

PURPOSE/APPLICATION

A **compressed gas** is a substance that is a gas at normal room temperature and pressure, and is contained under pressure, usually in a cylinder. These products are used in the welding process.

PPE

- Canadian Plains Energy Services (CPE) minimum requirements
- Face shield and gauntlets (propane N₂ / CO₂)

TRAINING

- Propane filling and use

HAZARDS & CONCERNS

- Fire/explosion
- Extreme Temperature (N₂ / CO₂)
- Oxygen deficiency
- Noise

PRECAUTIONS

Following these basic general safe practices will help protect you from the hazards associated with compressed and liquefied gases:

- Read the MSDS and labels for all of the products you work with.
- Know all of the hazards (fire/explosion, health, chemical reactivity, corrosivity, pressure) of the products you work with.
- Know which products you work with are compressed gases and check the label, not the cylinder colour, to identify the gas.
- Inspect all incoming cylinders before storing to ensure they are undamaged and properly labelled.
- Check that the cylinder was last tested within the required time.
- Store compressed gas cylinders separately, away from processing and handling areas.
- Store compressed gas cylinders in cool, dry, well-ventilated areas, away from incompatible materials and ignition sources. Ensure that the storage temperature does not exceed 52°C (125°F).
- If compressed gas cylinders are stored outside, use a well-drained, securely fenced area. Keep them on a raised concrete pad or non-combustible rack. Protect cylinders from the weather and do not allow them to stand directly on wet soil as this can cause corrosion.
- Compressed gas cylinders are to be securely fastened in place in the upright position. Never roll, drag, or drop cylinders or permit them to CPE each other.
- Move cylinders in handcarts or other devices designed for moving cylinders.
- Always transport cylinders with valve caps or other valve protection in place.
- Leave the cylinder valve protection cap in place until the cylinder is secured and ready for use.
- Discharge compressed gases safely using devices, such as pressure regulators, approved for the particular gas.
- Never force connections or use homemade adaptors.
- Ensure that equipment is compatible with cylinder pressure and contents.
- Carefully check all cylinder-to-equipment connections before use and periodically during use, to be sure they are tight, clean, in good condition and not leaking.

- Carefully open all valves, slowly, pointed away from you and others, using the proper tools.
- Remove regulators and close all valves when cylinders are not in use.
- Never tamper with safety devices in cylinders, valves or equipment.
- Do not keep cylinders longer than the supplier recommends.
- Do not allow flames to contact cylinders and do not CPE an electric arc on cylinders.
- Never tamper with cylinders in any way. Do not repaint them, change markings or identification, or interfere with valve threads or safety devices.
- Never hang clothes or equipment over a compressed gas cylinder.
- **How to handle "empty" cylinders:** leave a slight positive pressure in them, close cylinder valves, disassemble equipment properly, replace cylinder valve protection caps, mark cylinders "empty" or "MT," and store them separately from full cylinders.
- Ensure proper separation of combustible gases and oxygen's.
- Never use oxygen or even compressed air to remove dust from clothing or equipment.
- Ensure compressed and liquefied gas storage/containers are addressed in your emergencies response plan (ERP).

REFERENCES / ADDITIONAL INFORMATION

None

REGULATIONS

Alberta OHS Code - Part 10 Fire and Explosion Hazards

Compressed and liquefied gas 171

1. An employer must ensure that
 - a. *compressed or liquefied gas containers are used, handled, stored and transported in accordance with the manufacturer's specifications,*
 - b. *a cylinder of compressed flammable gas is not stored in the same room as a cylinder of compressed oxygen, unless the storage arrangements are in accordance with Part 3 of the Alberta Fire Code (1997),*
 - c. *compressed or liquefied gas cylinders, piping and fittings are protected from damage during handling, filling, transportation and storage,*
 - d. *compressed or liquefied gas cylinders are equipped with a valve protection cap if manufactured with a means of attachment, and*
 - e. *oxygen cylinders or valves, regulators or other fittings of the oxygen using apparatus or oxygen distributing system are kept free of oil and grease.*
2. *An employer must ensure that a compressed or liquefied gas system is not exposed to heat sources that generate temperatures that may*
 - a. *result in the failure or explosion of the contents or the system, or*
 - b. *exceed the maximum exposure temperatures specified by the manufacturer.*

3. *An employer must ensure that a compressed or liquefied gas system is kept clean and free from oil, grease and other contaminants that may
 - a. *cause the system to fail, or*
 - b. *burn or explode if they come in contact with the contents of the system.**
4. *An employer must ensure that on each hose of an oxygen-fuel system,
 - a. *a flashback device is installed at either the torch end or the regulator end, and*
 - b. *a back-flow prevention device is installed at the torch end.**
5. *An employer must ensure that compressed or liquefied gas cylinders are secured, preferably upright, and cannot fall or roll unless a professional engineer certifies another method that protects against the hazards caused by dislodgment.*
6. *Despite subsection (5), an employer must ensure that a cylinder containing acetylene is secured and stored upright.*
7. *Moved to section 170.1(5).*
8. *A worker must ensure that
 - a. *compressed gas equipment designed to be used with a specific gas is only used with that gas*
 - b. *the cylinder valve is shut off and pressure in the hose is released when cutting or welding is not in progress,*
 - c. *sparks, flames or other sources of ignition are not allowed to come in contact with the cylinders, regulators or hoses of a compressed or liquefied gas system, and*
 - d. *compressed air is not used to blow dust or other substances from clothing.**

