BY DIRECTION OF
DUKE OESO-FIRE SAFETY DIVISION

DUKE FIRE SAFETY INSTRUCTION 1-10

November 21, 2012

STORAGE OF FLAMMABLE CHEMICALS IN REFRIGERATORS

OFFICE OF PRIMARY RESPONSIBILITY

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Supersedes Storage of Flammable Chemicals in Refrigerators 1-10 (dated February 13, 2007)
Pages: 3

This instruction establishes policy and procedures and assigns responsibilities and requirements to ensure the safe storage of flammable chemicals in approved refrigerators. It applies to all refrigerators utilized for storage of chemicals throughout the University, Hospitals, and Medical Center. Information obtained and used in this instruction was abstracted from NFPA 45—*Fire Protection for Laboratories Using Chemicals.* **NOTE: For the intent of this Operating Instruction, Flammable Liquids defined as chemicals with a flashpoint below 100 degrees Fahrenheit.**

1. Objective

1.1. The objective of this Operating Instruction is to ensure that all refrigerators, freezers, and cooling equipment used to store or cool flammable liquids are of the proper type, and marked/labeled accordingly

2. Purpose

2.1. Clearly define and identify refrigerators, freezers, and cooling equipment as viable equipment used to lower the flashpoint of a liquid to a level that will not support the release of flammable vapors. Refrigerators, freezers, and cooling equipment must be of the proper type to prevent the accidental ignition of these vapors
2.2. Clearly define and identify domestic refrigerators or freezers not approved for the storage of typical flammable solvents present in the work area
2.3. Specify proper labeling instructions, locations, and type of labels

3. Refrigeration Equipment Types and Uses

3.1. The use of refrigerated equipment to reduce the release of vapors is a safe and viable method. However, to mitigate the ignition of flammable vapors in refrigerated equipment, the proper type equipment must be used

3.2. Three types of refrigerated equipment are available for use:

3.2.1. **Explosion proof**

3.2.1.1. Equipment designed to protect against ignition of flammable vapors both inside and outside the refrigerated storage compartment

3.2.1.2. Must be used in work areas where the refrigerated equipment is in the same location as the area used for working with the flammable chemicals

3.2.1.3. Must have the proper manufacture labeling listed for Class 1, Division 1

3.2.1.4. Must be installed in accordance with Article 501 of NFPA 70—*National Electrical Code*

3.2.2. **Laboratory-safe (explosion-safe)**

3.2.2.1. Designed to eliminate the ignition of vapors inside the storage compartment by sources also within the compartment

3.2.2.2. Used in areas where the refrigerated storage equipment is isolated or separated by an acceptable method from the working area. Areas where the refrigerated equipment and flammable chemicals are used can not be separated must be approved by the OESO-Fire Safety Office

3.2.2.3. Equipment must be listed special purpose units for use in laboratories in commercial occupancies or units listed for Class 1, Division 1 locations

3.2.3. **Modified Domestic Models**

3.2.3.1. Provide very limited protection to reduce the likelihood of igniting vapors inside the storage compartment and provide no protection from vapors outside the unit

3.2.3.2. Generally not accepted—(Exceptions must be approved prior to modification by the OESO-Fire Safety Office)

3.2.3.3. If approved by the OESO-Fire Safety Office, modification must be accomplished by a certified electrician with detailed documentation provided and meet NFPA 45 – *Fire Protection for Laboratories Using Chemicals,* Section 12.2.2 –Refrigeration and Cooling Equipment.

4. Refrigeration Equipment Labeling

4.1. **Explosion proof** and **Laboratory-safe (explosion-safe)** refrigeration storage equipment will be labeled as follows:

4.1.1. White Background with Blue Letters, self-adhesive vinyl decals with the wording:
"NOTICE – This refrigeration unit is approved for the storage of flammable chemicals.
No food or drinks may be stored in this refrigerator."

4.1.2. Label will be placed on the upper edge of the door (hinge side)

4.1.3. Label will remain unobstructed and will not be covered by papers, posters, notes, etc.

4.2. Modified Domestic Refrigeration Equipment

4.2.1. Black background with red letters, self-adhesive vinyl decals with the wording:
"NOTICE: This is not an explosion proof refrigeration unit, but it has been designed to permit safe storage of materials producing flammable vapors.
Containers must be well- stoppered or tightly closed.
No food or drinks may be stored in this refrigerator."

4.3. Labels can be obtained by calling the OESO-Biological Safety Division at 684-8822

5. Refrigeration Storage Equipment Placement

5.1. All equipment must be in safe locations that does not interfere with occupant's access to exit corridors, exit paths, or doorways
5.2. At no time will refrigeration storage equipment be permitted to be placed in corridors
5.2.1. EXCEPTION: Areas designated in approved facility plans designed with alcoves or other acceptable cut-in areas will be permitted
5.3. In areas where an explosion proof refrigeration unit is required, all equipment within the area must meet the requirements of Article 501, of NFPA 70—*National Electrical Code*
5.4. Temporary relocation of equipment must be coordinated with the OESO-Fire Safety Division