

PROPANE HANDLING

1. Task

Working safely with propane tanks and cylinders.

2. Hazards

Fire hazard, explosion hazard, burn injuries, and frostbite.

3. Controls

Pre-Job Safety Assessment (PSA). CSA/ANSI approved equipment and PPE, fire extinguisher, worker training (propane handling in construction), emergency planning, and competent supervision.

Receiving Cylinders at the Project:

Examine all propane cylinders received at the project are in date and in good condition. Reject any/all cylinders that are found with any of the following conditions:

- ❖ The cylinder has dents, gouges, damaged foot rings, collars or leaks.
- ❖ The cylinder re-qualification date has lapsed. Cylinders are required to be re-qualified and marked at ten-year intervals starting with the date of manufacture.
- ❖ All cylinders must have a protective collar or cap in place and the valve shall be closed during transportation and storage.
- ❖ The cylinder has a leaking or damaged service valve
- ❖ Missing TDG and/or WHMIS 2015 labels.

Cylinder Storage at the Project:

If a cylinder is not connected to a construction heater, propane torch or other appliance at the construction site, it must be stored outdoors.

A cylinder may be on a roof for work undertaken on the roof during the current or the following shift but not exceeding 1000 lbs. (450 kg) in total capacity. (CSA Standard B149.2-10 Clause 6.5.3.8)

When storing cylinders at the construction site, ensure they are not exposed to the following conditions:

- ❖ Open flame or other sources of ignition.
- ❖ Vehicular or mobile equipment movement. If required, cylinders must be protected by barriers or equivalent.
- ❖ Stored such that the pressure relief valve discharge is not less than 3 meters (10 feet) on the horizontal plane from any building opening that is below the level of the relief discharge or the air intake of any appliance or air moving equipment.
- ❖ Tampering or damage.

Cylinders should be stored such that propane cylinders are separated from other compressed gases and flammable and combustible liquids in accordance with the following:

At least 1 metre (3 feet) from other flammable compressed gas containers.

At least 6 metres (20 feet) from containers or dispensers for flammable and combustible liquids, or oxidizing, corrosive or toxic gases.

A storage compound can be constructed using traditional construction fence panels. Empty cylinders should be stored on one side and full cylinders on the other. Do not mix cylinders. The compound must not be located any closer than 7.5 meters (25 feet) to any building or adjoining property line with the distance increasing to 15 meters (50 feet) if determined the amount to be stored will exceed 2270 KG or 5000 LBS.

All sides of the storage compound shall prominently display “NO SMOKING” signs.

Propane cylinders shall not be stored or subjected to temperatures above 52°C (125°F)

Cylinders Installed Indoors:

- ❖ When cylinders are installed indoors, they must be in the same room as the construction heater.
- ❖ Cylinders must be secured by tying them upright to a secure structure. It is also acceptable to tie three together to secure them upright.
- ❖ Keep the cylinder at least 3 meters (10 feet) away from the construction heater.
- ❖ Never point a heater towards a cylinder.
- ❖ A cylinder may be used indoors (in the construction, repair, or improvements of a building or structure, including its fixtures and equipment) provided:
 - A pressure regulator is employed and directly connected to the appliance or cylinder valve, or located on a manifold which is connected to the cylinder valve;
 - Total capacity of cylinders connected indoors shall not exceed 135 KG (300 LBS). Manifolds of cylinders located 15 meters (50 feet) apart are permitted if located on the same floor area;
 - It is equipped with an excess flow valve as an internal component of the cylinder service valve or located in the outlet connection of the cylinder or service valve.
 - Cylinder or regulating equipment are not subjected to damage or exposed to temperatures in excess of 52°C (125°F); and
 - The cylinder is secured in an upright position.
- ❖ When repair work is being carried out in an occupied building that is not under construction, any cylinder used must always be under the supervision of the operator.
- ❖ A cylinder in use inside a building must not be located near an exit, stairway or area intended for the safe evacuation of people.
- ❖ Connection and disconnection of cylinders is to be done in a well-ventilated area with no source of ignition within 3 meters (10 feet) from the point of connection.
- ❖ If the cylinder valve does not have a hand wheel attached, a wrench for turning the valve stem must be readily available. On multiple cylinder installations, a single wrench per installation is enough.

Cylinders Installed Outdoors:

- ❖ Cylinders installed outdoors must be set on a firm, level base.
- ❖ Cylinders must be installed such that the pressure relief valve discharge is not less than 1 meter (3 feet) on the horizontal plane from any building opening that is below the level of the relief discharge.
- ❖ Cylinders must be installed such that the pressure relief valve discharge is not less than 3 meters (10 feet) on the horizontal plane from any air intake of any appliance or air moving equipment.
- ❖ Cylinders must be installed not less than 3 meters (10 feet) on the horizontal plane from any source of ignition.
- ❖ Cylinders must not be installed below grade. This requirement does not prohibit an installation in a compartment or recess below grade level, such as a niche in a slope or terrace wall that is used for no other purpose provided that:
 - The cylinder and regulating equipment are not in contact with the ground;
 - The compartment or recess is drained and ventilated horizontally outdoors from its lowest level; and
 - The discharge outlet is from any pressure relief valve is located at least 1 meter (3 feet) on the horizontal plane from any building opening that is below the level of such discharge.
- ❖ When damage to a cylinder from vehicular traffic is possible, protection in the form of posts, steel guardrails or jersey barriers must be used.
- ❖ A maximum of three (3) cylinders manifolded together to form a system may be located within 3 meters (10 feet) of a common wall of a building. No more than one such manifolded system may be located against the common wall of a building unless separated by 3 meters (10 feet).



- ❖ A maximum of four tanks, each less than 125 USWG (475 L), that are manifolded together to form a system may be located within 3 meters (10 feet) of a common wall of a building. No more than one such manifolded system may be located against the common wall of a building unless separated by 3 meters (10 feet).

Cylinder Use:

The following operational guidelines will help solve the most common problems encountered when using a propane cylinder to supply fuel to a construction heater or hand held torch.

- ❖ When connections are made, slowly open the cylinder service valve and check for leaks.
- ❖ If a leak is detected, shut off the cylinder service valve and make necessary repairs prior to using the cylinder.
- ❖ Opening the cylinder service valve too quickly will cause the excess flow valve to close. Excess flow valves are designed to shut off the fuel flow should the regulator be accidentally broken off.
- ❖ To open a closed excess flow valve, shut off the cylinder service valve, wait a couple of minutes for the excess flow valve to reopen and then open the cylinder service valve slowly.
- ❖ The cylinder service valve should always be opened to its fully open position. **DO NOT FORCE OPEN BEYOND THIS POINT.**
- ❖ Watch for a drop in pressure or reduced flame efficiency. This could indicate an insufficient supply of fuel. Additional cylinders may have to manifolded together to provide an enough supply of fuel (see vaporization).

Vaporization:

If the supply pressure to a construction heater or hand held torch is inadequate it may be that the cylinder cannot produce enough propane vapor to meet the demand.

The amount of propane vapors a cylinder can supply depends on the amount of propane liquid in contact with the cylinder shell and the temperature of the air around the cylinder. Typically, a 100lb. cylinder can supply approximately 50,000 BTUH at 0°C (32°F). A total of three 100lb. cylinders will be required to provide 150,000 BTUH at the same temperature.

Frost on the cylinder(s) and components (cylinder valve/regulator) is a clear sign that the cylinder(s) is having difficulty keeping up with the demand. The solution could be as simple as adding another cylinder or exchanging a partially filled cylinder with a full one, because as the propane liquid reduces so does the cylinder's ability to produce vapor.