

# BULLETIN

*Risk Control*

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## COMPRESSED GAS CYLINDER STORAGE AND USE

Containers of compressed gas go by many names, including gas cylinders, lecture bottles and high pressure tanks. The containers of gas, even when empty, are likely to contain a residual of at least one atmosphere of the gas. Poison, flammable and corrosive gases must be properly handled to prevent injury to others or to the environment.

End users are encouraged to rent rather than purchase gas cylinders. When the cylinder is empty, or the need for the gas is over, the gas supplier will pick up the cylinder for refilling and reuse. Cylinders which are purchased may or may not be returned to the manufacturer, while rented cylinders can be returned.

Cylinders present significant hazards due to the high pressure of gases contained within the cylinders. Persons using or handling cylinders should have basic training documented on-file. At a minimum, this training should include review of operating and safety protocols for tasks to be performed, review of appropriate Material Safety Data Sheets (MSDS), and hands-on assistance by an experienced gas user. The following are general guidelines for use, transport and storage of gas cylinders.

### Cylinder Use

- Be sure all connections are tight. Use soapy water to locate potential leaks.
- Keep cylinders valves, regulators, couplings, hose and apparatus clean and free of oil and grease.
- Keep cylinders away from open flames and sources of heat.
- Safety devices and valves shall not be tampered with, nor repairs attempted.
- Use flashback arrestors and reverse-flow check valves to prevent flashback when using oxygen-fuel systems.
- Regulators shall be removed when moving cylinders, when work is completed, and when cylinders are empty.



- The cylinder valve should always be opened slowly. Always stand away from the face and back of the gauge when opening the cylinder valve.
- When a special wrench is required to open a cylinder or manifold valve, the wrench shall be left in place on the valve stem when in use; this precaution is taken so the gas supply can be shut off quickly in case of an emergency; and that nothing shall be placed on top of a cylinder that may damage the safety device or interfere with the quick closing of the valve.
- Fire extinguishing equipment should be readily available, when combustible materials can be exposed to welding or cutting operations using compressed cylinder gases.

### Moving Cylinders

- Use a cylinder cart and secure cylinders with a chain. Rolling or "walking" cylinders is extremely hazardous. **Never transport a cylinder with a regulator attached!** Always protect the valve during transport by replacing the valve cover.
- Don't use the protective valve caps for moving or lifting cylinders.
- Don't drop a cylinder, or permit them to strike each other violently or be handled roughly.
- Unless cylinders are secured on a special cart, regulators shall be removed, valves closed, and protective valve caps in place before cylinders are moved.

### Cylinder Storage

- Cylinders should be stored in compatible groups:
  - ❖ Flammables from oxidizers.
  - ❖ Corrosives from flammables.
  - ❖ Full cylinders from empties.
  - ❖ Empty cylinders should be clearly marked and stored as carefully as those that are full, because residual gas may be present.

❖ All cylinders from corrosive vapors.

- Store cylinders in an upright position. Never lay cylinders containing flammable gases on their sides.
- Keep oxygen cylinders a minimum of 20 feet from flammable gas cylinders or combustible materials. If this cannot be done, separation by a non-combustible barrier at least 5 feet high having a fire-rating of at least one-half hour is required.
- Compressed gas cylinders should be secured firmly at all times. A clamp and belt or chain, securing the cylinder between "waist" and "shoulder" to a wall, are generally suitable for this purpose. Cylinders should also be secured near the foot, approximately 6 to 8 inches from the floor.
- Keep valve protective caps in place when the cylinder is not in use.
- Mark empty cylinders as **EMPTY**.
- Keep valves closed on empty cylinders.
- Cylinders must be kept away from sources of heat.
- Cylinders must be kept away from electrical wiring where the cylinder could become part of the circuit.
- Store cylinders in well-ventilated areas designated and marked only for cylinders.



### Things Not To Do

- ❖ **NEVER** roll a cylinder to move it.
- ❖ **NEVER** carry a cylinder by the valve.
- ❖ **NEVER** leave an open cylinder unattended.
- ❖ **NEVER** leave a cylinder unsecured.
- ❖ **NEVER** force improper attachments on to the wrong cylinder.
- ❖ **NEVER** grease or oil the regulator, valve, or fittings of an oxygen cylinder.
- ❖ **NEVER** refill a cylinder.
- ❖ **NEVER** use a flame to locate gas leaks.
- ❖ **NEVER** attempt to mix gases in a cylinder.
- ❖ **NEVER** discard pressurized cylinders in the normal trash.

### Oxygen and Oxidizers

Oxygen and other oxidizing gases pose additional hazards over usual compressed gas hazards. These gases can enrich an atmosphere so combustible materials readily ignite or the combustion is accelerated. For example, clothing, paper, and cardboard are very combustible in oxygen enriched atmospheres. Likewise, **never** use oil, grease or

other petroleum products on or near oxidizing gas cylinders.

### Acetylene

Over the years, there have been a number of reported incidents involving acetylene being used improperly. In 1994 alone, there were two documented incidents brought to the attention of the Compressed Gas Association. In both cases, individuals were using acetylene to inflate either balloons or plastic shopping bags. The inflated bags or balloons were then to be ignited to produce a large bang. In one case, an individual was burned over 50% of his body. In the other case, a father was not only killed by the shock wave in front of his children, but some of his children suffered injuries too. Both incidents resulted in a significant amount of property damage as well. Damage ranged from windows and doors being blown out of a warehouse, to windows being shattered in the neighborhood.

The same properties that make acetylene an attractive gas for cutting and welding, also make it an extremely dangerous gas to abuse in this manner. Any effort to transfer or mix acetylene into another container including a balloon, plastic bag, or another cylinder, is highly dangerous.

Even under circumstances where a "knowledgeable" person thinks he or she can do it safely, "playing" with acetylene is a very high risk activity. Acetylene can easily be ignited by static electricity. It is because of this fact that plastic piping is not used in the transmission of acetylene.

Engaging in any practices such as these is extremely hazardous. Not only can one be severely burned by acetylene's high heat content, but one can also be killed or severely injured by the intense shock wave that may be created by a small quantity of gas when ignited.

(Source: Compressed Gas Association, *Safety Alert SA-2*, 2008)



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