

# How to Handle Compressed Gases Safely

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Compressed gases pose two primary hazards. First, the gases in cylinders may be hazardous. Secondly, the pressure may be hazardous.

## Hazardous Contents

Many different gases and chemicals are stored in pressurized cylinders. Some are poisonous and may be an inhalation hazard. Some may displace oxygen to make the air unfit to breathe. Flammable and combustible gases may easily ignite. Other gases, such as oxygen, can contribute to a fire, making it burn faster and hotter.

## Hazardous Pressure

Pressurized cylinders contain large amounts of stored energy. If the cylinder bursts, the rapid release of that stored energy can be devastating. The cylinder could become a heavy, erratic missile tearing through the workplace.

## Gas Types

To better understand how to properly handle, store and use compressed gases, it is first necessary to understand the three basic types of gases stored in compressed cylinders.

**Compressed Gas.** This is a cylinder that is filled with gas under a great deal of pressure. The gas occupies the entire contents of the cylinder. Oxygen is an example of a compressed gas.

**Dissolved Gas.** This is a cylinder that stores a mixture of gas in a solution. Under the high-pressure created in the cylinder, the mixture remains stable. When the valve is open, some of the gas vaporizes and comes out of the solution. This is similar to what happens with carbonated beverages. Acetylene, is an example of dissolved gas.

**Liquefied Gas.** When some gases are compressed, they revert to the liquid state. Filled cylinders contain this liquid in the bottom and gas at the top. As the valve is opened, the gas at the top escapes. As this gas escapes, the pressure in the cylinder decreases and some of the liquid at the bottom evaporates, changing back to gas and thereby keeping the pressure constant. Propane is an example of a liquefied gas.

## Proper Handling and Storage

Most of the problems associated with gas cylinders are due to improper handling. Gas cylinders should be inspected when they are initially received. They should be checked for signs of leakage, damage and proper labeling. A cylinder hand truck should be used when transporting the cylinders. The cylinder, should always be secure during transport.

Proper storage is a must with pressurized gas cylinders. Generally good precautions include the following:

- Store compressed gas cylinders in a well – ventilated area.
- Properly secure cylinders during storage.
- Provide fire protection and firefighting equipment at the storage site.
- Keep full cylinders and empty cylinders in a separate storage area and make sure these areas are clearly marked.
- When a cylinder is not in use or being moved, the valve should be closed and the valve protector should be in place.

Compressed gas cylinders are designed to not burst even under extreme conditions. Systems to more safely release the pressure are built into the cylinders or valves. Typically, there are three ways this is accomplished.

**Pressure Relief Valve.** These are spring-loaded valves that are strong enough to stay closed during normal working loads. If the pressure inside the cylinder reaches a predetermined level, the pressure relief will then vent off gas until the cylinder returns to an acceptable pressure.

**Fusible Plugs.** A fusible plug melts when it reaches a predetermined temperature at that point, the gas in the cylinders is released through the fusible plug, thus lowering the cylinder's internal temperature and pressure. Although the release of the flammable gas in a fire is dangerous, it's less dangerous and harmful than a sudden rupture.

**Rupture Plugs.** Rupture plugs work like fusible plugs but they react to extreme pressure instead of temperature. The entire contents of the cylinder are released when these plugs rupture.