



Date Issued: 27 September 2018	Page No: 1	Document No.: SOP-FIRE-07
Revision: 1.0	Subject: Compressed Gas Cylinder Storage & Transport	

1.0 Introduction

This Standard Operating Procedure outlines the requirements for Compressed Gas Cylinder (cylinder) storage and transport. In accordance with Provincial Legislation, the Department of Environmental Health & Safety has developed this standard operating procedure outlining the storage and handling of compressed gas cylinders on campus.

Assistance in using these procedures and meeting the requirements of provincial codes is available from the Department of Environmental Health & Safety

2.0 Scope

This SOP applies to the use and storage of all compressed gas cylinders at Queen's University.

3.0 Applicable Legislation:

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

The Ontario Fire Code (O. Reg. 213/07) as amended by (O. Reg. 194/14)

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

4.0 Responsibilities

4.1 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.

4.2 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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5.0 Transportation and handling of Compressed Gas Cylinders

Protective caps must be installed over the valve any time a cylinder is moved.

Cylinders must not be lifted using the protective cap.

Cylinders must not be rolled on its side or dragged.

If moving less than 2 meters, it is acceptable to roll a cylinder on its base.

Moving a cylinder more than 2 meters must be done using a cart designed for cylinder transport.

Closed toed footwear is required to be worn for moving or handling cylinders.

6.0 Storage of Compressed Gas Cylinders

6.1 General Storage Requirements

All cylinders must be stored upright and be secured from tipping at all times.

Cylinders not in use, shall have the protective cap installed.

Cylinders that will not be used for more than 2 weeks should have the regulator removed and the protective cap installed.

Cylinders shall be secured to a solid fixed surface such as a wall or sturdy lab bench.

Cylinders shall be restrained using a chain or a strap designed for securing cylinders. Rope, twine or bungee cords are not acceptable.

The chain or strap restraining the cylinder should be installed at a point approximately 2/3 the cylinder height off the floor.

It is preferred that each cylinder be individually secured.

No more than 3 cylinders may be nested against a wall or solid structure and secured by a strap or chain.

Cylinder storage racks are permitted (similar to Chernoff loading dock)

Cylinders must be individually secured any time a regulator is installed.



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6.2 Outdoor Storage of Compressed Gas Cylinders

Outdoor locations for the storage of compressed gas cylinders must be approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Requires a raised platform, walls or cage and a roof.
- Must be secured to prevent unauthorized access
- Most gas suppliers sell prebuilt gas storage cages that meet these requirements.

Outdoor storage locations must be selected to ensure the proper separation to building openings such as doors, windows that open, air intakes, etc. The distance to the opening is based on the aggregate capacity of gases to be stored:

- Up to 170m³ – 1.5m
- 170 - 500m³ – 7.5m
- Over 500m³ – 15m

6.3 Indoor Storage of Flammable Heavier than Air Gases

Flammable heavier than air gas cylinder storage locations must be approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Maximum of 3 cylinders or aggregate capacity of 100kg, whichever is less.
- Storage area cannot be in a hallway that is an access to an exit.
- Storage location must be in a minimum 45-minute fire compartment and may not be in a basement or below grade.
- Room must have continuous ventilation to the outdoors (not part of the building's HVAC)

6.4 Indoor Storage of Flammable Lighter than Air Gases

Flammable lighter than air gas cylinder storage locations must be approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Maximum of 60m³ of expanded gas per fire compartment in a non-sprinklered building.
- Maximum of 170m³ of expanded gas per fire compartment in a sprinklered building.
- Storage area cannot be a hallway that is an access to an exit.
- Room must have ventilation to dissipate gas – the building's HVAC is acceptable.



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6.5 Inert Gases

A dedicated storage room is not required, but is preferred.

Storage area should be ventilated to dissipate any gas leaks - the building's HVAC is acceptable.

Storage area cannot be located in a hallway that is an access to an exit.

A maximum of 150kg of inert gas may be stored in a single fire compartment.

6.6 Storage of Flammable Gases in Excess of the Amounts in Sections 6.3, 6.4 and 6.5

Indoor storage location for must be approved by the Department of Environmental Health and Safety.

Outdoor storage is permitted subject to Section 6.2 Outdoor Storage of Compressed Gas Cylinders.

6.7 Indoor Storage of Poisonous Gases

Poisonous gas cylinders must be stored in a dedicated room approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Room must have a gas tight, 2-hour fire separation from the rest of the building
- Continuous ventilation to the outside.
- Room may not be used to store flammable gases.
- Room may not have any combustible materials.

6.8 Indoor Storage of Corrosive Gases

Corrosive gas cylinders must be stored in a dedicated room approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Room must have a gas tight, 2-hour fire separation from the rest of the building
- Continuous ventilation to the outside.
- Room may not be used to store flammable gases.
- Room may not have any combustible materials.



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6.9 Indoor Storage of Reactive Gases

Reactive gas cylinders must be stored in a dedicated room approved by the Department of Environmental Health and Safety and must meet the following requirements:

- Stored in a room constructed as a 1-hour fire separation.
- Where all gases are lighter than air, separated by 7.5m in the same room, or
- Where all gases are heavier than air, separated by 15m in the same room, or
- Where there is a combination of heavier and lighter than air gases, separated by 15m in the same room.
- Oxidizers and flammable gasses are considered reactive gasses.
- Other storage configurations may be approved.

6.10 Empty Compressed Gas Cylinders

Empty cylinders shall be marked "EMPTY" or "MT" using chalk or similar media.

Storage of empty cylinders must comply all with the storage and handing requirements for the gas they contained when full.

For the purposes of determining maximum quantities, empty compressed gas cylinders are considered full.

6.11 Revision History

1.0 Initial release