

Chemicals and Materials

How to work safely with - Liquefied Petroleum Gas (LPG)

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What is LPG?

Liquefied petroleum gas (LPG) is a mixture of gases or a single gas that has liquefied when under pressure. Usually, LPG contains mainly propane and butane. Propylene and butylene may also be present in some mixtures.

LPG does not naturally have an odour, but odorant substances (i.e., volatile mercaptans) are added to warn users about leaks. The amount of LPG in the air cannot be determined by the level of odour. Detecting and measuring the gas concentration should be done with a measuring instrument.

For more information on the safe handling of LPG for forklifts, please see the OSH Answers [Forklift Trucks - Safe Handling of Propane \(LPG\) Fuel](#) and [Forklift Trucks – Hazards of Propane](#).

What are the hazards of working with LPG?

LPGs are flammable.

Exposure to higher concentrations of gas may lead to drowsiness, dizziness, and narcosis (in a deep stupor or unconsciousness).

LPG is heavier than the air. It will accumulate close to the ground and cause asphyxia by oxygen displacement at concentrations much lower than the lower flammability limit.

Frostbite is also a concern. When the gas mixture is contained in compressed gas cylinders in a liquefied state, contact with rapid evaporating gas released from the cylinder may cause frostbite.

What safety practices should be followed when transferring LPG and filling cylinders?

The jurisdiction's health and safety legislation and fire and building codes establish compressed gas handling and storage rules. Guidelines are offered by standards such as the National Fire Protection Agency (NFPA) 58 Liquefied Petroleum Gas Code, NFPA 55 Compressed Gases and Cryogenic Fluids Code, Canadian Standards Association CAN / CSA-B149.2-20 Propane Handling and Storage Code, and Compressed Gas Association (CGA) P-1 Standard for Safe handling for compressed gas in containers.

The following are general safety practices. All transfer operations must be performed by qualified personnel who are trained in safe operating procedures and emergency response. Make sure you know and follow every step of your workplace's safety procedures. The safety procedures should include detailed information about inspection, connection and disconnection procedures, and what to do in case of a release of flammable gas in the air.

Do

- Fill only containers that follow the design, manufacturing, and inspection markings required by legislation or applicable standards.
- Protect containers, fittings, and valves from damage or unintentional contact with objects or vehicles.
- Before each use, inspect the transfer hose assemblies for leaks or damage. If leaking or damaged, do not use them and remove them from service until replaced or repaired.
- If the cylinder has a sleeve, remove the sleeve before filling so that you can inspect the cylinder.
- Move cylinders by using a hand truck or other appropriate equipment. Use lifting cradles when moving them with hoisting equipment.
- Turn off sources of ignition during connection, transfer, disconnection, or venting.
- Remain with the cylinder until the gas transfer is complete and all valves are closed.
- Open the cylinder valve slowly.
- Vent outdoors only in conditions that allow the gas to dilute quickly. Do not vent indoors unless the building meets the requirements for housing LPG facilities.
- Use intrinsically safe tools on the cylinders and gas systems.
- Know what to do in case of a leak or fire.

Do Not

- Do not allow other people in the filling area.
- Do not smoke or use open flame devices or portable electrical tools within 25 ft (7.6 m) of the transfer point while transferring LPG.
- Do not roll or drag the cylinders.
- Do not lift them by the cap, valves, and collars, and do not use a lifting magnet.
- Do not refill cylinders with an expired manufacturing or requalification date.
- Do not refill damaged cylinders.
- Do not try to repair or alter valves or other safety devices.
- Do not fill a cylinder that requires overfilling prevention device but does not have it.
- Do not refill non-refillable or disposable cylinders.

What are general safety practices for the storage of LPG cylinders?

- Store according to municipal bylaws and jurisdictional fire and building codes.
- Limit access to only authorized personnel.
- Empty cylinders must be included (as if they are full) when determining the number of cylinders that are being stored.
- Plan the storage area so that you can remove cylinders easily without having to move other cylinders around.
- Store cylinders in the upright position and secure them from falling. (Note: cylinders designed to be used in a horizontal position, such as those for forklift trucks, may be stored horizontally only if the relief valve is positioned so that it is in direct contact with the vapour space in the cylinder (at 12 o'clock). However, some jurisdictions require that all cylinders be stored vertically. Check the legislation in your jurisdiction for specific requirements).
- Keep the valve protected with screw-on caps or collars on all cylinders (including empty cylinders).
- Store away from corrosive materials or protect from environmental factors which may cause corrosion.
- Follow the segregation and distance requirements if LPG cylinders are stored in an area with other compressed gases and other hazardous products.
- Store away from oxidizers, combustible materials, and any heat or ignition source.

- Label empty cylinders as “empty” and store them separately from full ones.
- If stored **outdoors** (preferred location):
 - Store at a distance from any building openings, air intake locations, and equipment that could be a source of ignition as required by the fire code in your jurisdiction (or use industry standards if the legislation does not address this topic).
 - Store on raised concrete or other non-combustible materials.
 - Protect from unintentional contact with vehicles and other objects by storing them in a fenced enclosure. Install additional protective structures (e.g., guardrails) if needed.
 - Make sure that containers, cylinders, valves, and fittings are protected from ice or snow accumulation. Thaw the ice at room temperature or with warm water (not exceeding 51.7°C (125°F)).
- If stored **indoors**:
 - Store in purposely built compartments or building that meets the requirements for fire and explosion hazards.
 - Make sure that the location is dry and that there is adequate ventilation.
 - Do not store near exits, stairways, or other egress areas.
- Do not store in extreme heat conditions. Cylinders must not be exposed to temperatures above 51.7°C (125°F). It is not recommended to store cylinders inside a vehicle. Trunk and passenger areas of vehicles can exceed this temperature during sunny or warm weather.
- Do not store on roofs.
- Place placards identifying the product to be visible from a distance. These signs will help emergency responders identify the product in case of an emergency.
- Make sure that appropriate portable fire extinguishers are readily available.

What should be done in case of an emergency?

Only trained personnel should respond to an emergency involving LPG. Other personnel should be evacuated at a safe distance located upwind.

Do not use a flame to detect a leak. Soapy water may be used to test if a cylinder is leaking. Use a compatible flammable gas detector to determine the presence and concentration of flammable gas in an indoor location. Where permanently installed, gas detectors should be visible and audible. Workers should be familiar with the alarm system and its warning sounds.

If a cylinder leaks, tighten the valve, attach a tag indicating that the cylinder is damaged and contains flammable gas, and store it in a well-ventilated area. Contact the supplier for instructions on returning the cylinder.

In case of a fire caused by flammable gas, shut off the gas supply to extinguish the fire if it is safe to do so. Attempting to extinguish the fire without shutting off the fuel supply will not prevent the gas from escaping and accumulating in the atmosphere at dangerous levels. The fire extinguishers provided in the area are intended to extinguish small fires near the location of the cylinders.

Cylinders exposed to fire may vent and release the flammable gas through pressure relief devices.

Fact sheet first published: 2022-12-20

Fact sheet last revised: 2022-12-20

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