Practice: No.5 **Issue: No. 1, rev 1** **Date: July 2015**	# Flammable Storage in Laboratory Refrigerators
Practice Perspective	Numerous fires and explosions have occurred in university laboratories when flammable chemicals were stored in domestic, household-type refrigerators and cold rooms. These explosions have resulted in damage to physical structures, research materials and have the potential to seriously injure laboratory personnel.
Standard Practice	**Flammable chemicals may not be stored in household-type refrigerators, freezers and cold rooms in MSU-affiliated laboratories. Flammable chemicals may be stored in laboratory-safe or explosion-proof refrigerators specifically designed for such purpose.** **All refrigeration, freezer and cold room units used in laboratories must be marked as "SAFE FOR FLAMMABLE STORAGE" or "UNSAFE FOR FLAMMABLE STORAGE" on the exterior surface of the unit as appropriate.**
Definitions	- *Flammable chemicals* are chemicals that have a flashpoint of less than 100^{o}F. This includes mixtures, compounds, dilutions and solutions that have a flashpoint of less than 100^{o}F - *Household refrigerators* are refrigerators that may produce sparks, arcs or flames inside of the refrigerated compartment during their normal intended operation. - *Household freezers* are freezers that may produce sparks, arcs or flames inside of the refrigerated compartment during their normal intended operation. - *Cold rooms* are laboratory spaces that are engineered and constructed to maintain an internal temperature below that of normal ambient air temperatures. Cold rooms may produce sparks, arcs or flames inside of the refrigerated compartment during their normal intended operation. - *MSU-affiliated laboratories* are those locations that are owned (in part or full), leased, rented or associated with Michigan State University for research, diagnostic and/or teaching purposes. - *Laboratory-safe refrigerators* are refrigerators that are constructed with all electrical components and compressors located outside of the refrigerated storage compartment area. These units prevent ignition of flammable vapors inside of the refrigerator. Laboratory-safe refrigerators may 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. - *Laboratory-safe freezers* are freezers that are constructed with all electrical components and compressors located outside of the refrigerated storage compartment area. These units prevent ignition of flammable vapors inside of the freezer. Laboratory-safe

	freezers also may 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 refrigerators that are constructed to prevent sparks, arcs or flames on the inside and outside of the refrigerator. These units prevent ignition of flammable compounds stored in the room housing the unit, such as solvent storage areas, etc. Explosion-proof refrigerators are not commonly required in research facilities; consult MSU EHS for assistance. - *Explosion-proof freezers* are freezers that are constructed to prevent sparks, arcs or flames on the inside and outside of the freezer. These units prevent ignition of flammable compounds stored in the room housing the unit, such as solvent storage areas, etc. Explosion-proof freezers are not commonly required in laboratory facilities; consult MSU EHS for assistance.
Regulatory Drivers	**NFPA 45** - Fire Protection for Laboratories Using Chemicals, 11.3.2 Refrigeration and Cooling Equipment **National Electric Code** – Articles 500, 501, 504, 505
MSU CHP change:	MSU Chemical Hygiene Plan 3.4.1.7: All refrigerator and freezer units used in laboratories must be marked as “SAFE FOR FLAMMABLE STORAGE” or “UNSAFE FOR FLAMMABLE STORAGE” on the exterior surface of the unit as appropriate. All cold rooms must be marked “UNSAFE FOR FLAMMABLE STORAGE”. MSU Chemical Hygiene Plan 3.6.1 F: Flammable chemicals may not be stored in household-type refrigerators, freezers and cold rooms. Use laboratory-safe refrigerators and freezers specifically designed for such purpose to store flammable chemicals.