

Compressed Gas Cylinder Safety

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We take for granted the power a compressed gas cylinder possesses. Think about it, most cylinders are pressurized to in excess of 2,000 pounds per square inch! Pretty amazing considering many fluid power pneumatic systems only reach a maximum of 250 PSI.

What's even more fascinating is how casually we treat these "Sleeping Giants". The following suggestions can be found in the Compressed Gas Association Pamphlet P-1. Let's look at a few common hazards to avoid when handling or using a pressurized cylinder:

Capless Cylinders

Cylinder caps are designed to protect the valve from damage and releasing gas under pressure. If you notice an un-capped cylinder, immediately locate and secure the protective cap. If a capless pressurized cylinder were to fall over and the valve broken, the cylinder could turn into a rocket. If a cap is excessively hard to open, contact your supplier immediately for replacement. Valve protection caps for a cylinder designed to accept a cap shall always be in place and hand tight except when cylinders are secured, in use, or connected for use. The user should not switch caps since not all gas suppliers use the same cap threads. A cracked or dented cap should be brought to the attention of the gas supplier.

(CGA Pamphlet P-1 Sec. 3.4.1)

It's a good idea to store caps in close proximity to the cylinders in use. Remember, the cylinder cap is designed for your protection, use them.



Exhibit 1.

Temperature Extremes

Compressed gas containers shall not be exposed to temperature extremes. High temperatures may result in excessive cylinder pressure. Never apply a flame or heat directly to any part of a compressed gas container or allow it to come in contact with an electrically energized system. If ice or snow accumulates on a container, thaw at room temperature, or with water at a temperature not exceeding 125 °F (51.7 °C).

(CGA Pamphlet P-1 Sec. 3.3.3)

Moving Cylinders

Always transport high-pressure containers using a cart specifically designed for that purpose. Users of compressed gas containers should not roll or drag cylinders due the potential for damage or weakening of steel or aluminum walls. A variety of single or multiple cylinder carts are available through your gas suppliers. Always keep carts where cylinders are used and stored.



Exhibit 2.

Cylinder Storage

All compressed gas cylinders in service or in storage at user locations shall be secured to prevent falling or rolling. Ensure that containers stored or used in public areas are protected against tampering and damage. Furthermore, stored containers (either inside or outside) shall not obstruct exit routes or other reason normally used or intended for the safe exit of personnel.

(CGA Pamphlet P-1 Sec. 3.7.3, 3.7.4)

Loosely draped chains, ropes or tape often do not provide adequate restraint. Periodically check the strength and effectiveness of your gas cylinder restraint system.



Exhibit 3.

Leak Test

Piping, regulators and other apparatus shall be kept gas tight to prevent leakage. This can be confirmed by the use of a compatible leak test solution or an appropriate leak detection instrument.



Exhibit 4.

Note – Do not attempt to repair a leak while the system is still under pressure.
(CGA Pamphlet P-1 Sec. 3.8.4)

The main hazard in working with inert gases such as Argon, Helium and Nitrogen is their ability to asphyxiate humans. Always have leak detection solution such as “Snoop” available to ensure all connections are tight.

Training

Personnel who handle containers shall be trained in the safe handling and storage of compressed gases in containers.

(CGA Pamphlet P-1 Sec. 3.5.1)

Proper safety training is the single most effective means of reducing workplace accidents and death. An annual review of safety specific to compressed gas cylinders is recommended.

Labeling & Markings

The labels applied by the gas supplier to identify the container contents shall not be defaced or removed by the user until the cylinder is empty in accordance with the provision of 29 CFR 1910.1200(f) [9]. In addition, color shall not be used to identify container content. The primary identifier is the container label ... Containers not bearing a legibly written, stamped, or stenciled identification of the contents shall not be used. They shall be segregated for return to the gas supplier or distributor.

(CGA Pamphlet P-1 Sec. 3.1.1, 3.1.2)

Consult with your gas supplier to determine the best means of identifying and separating Full from Empty cylinders. Empty / Full tags come in a variety of forms; it's important to store Empty cylinders in a separate area for prompt return to your supplier.

Posting

Container storage areas shall be prominently posted with the hazard class or the name of the gases stored. Where required by federal, state, provincial, or local ordinance and after appropriate employee training, alternate postings may be used. No smoking signs shall be posted where appropriate.

(CGA Pamphlet P-1 Sec. 3.7)



Exhibit 5.

A clean, well organized work environment is a safe work environment. Signs identifying Inert, Oxidizer, Flammable, etc. are available through your gas supplier or safety equipment supplier.

Container Valves & Regulators

The container valve shall be kept closed at all times (charged or empty) except when the container is in use. Valve outlets shall be pointed away from all personnel when the valve is being opened. In addition, before a regulator is removed from a container, close the container valve and relieve the regulator of gas pressure ... do not tighten connections or leaking fittings or attempt other repairs while the system is under pressure. (*CGA Pamphlet P-1 Sec. 3.8.1*)



Exhibit 6.

When handling storing or using compressed gas cylinders utilize the following checklist and remember—respect these “Sleeping Giants”.

☒ **Cylinder Safety Checklist**

- ☐ Cylinder carts / dollies are used to transport compressed gas cylinders
- ☐ Cylinders are secured and stored in the upright position
- ☐ Cylinder caps are always in place when container is not in use
- ☐ Leak check all newly installed cylinders
- ☐ Ensure FULL / EMPTY cylinders are properly segregated and labeled
- ☐ MSDS sheets are available and accessible
- ☐ Observe the 20 foot rule
- ☐ Cylinders are protected from temperature extremes
- ☐ All personnel handling compressed gas cylinders are properly trained
- ☐ Develop an Emergency Response Plan in case of accident or spill
- ☐ Use appropriate PPE for Cryogenic Gases