Fact Sheet

OSU ENVIRONMENTAL HEALTH & SAFETY

Safety Instruction

Laboratory Refrigerator/Freezer

Introduction

General purpose, household-type refrigerators and freezers are designed for storage of food and beverages. Household-type refrigerators are permitted in laboratories exclusively for the use of non-flammable or non-explosive materials. These units pose a hazard if used for the storage of flammable materials or unstable chemicals; accumulated vapors arising from chemicals stored in refrigerators present a flammable or explosive hazard due to the in-built ignition sources (e.g. temperature controls, thermostats, light switches, light assemblies, fans, defrost mechanisms, etc.) in the refrigerators.

If flammable or explosive materials are to be stored in a refrigerator or freezer, the refrigerator or freezer must be UL rated.

Types of Refrigerators/Freezers

There are primarily three different types of refrigerators/freezers for chemicals:

- *Household (Domestic*): Although not recommended for laboratory use, household refrigerators and freezers may be used for storage of non-flammable aqueous solutions.
- *Lab-Safe (or Explosion-Safe or Flammable):* Refrigerators and freezers are used for storage of flammable or explosive materials. This type of cooling technology has no internal switching devices that can arc or spark as a source of ignition. The compressor and other circuits usually are located at the top of the unit to reduce the potential for ignition of flammable vapors. These refrigerators also incorporate features such as thresholds, self-closing doors, and magnetic door gaskets. Special inner shell materials limit damage should an exothermic reaction occur within the storage compartment.
- *Explosion-Proof:* Refrigerators are designed to be operational in areas where the air outside the refrigerator might be explosive. This includes liquids, gases, or solids with flashpoints of less than 100°F. Explosion-proof refrigerators feature enclosed motors to eliminate sparking and bear a FM® (Factory Mutual) or UL® (Underwriters Laboratory) explosion-proof label. Such refrigerators must meet the requirements for Class 1, Division 1 Electrical Safety Code (NPFA 45 and 70) and require direct wiring to the power source via a metal conduit. In a typical lab setting explosion-proof refrigerators are usually not necessary.

Safe Laboratory Refrigerator/Freezer Operating Procedures

- ***Never*** store flammables with a flash point below 37.8°C (100°F) in a household (domestic) refrigerator.
- ***Never*** store food or drink for human consumption in any refrigerator or freezer used in a laboratory.
- Ensure that the chemicals stored in the refrigerator are compatible. See Chemical Storage Guidelines
- All containers placed in a refrigerator/ freezer should be *completely sealed or capped and safely positioned/securely placed.* Containers should not be capped with aluminum foil, corks, and ungreased glass stoppers.
- Shelves in refrigerators should all have suitable plastic trays for secondary containment in the refrigerator and freezer compartments. If plastic trays are not available, liquid chemicals should be placed in secondary containers to contain the spill.
- All items stored in a refrigerator must be appropriately *labeled*. See Chemical Labeling Requirements
- Store only chemicals in amounts needed over a reasonable amount of time. Compounds stored in refrigerators may be especially prone to degradation if not properly stored and sealed.
- Remember that *power outages* and technology failures can cause internal temperatures to rise, which can impact chemical contents. Be aware of unusual odors, vapors, etc, when opening the refrigerator.
- Units must be grounded and permanently installed; *extension cord may not be used.*
- Refrigerators and freezers should be *cleaned-out and manually defrosted* at least annually or more frequently as needed.

Chemical/Biological/Radioactive Material Spills

Follow the guidelines on OSU's chemical spill procedures (link below) in addition to the following:

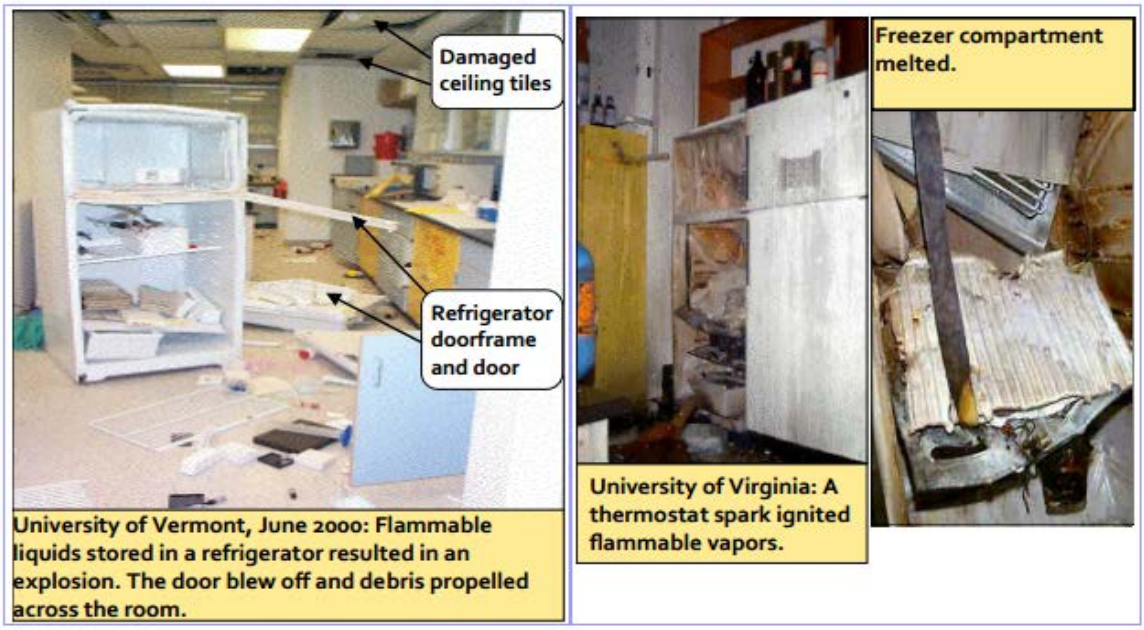
- For radiological spills: contact EH&S
- For biological agent spills: clean with 10% bleach solution or with an absorbent after items in fridge are removed and fridge has been defrosted.
- For chemical spills: remove and defrost fridge. Clean using spill/pig pads available in your spill kit. After chemicals are removed, use soap or water to clean plastic parts (review MSDS to ensure this is okay for the substance you are cleaning up).

Disposal (stepwise)

1. Lab personnel decontaminate and clean equipment as needed.
2. Lab personnel request clearance via the web request
3. EH&S provides clearance via a phone consultation or a site visit.
4. Lab personnel remove all hazard warning labels.
5. Lab personnel affix a "CLEARED" tag.
6. Lab personnel request pickup from OSU Property Surplus
7. See Equipment Clearance Guidelines

Available Products

- https://us.vwr.com/assetsvc/asset/en_US/id/22493652/contents
- https://www.fishersci.com/us/en/products/I9C8L3OR/laboratory-refrigerators.html
- https://www.labrepco.com/store/categories/view/id/3542/title/Flammable_Materials_Storage_and_Explosion_Proof_Hazardous_Location_Refrigerators
- https://www.thomassci.com/scientific-supplies/Flammable-Refrigerator-Freezer
- http://www.americanbiotechsupply.com/Products/Refrigerators/Flammable-Storage.aspx



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