UCI Environmental Health & Safety

Refrigerator and Freezer Purchasing Procedure for UC Irvine Laboratories

Responsible Administrator: Chemical Hygiene Officer
Revised: November 2023

Summary:

1. Program Description

This refrigerator and freezer purchasing procedure was developed to assist the campus community in purchasing the appropriate refrigerator or freezer for their particular use.

2. Scope

This procedure applies to all UC Irvine owned or operated facilities.

3. Definitions

Adequate Separation: A distance of 8 linear feet between domestic refrigerators or freezers and flammable liquid or gaseous reagents in a laboratory setting.

Designated Clean Area: Follow EHS clean area guidelines: https://www.ehs.uci.edu/programs/_pdf/lab-res/clean-areas-program.docx.pdf

Domestic Refrigerator or Freezer: Standard household refrigerator or freezer. These units are generally sold at department stores and other retail outlets and are only approved for the storage of food. All other intended uses must be approved by EHS prior to purchasing.

Explosion-proof refrigerators: Explosion-proof refrigerators are designed to operate in areas where the air outside of the refrigerator may be explosive and prevent ignition of flammable vapors or gases that may be present outside the refrigerator. Explosion-proof refrigerators require special hazardous wiring. In a typical lab setting explosion-proof refrigerators are usually not necessary.

Flammable liquid: The NFPA defines a flammable liquid, as a liquid that has a flash point of 100 °F (37.8 °C) or less. OSHA defines a flammable liquid as a liquid that has a flash point at or below 199.4 °F (93 °C).

Flammable Material Storage Refrigerators and Freezers: Laboratory refrigerators or freezers approved for the storage of flammable or reactive reagents. These units are generally sold through laboratory equipment supply outlets such as Fisher Scientific or VWR.

General-Purpose Lab Refrigerators or Freezers: Laboratory refrigerators and freezers approved for the storage of non-flammable, nonvolatile reagents and nonvolatile biological specimens. These units are generally sold through laboratory equipment supply outlets such as Fisher Scientific or VWR.

Laboratory Setting: For the purpose of this procedure, a laboratory setting is defined as a room where hazardous materials (e.g., flammable or reactive chemicals) are used or stored.

Personal Use: For the purpose of this procedure, personal use is defined as storing staff lunches and other personal items in a refrigerator or freezer. Personal use refrigerators must be purchased with employee personal contributions only.

Reactive reagents: For the purpose of this procedure, the term reactive reagent is defined as a material, which will spontaneously or vigorously reacts with air or water.

4. Responsibilities

All UC Irvine faculty, staff, and students are responsible for compliance with this program as it relates to operations under their control or activities in which they participate.

5. Program Components

5.1 What type of refrigerator or freezer will I need to purchase?

USAGE	TYPE
To store **only food** for my department's general use OUTSIDE OF THE LAB ENVIRONMENT.	Domestic household type unit with an "Energy Star" rating.
To store **non-flammable, non-volatile reagents or non-volatile biological specimens** INSIDE A LAB ENVIRONMENT.	Domestic household type unit with an "Energy Star" rating or a general-purpose lab refrigerator or freezer, chromatography or pharmacy refrigerator, or ultralow freezer.
To store **flammable or reactive reagents**.	Flammable materials storage refrigerator or freezer.
Explosion-proof refrigerators are designed to operate in areas where the air outside of the refrigerator may be explosive and prevent ignition of flammable vapors or gases that may be present outside the refrigerator.	Please contact EHS (949-824-6200) if you believe you need an explosion-proof refrigerator. Explosion-proof refrigerators require special hazardous wiring. **In a typical lab setting explosion-proof refrigerators are usually not necessary.**

5.2 Background

5.2.1 Flammable liquids or reactive reagents must be stored in flammable materials storage refrigerators or freezers. Fires and explosions can and do occur in either general-purpose laboratory or ordinary domestic refrigerators or freezers when these types of appliances are used to store volatile or flammable materials. Domestic or general-purpose laboratory refrigerators and freezers can contain up to nine arcing points in the storage compartment. Each produces electrical arcs or sparks during the normal course of operations. The arc produced at the arc points will ignite flammable vapors emitted from damaged or unsealed containers. In addition, the compressor and its circuits are typically located at the bottom of the domestic unit where vapors from flammable liquid spills or leaks in the storage compartment may easily accumulate. The compressor unit for domestic units is not vapor-proof; therefore, arc points inside the compressor pose the identical

hazard as described above. In contrast, all commercial laboratory refrigerators and freezers are equipped with fully vapor sealed or semi-sealed compressors.

5.3 Purchasing Procedure

5.3.1 University funds, regardless of source, may not be used to purchase personal use refrigerators/freezers. Personal use refrigerators/freezers must be purchased with employee personal contributions only. "Energy Star" rated equipment must be purchased.

5.3.2 For the purpose of this procedure, a laboratory setting is defined as a room where hazardous materials (e.g. flammable or reactive chemicals) are used or stored.

- Domestic refrigerators or freezers are approved for food storage within the “designated clean area” in the lab environment. A “clean area” sign must be affixed to the front door of the refrigerator or freezer in addition to the designated clean area. All flammable liquids will not be used or stored within 8 feet of the unit, because the compressor is not vapor-proof and poses a potential safety hazard.

- General-purpose lab refrigerators or freezers, chromatography or pharmacy refrigerators and ultralow freezers are approved for the storage of nonvolatile reagents and nonvolatile biological specimens. Flammable liquids and reactive reagents must never be stored in these refrigerators or freezers.

- Flammable materials storage refrigerators and freezers are approved for the storage of flammable or reactive reagents.

- This procedure also applies to departments loaning, renting or receiving gifts of this type of equipment from outside sources and all incoming P.I.'s who transfer their own equipment to UC Irvine.

- Chemicals stored in the refrigerator or freezer must be compatible or properly segregated. All containers should be completely sealed or capped and safely positioned and securely placed. Chemicals must be properly labeled and stored in secondary containment within the refrigerator or freezer. Refrigerator and freezers must be defrosted regularly.

6. Reporting Requirements

There are no reporting requirements for this program.

7. References

OSHA. Laboratory Safety Guidance. OSHA 3404-11R 2011.
https://www.osha.gov/sites/default/files/publications/OSHA3404laboratory-safety-guidance.pdf

National Research Council of the National Academies. Prudent Practices in the Laboratory. Handling and Management of Chemical Hazards.
https://www.ncbi.nlm.nih.gov/books/NBK55878/pdf/Bookshelf_NBK55878.pdf