

# COMPRESSED GAS STORAGE

## What are the requirements for compressed gas storage?

The National Fire Code – 2019 Alberta Edition (NFC(AE)) covers the storage of compressed gases. However, the storage of liquefied petroleum gases (i.e. propane) and natural gas falls under the Gas Code Regulation and is outside the scope of the NFC(AE).

The NFC(AE) primarily speaks to the storage of cylinders of Class 2 gases that fall under 3 categories:

- 2.1 flammable (example – acetylene)
- 2.2 non-flammable and non-toxic (example – oxygen and helium)
- 2.3 toxic or corrosive (example – chlorine)

There are some general storage rules for these compressed gases:

- Class 2 gases shall not be stored in an area where the ambient air temperature is higher than 52°C.
- cylinders and tanks of Class 2 gases shall be protected against mechanical damage.
- cylinders of Class 2 gases that are in storage shall be
  - protected against valve damage, and
  - firmly secured in a position that will not interfere with the operation of the cylinder valve assembly.
- cylinders of Class 2 gases shall be transported in devices designed to provide restraint against movement in any direction.
- except for portable fire extinguishers, cylinders of Class 2 gases shall not be stored
  - in any exit or corridor providing access to exits,
  - under any fire escape, outside exit stair, passage or ramp, or
  - within 1 m of any exit.

The indoor storage of cylinders of flammable compressed gases shall be in a room that:

- is separated from the remainder of the building by gas-tight walls having a fire resistance rating of 2 hours,
- is located on an exterior of the building,
- whose doors leading to the interior of the building are:
  - equipped with self-closing devices that keep the doors closed when not in use, and
  - constructed so as to prevent the migration of gases from the room into other parts of the building,



# SAFETY TIPS

## COMPRESSED GAS STORAGE

- is designed to prevent critical structural and mechanical damage from an internal explosion in conformance with good engineering practice such as that described in NFPA 68, “Explosion Protection by Deflagration Venting”,
- is provided with natural or mechanical ventilation,
- does not contain fuel-fired appliances or high-temperature heating elements, and
- is used for no purpose other than the storage of Class 2 gases.

Cylinders of Class 2.1 flammable, lighter-than-air gases are permitted to be stored outside of a room described above provided that the aggregate capacity per area of expanded gas outside of the room is not more than:

- 60 m<sup>3</sup> in an unsprinklered building of combustibile construction, and
- 170 m<sup>3</sup> in a sprinklered building or in a building of noncombustible construction.

The storage of “single-trip” non-refillable cylinders (i.e. camp stove propane supply) with water capacities of more than 375 g and less than 1.13 kg located within mercantile occupancies shall conform to gas regulations made pursuant to the Safety Codes Act.

Cylinders of Class 2.3 toxic or corrosive gases or Class 2.2 (5.1) oxidizing gases stored indoors shall be located in a room:

- that is separated from the remainder of the building by a gas-tight fire separation having a fire resistance rating of at least 1 hour,
- that can be entered from the exterior,
- whose doors leading to the interior of the building are:
  - equipped with self-closing devices that keep the doors closed when not in use, and
  - constructed so as to prevent the migration of gases from the room into other parts of the building,
- is provided with ventilation to the outdoors.
- cylinders of 2.3 toxic or corrosive gases or Class 2.2 (5.1) oxidising gases shall not be stored in a room containing combustibile materials.

In buildings or areas where Cylinders of Class 2.3 toxic or corrosive gases or Class 2.2 (5.1) oxidizing gases are stored, a fire safety plan is required and shall include:

- the product classifications for each part of the building where products of different classification are stored,
- the method of storage, including aisle widths for rack storage,
- the maximum permitted height of storage for the building or part of the building, if different,
- the maximum permitted size of individual storage areas,
- in sprinklered buildings, the sprinkler system design criteria, inside and outside hose allowances, and results of the benchmark sprinkler system main drain and water flow tests,



# SAFETY TIPS

## COMPRESSED GAS STORAGE

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- the storage method and maximum height of storage shall be posted in the storage area and the signs shall have:
  - a minimum dimension of 200 mm, and
  - letters not less than 25 mm high
- the identification of the location and maximum quantity of product that is being stored.

In addition to the information required in the fire safety plan, where dangerous goods are stored or handled, the fire safety plan shall include the names, addresses and telephone numbers of persons to be contacted in case of fire during non-operating hours.

Cylinders of Class 2.1 flammable gases or Class 2.3 toxic or corrosive gases stored outdoors shall be not less than:

- 1.5 m from any building opening, if the aggregate capacity of expanded gas is not more than 170 m<sup>3</sup>
- 7.5 m from any building opening, if the aggregate capacity of expanded gas is more than 170 m<sup>3</sup> but less than 500 m<sup>3</sup>, and
- 15 m from any building opening, if the aggregate capacity of expanded gas is 500 m<sup>3</sup> or more.

If the opening above is into a specific built room for the storage of compressed gas then the distances don't apply.

**NOTE:** Please contact the local Authority Having Jurisdiction for any questions regarding this Safety Tip.

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### Contact

**Community and Technical Support branch of Municipal Affairs:**

Hours: 8:15 am to 4:30 pm (open Monday to Friday, closed statutory holidays)

Toll free: 1-866-421-6929

Email: [safety.services@gov.ab.ca](mailto:safety.services@gov.ab.ca)

**Please contact your local Fire Department for any questions regarding this Safety Tip.**

