Compressed gas cylinder storage

FAST FACTS

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Cylinders should be stored in assigned places away from elevators, stairs, or gangways. Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized persons.

Compressed gas cylinders are utilized in a wide range of workplaces including medical facilities, restaurants, laboratories, and industrial settings. While different gases have different properties, they have similar hazards and requirements regarding identification and handling.

Every compressed gas cylinder should be treated as a potential high energy projectile and, therefore, gas cylinders should be secured at all times to prevent tipping.

Hazards associated with compressed gases include oxygen displacement, fires, explosions, and toxic gas exposures, as well as the physical hazards associated with high pressure systems. Special storage, use, and handling precautions are necessary in order to protect against these hazards.

According to the Bureau of Labor Statistics, there were 10 deaths and 3,920 injuries related to pressurized containers in 2016. The Office of Congressional Workplace Rights found 27 occupational hazards related to compressed gases in the 115th Congress.

The handling, use, and storage of compressed gas cylinders in applications other than welding and cutting in general industry workplaces is governed by OSHA's Compressed Gases Standard, 29 CFR 1910.101.

SELF-INSPECTION CHECKLIST

☐ Are cylinders stored in upright positions and secured to prevent them from being knocked over?

☐ Are cylinders stored away from highly flammable substances such as oil, gasoline, or waste?

☐ Are cylinders stored away from electrical connections, gas flames or other sources of ignition, and substances such as flammable solvents and combustible waste material?

☐ Are flammable gases separated from oxidizing gases in storage areas?
Note: Acetylene and propane cylinders should be separated from oxygen cylinders when not in use.

☐ Are oxygen and fuel gas cylinders separated by a minimum of 20 feet when in storage?
Note: A fire-resistant partition between the cylinders can also be used.

☐ Are storage rooms for cylinders dry, cool, and well-ventilated?
Note: The storage rooms should be fire resistant and the storage should not be in subsurface locations.

☐ Are cylinders stored away from incompatibles, excessive heat, continuous dampness, salt or other corrosive chemicals, and any areas that may subject them to damage?
Note: Rusting may damage the cylinder and cause the valve protection cap to stick.

☐ Is the storage area permanently posted with the names of the gases stored in the cylinders?

☐ Do all cylinders have their contents and precautionary labeling clearly marked on their exteriors?

☐ Are all cylinder valve covers in place when cylinders are not in use?

☐ Are all cylinders stored so they do not interfere with exit paths?

☐ Are all cylinders subjected to periodic hydrostatic testing and interior inspection?
Note: This is normally done by the supplier.

☐ Do all compressed gas cylinders have safety pressure relief valves?

The standard, at 29 CFR 1910.101(a), requires that gas cylinders be visually inspected to determine that they are in safe condition. Otherwise, Compressed Gas Association Pamphlets (e.g. P-1-1965) address safety and technical information related to the manufacture, transportation, storage, transfilling, and disposal of gases (liquefied, non-liquefied, dissolved, and cryogenic), and the containers and valves that hold compressed gases. (See 29 CFR 1910.1201)

Identification: Ensure that cylinders are clearly identified. Compressed gas cylinders should only be identified by their labels and NOT by the color of the cylinder. Global Harmonized System (GHS) compliant labels will have at least one pictogram indicating the type of hazards for the gas inside each container. The most common types of hazards include oxygen displacement, explosion, and toxic effects as well as the physical hazards of a ruptured cylinder.

Cylinder Handling: There are several good practices to implement to prevent injuries when handling cylinders. There are multiple options to secure and transport a cylinder. A suitable hand truck, forklift truck, or similar material-handling device may be used with the container properly attached to the device, which can protect the cylinder from being damaged by preventing it from being struck by other objects or falling out. Cylinders should never be dragged, nor rolled in the horizontal position. Do not lift cylinders by the caps: cylinder caps are not engineered to hold the weight of a cylinder. If a cylinder begins to slip out of control, do NOT try to catch it; this is a primary cause of injury.

Cylinder Storage: Storage areas should protect cylinders from damage. To avoid potential loss of property - and even human life - chain or secure all pressurized cylinders to keep them from falling. "Securing" a cylinder is a performance-based measure. Store areas should also be dry, well-drained, ventilated, and fire-resistant. Group and store compressed gases based on their hazard class.

Provide adequate space or segregate by partitions and post a conspicuous sign that identifies the gas or hazard class. The guidelines provided in CGA Pamphlet P-1-1965 and in other more recent versions of the pamphlet describe how care is to be exercised to ensure that cylinders are secure. For a cylinder to be secure, it must not be allowed to drop, nor be transported in a way in which it could strike another object.

ADDITIONAL RESOURCES

Compressed Gas Association (CGA) website: www.cganet.com

Compressed Gas Safety Guide, Stony Brook University, Environmental Health and Safety (EHS) (September 2005)

☐ Are cylinders always maintained at temperatures below 125°F?
Note: A flame should never come in contact with any part of a compressed gas cylinder. Cylinders should be stored away from heat sources.

☐ Are safety relief devices in the valve or on the cylinder free from any indication of tampering?

☐ Is repair or alteration to the cylinder, valve, or safety relief devices prohibited?
Note: All alterations and repairs to the cylinder and valve must be made by the compressed gas vendor.

☐ Is painting cylinders without authorization by the owner prohibited?
Note: Often color codes are used to help designate cylinders.

☐ Are charged or full cylinders labeled and stored away from empty cylinders?

☐ Is the bottom of the cylinder protected from the ground to prevent rusting?

☐ Are cylinders regularly inspected for corrosion, pitting, cuts, gouges, digs, bulges, neck defects, and general distortion?

☐ Are cylinder valves closed at all times, except when the valve is in use?

☐ Are cylinders always moved, even short distances, by a hand truck?
Note: They must never be dragged across the floor.

☐ Is using wrenches or other tools for opening and closing valves prohibited?
Note: For valves that are hard to open, contact the supplier for instruction.

☐ Are pressure regulating devices in use whenever the gas is emitted to systems with pressure-rated limitations lower than the cylinder pressure?

☐ Are cylinder connections such as pressure regulators, manifolds, hoses, gauges, and relief valves checked for integrity and tightness?

☐ Are cylinders regularly subjected to leak detection using an approved leak detecting liquid?
Note: Ordinary soap solution may contain oils that are unsafe when used with oxygen cylinders. Leak detection liquids are available from commercial welding supply houses.

☐ Is an approved leak-detection liquid used to detect flammable gas leaks? Note: A flame should never be used.

☐ Are procedures established for when a compressed gas cylinder leak cannot be remedied by simply tightening the valve? The procedures should include the following:

- Attach tag to the cylinder stating it is unserviceable.
- Remove cylinder to a well-ventilated, outdoor location.
- If the gas is flammable or toxic, place an appropriate sign on the cylinder warning of these hazards.
- Notify the gas supplier and follow instructions for returning the cylinder.

☐ Are employees prohibited from using compressed gases (air) to clean clothing or work surfaces?

☐ Are compressed gases only handled by experienced and properly trained people?

Source: (NIOSH) Publication Number 2004-10