



Queen's University Environmental Health and Safety

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Revision: 2.0	Subject: General Flammable and Combustible Liquid Handling Procedures	

1.0 Introduction

This document is intended as a guide to the Queen's University requirements for handling and storing flammable and combustible material in non-laboratories areas.

For information regarding flammable and combustible liquids handling in laboratory environments, refer to the "Laboratory Flammable and Combustible Liquids Handling Procedures" (SOP-Chem-02).

2.0 Applicable Legislation

Ontario Fire Code (O.Reg 213/07)
Ontario Occupational Health and Safety Act (R.S.O. 1990)
National Fire Protection Code of Canada
National Fire Protection Association Guidelines
ULC/ORD-C30 "Safety Containers"
ULC/ORC-C1275 "Storage Cabinets for Flammable Liquid Containers"

3.0 Definitions

Flammable Liquid:

A liquid having a flash point below 37.8⁰ C and having a vapour pressure not exceeding 40 psi at 37.8⁰ C. Flammable liquids are also termed Class I, which are further subdivided in to Class IA, Class IB and Class IC.

Class IA: Flash point below 22.8⁰ C and a boiling point below 37.8⁰ C

Class IB: Flash point below 22.8⁰ C and a boiling point at or above 37.8⁰ C

Class IC: Flash point at or above 22.8⁰ C and below 37.8⁰ C

Combustible Liquids:

A liquid having a flash point at or above 37.8⁰ C. Combustible liquids can be subdivided into Class II, Class IIIA and Class IIIB.

Class II: Flash point at or above 37.8⁰ C and below 60⁰ C

Class IIIA: Flash point at or above 60⁰ C and below 93.3⁰ C

Flash Point:

The minimum temperature at which a liquid gives off vapour in sufficient concentrations to form an ignitable mixture with air near the surface of the liquid.



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Fire Separation:

Refers to a construction assembly (i.e. wall, door, etc.) that acts as a barrier against the spread of fire. The construction assembly may or may not have a fire-resistance rating or a fire-protection rating.

A laboratory must be separated from other parts of a building by a fire separation having a fire resistance rating of 1 hour.

Note: When a liquid having a flash point at or above 37.8⁰ C is being processed, stored, handled or used at temperatures at or above its flash point, it must be treated as a flammable (Class1) liquid.

4.0 Purchasing

Individual investigators or departments may purchase flammable liquids directly from external suppliers **ONLY** if the flammable liquids are in glass or metal containers of 5 litre capacity or less.

5.0 Dispensing

5.1 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). This presently is the only approved dispensing room on campus. Dispensing from containers larger than 5 litres in any other area is PROHIBITED.

5.2 Containers **SHALL** be grounded at all times during the dispensing process.

5.3 The fueling of gasoline engines on mobile or portable equipment must be conducted outdoors, with the engine stopped, no sources of ignition within 3 m and with an allowance for the expansion of fuel.

Note: The transportation of flammable and combustible liquids requires care. Glass bottles (Winchesters) require special care when handling and it is recommended that a safety bottle carrier be used.

6.0 Storage

6.1 The storage, handling and use of flammable or combustible liquids in a glass or plastic container, with a capacity greater than those listed in subsection 6.2, is permitted only if the required liquid purity would be affected by storage in a metal container, or if the liquid would cause excessive corrosion of the metal container.



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6.2 Properly stoppered or closed containers may be stored outside of a storage cabinet if they are of a capacity of 1 litre or less for flammable liquids and of a capacity of 5 litres or less for combustible liquids. However, it is preferable to store all flammable or combustible liquid, regardless of container type, in a storage cabinet when not in use.

6.3 Where individual containers with a capacity greater than those listed in subsection 6.2 are required for storage of flammable and combustible liquids in a building, safety containers conforming to the CSA-B376 "Portable Containers for Gasoline and Other Petroleum Fuels" or the ULC/ORD-C30 "Safety Container" guidelines, shall be used. Furthermore, these containers must not have a capacity greater than 25 litres.