Saskatchewan OHS Regulation - PART XXV Fire and Explosion Hazards

Compressed and liquefied gas systems 371

1. *An employer or contractor shall:
 - a. *develop and implement written procedures for the safe installation, use and maintenance of a system;*
 - b. *make readily available for reference by workers the procedures developed pursuant to clause (a) before requiring or permitting the use of the system; and*
 - c. *ensure that all workers are trained in and implement the procedures developed pursuant to clause (a).**
2. *The workers shall implement the procedures developed pursuant to clause (1)(a).*
3. *An employer or contractor shall ensure:
 - a. *that a system:
 - I. *is not exposed to temperatures that may result in the failure of the system or explosion of the contents of the system;*
 - II. *is maintained in a clean state, free from oil, grease or other contaminant that may cause a failure of the system or that may burn or explode if the contaminant comes into contact with the contents of the system; and***

- III. is located, guarded and handled during filling, transportation, use and storage so that the system is protected from damage;*
- b. that service valve outlets and the extensions of service valve outlets of containers that are not connected to any apparatus are capped; and*
- c. where equipment is designed for use with a particular compressed or liquefied gas or gases, that:*
 - I. only those gases are used in the equipment; and*
 - II. the equipment is clearly labeled as being only for that use.*

British Columbia OHS Regulation - Part 5 Chemical and Biological Substances

SUBSTANCES UNDER PRESSURE

5.36 Containers

- 1. A tank, cylinder, bottle or other vessel containing a substance under pressure, together with any associated pressure or flow regulator and piping or conveyance system, must be*
 - a. protected from sparks, flames, excessive heat, physical damage, electrical contact or corrosion, and*
 - b. equipped with suitable pressure relief mechanisms installed so that no worker will be endangered in the event of discharge.*
 - c. Repealed. [B.C. Reg. 312/2003, effective October 29, 2003.] (2) Hand-held aerosol spray cans are exempt from the requirements of subsection (1)(b).*

5.37 Pressure testing

A compressed gas container which requires pressure testing must bear a valid and current indication that it has been pressure tested.

5.38 Handling and securing cylinders

- 1. A compressed gas cylinder must not be hoisted by a sling or magnet, dropped, subjected to impact, handled by the regulator or used as a roller or work support.*
- 2. A compressed gas cylinder must be secured to prevent falling or rolling during storage, transportation and use, and where practicable, must be kept in the upright position.*

5.39 Cylinder markings

A compressed gas cylinder must be marked to indicate its rated pressure and the type of gas it contains.

5.40 Cylinder valves

- 1. The valve on a compressed gas cylinder must be kept closed when the cylinder is empty or not in use.*
- 2. A worker must not stand directly in front of a regulator attached to a compressed gas cylinder when the cylinder valve is being opened.*
- 3. Any valve, regulator or fitting connected to a compressed gas cylinder must be a standard fitting, designed and manufactured for the type of cylinder and compressed gas for which it will be used, and must include provisions for flashback arresters where necessary.*
- 4. Unless a compressed gas cylinder is equipped with an integral valve guard, the valve cover must be in position when the cylinder is not connected for use.*

5.41 Fittings

Only standard fittings designed for the specific compressed gas service may be used with a compressed gas system.

5.43 Empty cylinders

An empty compressed gas cylinder must be identified as being empty and must be stored separately from other compressed gas cylinders.

5.44 Acetylene cylinders

1. *A compressed gas cylinder containing acetylene must be used only in the upright position.*
2. *If the cylinder has been stored or transported in a horizontal position, it must be placed in the upright position for at least 1 hour before it is used.*
3. *A suitable device for closing the valve on an acetylene cylinder must be immediately available when the cylinder is connected for use.*

5.45 Restriction on use of copper

A fitting or tube made of copper or any alloy containing more than 67% copper must not be used in a system carrying acetylene gas, except for copper torch tips and lengths of copper tubing 30 cm (1 ft) or less in length which are open to the atmosphere.

5.46 Restriction on use of oxygen

1. *Oxygen gas must not be used in any circumstance where it can contact a substance that oxidizes readily, such as a petroleum product, natural fibre or metal powder.*
2. *Oxygen gas must not be used to*
 - a. *operate a pneumatic tool,*
 - b. *start an internal combustion engine,*
 - c. *clean equipment or clothing,*
 - d. *create pressure in a container, or*
 - e. *ventilate a workplace.*

5.47 Cleanliness

A worker must not permit oil or grease to contact an oxygen cylinder valve, regulator, or fitting.

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