flammable Material Storage Refrigerators.
- Ultra-low freezers (less than -40°F) generally cannot be approved for storage of flammable materials.

EXPLOSION-PROOF UNITS

Flammable Explosion-proof refrigerators are designed to prevent ignition of flammable vapors or gases that may be present inside but also outside the refrigerator. This type of refrigerator must be used in locations such as solvent dispensing rooms, where a flammable atmosphere may develop at some time in the room.

Explosion-proof refrigerators have very limited use on campus and require special hazardous-location wiring rather than simple cord-and-plug connections. Please contact the fire safety specialist at EH&S (206) 685-0341 if you believe you have a need for an explosion-proof refrigerator.

LABELS AND STICKERS

Regardless of type, every laboratory refrigerator and freezer must be clearly labeled to indicate whether it is appropriate for the storage of flammable materials. If your laboratory refrigerator is unlabeled, it is probably a domestic refrigerator that needs the label below.



Food and drink cannot be stored or consumed in laboratory areas because there is a risk of chemical and biological contamination.

Food refrigerators

must be located in break areas or another location separate from laboratory space.

Laboratory refrigerators and freezers should be labeled "No Food."

Contact EH&S at (206) 543-7262 or ehsdept@uw.edu to request stickers.



DISPOSAL

Prior to disposal, all biological, radiological, and chemical hazards must be removed. If the unit was used to store radioactive isotopes, it should be cleaned and surveyed. EH&S's Radiation Safety team should be contacted at radsaf@uw.edu to confirm that it is clean.

UW Surplus will pick up refrigerators if there are no visible hazards or hazardous labels. The Freon refrigerant is EPA regulated and must be collected and removed. There may be a recharge for collecting the Freon.

COMMON LAB SOLVENTS

Common solvents used in labs are listed below. These liquids have a flashpoint below 100°F/ 38°C and should **not** be stored in standard domestic refrigerators or freezers.

| Chemical | Flash point (°F) | Chemical | Flash point (°F) |
|---------------|------------------|-----------------|------------------|
| Acetone | 4 | Isopropanol | 53 |
| Acetonitrile | 42 | Methanol | 54 |
| Benzene | 12.2 | Petroleum ether | 20 |
| Butanol | 84 | Propyl Alcohol | 74 |
| Cyclohexene | 10 | Pyridine | 68 |
| Dioxane | 54 | Tetrahydrofuran | 6 |
| Ethyl Acetate | 24 | TEMED | 50 |
| Ethyl Alcohol | 55 | Toluene | 40 |
| Ethyl Ether | -49 | Triethylamine | 20 |
| Hexane | -7 | Xylene | 84 |

For materials not on this list, the flashpoint is generally found on the product safety data sheet (MSDS/SDS).

CLEANING

Free up space in your freezers and refrigerators by removing old and unwanted items that may otherwise sequester away in the freezer for years. Overly full freezers can lead to frost buildup that can decrease the efficiency and lifetime of the freezer. Defrost freezers annually or as needed with your lab's ongoing experiments and identify a location to house samples in the interim.

1. Set up trays and absorbent pads to collect water and moisture.
2. Avoid using sharp instruments to chip away at ice as this can damage equipment; instead, use a spray bottle of warm water or a blunt scraper.
3. Evaluate materials as they are removed: Do they need to be retained, are they stored and labeled appropriately, are they included in your lab's inventory?
4. Dispose of unwanted biohazardous agents appropriately. Update freezer maps and inventory.
5. Finally, use a diluted bleach solution to decontaminate freezer and refrigerator surfaces.

Contact the Lab Safety Team at labcheck@uw.edu for more information.