

LAB REFRIGERATORS & FREEZERS

PROPER SELECTION OF REFRIGERATORS AND FREEZERS 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 EH&S at 206.616.5530.

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). See examples 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

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 206.616.5530 if you believe you have a need for an "explosion-proof" refrigerator.

SAFE STORAGE

- Storage within refrigerators/freezers must be kept orderly. Ensure all chemicals and chemical wastes have correct labels.
- If containers are placed on door shelves, use secondary containers, barriers, Velcro or other protective measures to keep them from falling out when the door is opened.
- Flammable liquids may never be stored with strong oxidizers or acids.
- Compressed gases should not be stored in enclosed spaces like refrigerators.

PURCHASING

When purchasing new refrigerators and freezers through the Ariba 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.

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". These stickers are available from EH&S.



Email avanv@uw.edu or call 206.543.0465 to request these stickers.

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 MSDS/SDS.

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 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.

For questions about lab refrigerators and freezers, contact EH&S at 206.616.5530.