6.4 All 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.

6.5 Up to 5 litres of flammable liquids may be stored in basement areas, provided it is stored in a safety container conforming to the guidelines listed in subsection 6.3.

6.6 The maximum volume of flammable and combustible liquid that can be stored outside of a cabinet in a room with no fire separation rating is 10 L, of which not more than 5 L can be flammable liquid.

6.7 The maximum volume of flammable and combustible liquid that can be stored outside a cabinet in a room having at least a minimum 45 minute fire separation is 250 L, of which not more than 60 L can be a Class II combustible liquid or 10 L of a flammable liquid.

6.8 In shops or industrial arts areas storage of up to 75 L of flammable and combustible material, of which not more than 25 L can be flammable liquids, shall be permitted outside of a cabinet.

6.9 Flammable and combustible liquids must be segregated by chemical group, where possible, in all storage areas.

6.10 Containers shall be stored such that they are not subject to excess heat, excess cold, or direct sunlight.

6.11 Storage volumes greater than those listed in subsections 6.6, 6.7 & 6.8 must be stored in an approved flammable liquid storage cabinet. The maximum storage in a single cabinet is 500 litres, of which not more than 250 litres can be flammable liquids. Only one cabinet is allowed per room.



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6.12 Storage cabinets must conform to the ULC-C1275 "Storage Cabinets for Flammable Liquid Containers", ULI 1275 "Flammable Liquids Storage Cabinets", Factory Mutual Research or the NFPA 30 guidelines.

6.13 Storage cabinets shall not be located in or adjacent to exits, elevators or principle routes that provide access to exits.

6.14 All flammable liquid storage cabinets must be labeled with conspicuous lettering to indicate the cabinet contains flammable liquids and open flames must be kept away.

6.15 The Department of Environmental Health & Safety **must approve** any room being used for storage of flammable and/or combustible liquids in volumes greater than those listed in these procedures. Flammable and combustible liquid storage rooms must meet stringent requirements outlined in the Ontario Fire and Building Codes.

6.16 For the requirements regarding the storage of flammable and combustible materials in storage tanks, contact the Department of Environmental Health & Safety.

6.17 **Approved and Labelled** 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.

THE USE OF STANDARD, DOMESTIC REFRIGERATORS, REFRIGERATION UNITS, AND/OR FREEZERS FOR STORING ANY FLAMMABLE AND/OR COMBUSTIBLE MATERIAL IS PROHIBITED.

NOTE: The maximum allowable concentration for storage in a domestic refrigerator is **20% flammable or combustible in an aqueous solution. NO EXCEPTIONS!!!**

7.0 Spills

7.1 A spill control procedure shall be developed, approved and implemented for any location where flammable and/or combustible liquids are stored, handled, processed or used. **The procedure must be based on and compatible with the Queen's University Spill Response Procedures (SOP-HAZMAT-03) issued by the Department of Environmental, Health and Safety.**

7.2 Spill control procedures shall be prominently posted and maintained where flammable and/or combustible material is stored, handled, processed or used.



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7.3 Adequate spill control material shall be available and located in close proximity to areas where flammable and/or combustible liquid is stored, handled, processed or used. This is in accordance to the Queen's University Spill Response Procedures.

8.0 Disposal of Waste Flammable and Combustible Liquids

8.1 To ensure compliance with all applicable government regulations, 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.

8.2 Waste flammable and combustible liquids awaiting disposal must be stored in an **Approved** disposal container with a maximum capacity of 20 litres, or in accordance with section 6.3. The container must be clean and in good condition. The flame arrester must be secured in place and free of debris. Labelling of the disposal container must comply with subsection 6.4. In addition, name, department and room number the can is to be returned to must be clearly displayed.

8.3 Waste liquid is classified as flammable and quantities fall under amounts specified in section 6.0.

8.4 Waste oil awaiting disposal should be stored in 20 litre (5 gallon) UN approved oil drums or pails.

Revision History

July 2005-Revision 1.0 Initial Release

April 2009-Revision 2.0 Section 8.0 Revised