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Revision: 3.0	Subject: Laboratory Flammable and Combustible Liquids Storage and Handling	

1.0 Introduction

The Department of Environmental Health & Safety has developed this standard operating procedure to ensure compliance with Provincial Legislation. Assistance in using these procedures is available from the Department of Environmental Health & Safety.

2.0 Scope

This SOP applies to the storage and handling of flammable and combustible liquids in laboratories at Queen's University. This SOP does not apply non-laboratory areas. Refer SOP-CHEM-08 General Flammable and Combustible Liquid Storage and Handling.

3.0 Applicable Legislation and Standards:

The Ontario Building Code Act 1992 (O. Reg. 332/12)

The Ontario Fire Code (O. Reg. 213/07) as amended by (O. Reg. 256/14)

The Occupational Health and Safety Act, Industrial Establishments O. Reg. 851

ULC/ORD-C30 "Safety Containers"

ULC/ORC-C1275 "Storage Cabinets for Flammable Liquid Containers"

ULC/ORD-C1275, "Guide for the Investigation of Storage Cabinets for Flammable Liquid Containers"

NFPA 30, "Flammable and Combustible Liquids Code"



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4.0 Definitions

Approved – approved by Queen’s Department of Environmental Health and Safety

Combustible liquid - any liquid having a flash point at or above 37.8°C and below 93.3°C.

EHS – Queen’s Department of Environmental Health and Safety

Fire Compartment - an enclosed space in a building that is separated from all other parts of the building by enclosing construction that provides a fire separation having a required fire-resistance rating.

Fire Separation - a construction assembly that acts as a barrier against the spread of fire. Includes walls, floors, ceilings windows and doors.

Flammable Liquid – a liquid having a flash point below 37.8C and having a vapour pressure not more than 275.8 kPa (absolute) at 37.8C as determined by ASTM D 323, “Vapor Pressure of Petroleum Products (Reid Method)

5.0 Responsibilities

5.1 Directors, Department Heads and Managers

Each Director, Department Head and Manager shall ensure that pertinent supervisors, employees, students and contractors are aware of and are in compliance with, this SOP.

5.2 Department of Environmental Health and Safety

Shall ensure that each department is made aware of responsibilities under this procedure.

Shall serve as a resource to individuals which require assistance in complying with this SOP.

Shall conduct regular inspections to ensure that faculties, departments and units are complying with the requirements of this SOP and the Ontario Fire Code.



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6.0 Dispensing

- 6.1 The dispensing of flammable and combustible liquids from containers larger than 5 litres must be performed in the Botterell Hall Dispensing Room (loading dock area). Currently this is the only Approved dispensing room on campus. Dispensing from containers larger than 5 litres in any other area is PROHIBITED.
- 6.2 Containers shall be grounded at all times during the dispensing process.

7.0 Laboratory Separation

- 7.1 A laboratory where flammable liquids and combustible liquids are used or handled shall be separated from other parts of the building by a fire separation having a fire-resistance rating of not less than 1 hour.
- 7.2 Flammable and combustible liquids shall not be used or handled in laboratories that do not have a 1-hour fire separation
- 7.3 If unsure about a laboratory's fire separation rating, contact the EHS (613-533-2999) to determine if the space meets the legislative requirements.

8.0 Maximum Quantities

- 8.1 Containers used for the storage of flammable or combustible liquids shall be less than 5 litres in capacity.
- 8.2 Containers greater than 5 liters in capacity shall comply with ULC/ORD-C30, "Safety Containers"
- 8.3 Containers greater than 25 liters in capacity are not permitted in laboratories
- 8.4 No more than 300 litres of flammable and combustible liquids of which no more than 50 liters may be flammable liquids, shall be kept in the open area of a lab. This includes fume hoods.
- 8.5 Quantities in excess of those permitted in 8.4 shall be stored in flammable storage cabinets.
- 8.6 No more than 1500 liters of flammable or combustible liquids shall be stored in flammable storage cabinets in a single fire compartment.



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9.0 Storage - General

- 9.1 Containers of flammable or combustible liquids shall be kept closed when not in use.
- 9.2 Containers for flammable or combustible liquid shall be labeled in accordance with WHMIS regulations. Labelling must be with easily legible type, which contrasts any other printed matter on the container.
- 9.3 Flammable and combustible liquids must be segregated by chemical group, where possible, in all storage areas. (Note: includes organic acids such as Acetic Acid, Formic acid, etc.)
- 9.4 Containers shall be stored such that they are not subject to excess heat, excess cold, or direct sunlight.
- 9.5 Containers shall be stored so there no danger of tipping.

10.0 Refrigerated Storage

- 10.1 Refrigerators used for the storage shall be conspicuously identified as containing flammable liquids or combustible liquids.
- 10.2 Approved laboratory-safe refrigerators shall be used to store suitably contained flammable and combustible liquids below room temperature. These refrigerators have all the electrical contacts removed from the storage compartments thereby eliminating the risk of spark and possible ignition of the liquids.
- 10.3 Standard domestic refrigerators and or freezers are not permitted to be used for the storage of any flammable or combustible liquids



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11.0 Flammable Storage Cabinets

11.1 Cabinets for storage of flammable or combustible liquids shall be labelled in conspicuous lettering to indicate that the cabinet contains flammable materials and that open flames must be kept away.

11.2 Flammable Storage Cabinets shall:

- a) Comply with ULC/ORD-C1275, "Guide for the Investigation of Storage Cabinets for Flammable Liquid Containers"
- b) Comply with ULI 1275, "Flammable Liquid Storage Cabinets",
- c) Be identified as "FM APPROVED" by FM Global, or
- d) Be listed as meeting NFPA 30, "Flammable and Combustible Liquids Code"

11.3 No more than 500 litres of flammable or combustible liquids shall be stored in a single cabinet

12.0 Spill Control

12.1 Every laboratory where flammable or combustible liquids are used or handled shall have a written spill procedure. The procedure must be based on and compatible with the Queen's University Spill Response Procedures (SOP-HAZMAT-03).

12.2 Spill control procedures shall be prominently posted and maintained where flammable or combustible liquids are used or handled.

12.3 Adequate spill control material shall be available and located in close proximity to areas where flammable or combustible liquid is used or handled.

13.0 Fume hoods

The use and handling of flammable or combustible liquids in a laboratory shall be confined inside a fume hood when:

- a) their use releases flammable vapours which could be potentially explosive,
- b) liquids are heated to a temperature equal to or greater than their flash point, or
- c) unstable liquids are used.



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14.0 Disposal of Waste Flammable and Combustible Liquids

- 14.1 To ensure compliance with all applicable government regulations, waste flammable and combustible material must be disposed of in accordance with the Hazardous Waste Disposal Procedures (SOP-Chem-01) issued by the Department of Environmental, Health and Safety. Failure to do so will result in the material being rejected during pick-ups.
- 14.2 Waste flammable and combustible liquids awaiting disposal must be stored in an Approved disposal container with a maximum capacity of 20 L, see section 6.3, or in containers smaller than 5 L as outlined in section 6.2. The container must be clean and in good condition. The flame arrester must be secured in place and free of debris. Labelling of the safety container must comply with subsection 6.6. In addition, the researcher's name, department and room number the can is to be returned to must also be clearly displayed.
- 14.3 Waste liquid in Safety Containers (red solvent cans) is classified as flammable and quantities must be in compliance with section 8.0 of this SOP.

15.0 Revision History

July 2005	1.0 Initial Release
April 2009	2.0 Revision of Disposal section
Sept. 2019	3.0 Re-release to better align SOP with the Ontario Fire Code