

Practice Safety – and Common Sense –

When Handling Compressed Gas Cylinders

Compressed gases are hazardous due to their ability to create harmful environments that are either flammable, oxygen enriched or oxygen deficient.

BY BOB DAVIS

It comes as no surprise that safety should always be a top concern when using compressed gases. What may be most surprising to learn, however, is that almost all accidents involving compressed gases initially result from not following established methods for the safe handling and transportation of compressed gas cylinders.

The average compressed gas cylinder is 4 feet tall and weighs between 75 and 80 pounds with contents pressured up to 2,200 pounds per square inch (psi). While this may not sound particularly heavy, serious injury can occur if these cumbersome objects are moved incorrectly or fall on an employee. Abrasions, contusions, fractures and broken bones, asphyxiation, musculoskeletal disorders, spinal cord injuries, poisoning and even death can occur if there is an accident with a compressed gas cylinder.

The most common injuries related to cylinder handling result from falling cylinders. The most prevalent are contusions and fractures in the lower extremities, including breaks in the phalanges, metatarsal, tibia and fibula bones. The second-most common injuries include sprains, strains and spinal cord injuries in the lower lumbar spine, such as herniated or bulged discs (L1-L5) in workers who attempt to catch or stop falling cylinders.

Another misstep when handling cylinders is when a worker attempts to move or lift the cylinder by pulling on the cap instead of using a cylinder cart. Often, this results in the cap disconnecting from the cylinder and forcefully projecting up into the worker's face, leading to injuries such as lost or broken teeth or other facial injuries. Bruises and fractures, especially around the eye

socket, are other common injuries. When a cap is broken off or becomes damaged in a fall, the valve easily can become compromised, exposing the worker to flammable or toxic environments and burns, smoke inhalation or asphyxiation and gas poisoning.

The handling miscues mentioned above are all too common in the workplace and hundreds of cylinder handling-related injuries are reported to OSHA each year. By keeping in mind these safe handling and transportation tips, injuries related to compressed gases can become more of a rarity on site:

Always wear the proper personal protective equipment (PPE), including safety glasses, gloves and hard-toed shoes when working around or with compressed gas cylinders. Remember that the gas comes out of the cylinder pressurized up to 2,200 psi and anything near the valve could



AIRGAS INC.

To avoid fractures and back strain, workers should employ the use of a cylinder cart when transporting cylinders.



AIRGAS INC.

Almost all accidents involving compressed gases initially result from not following established methods for the safe handling and transportation of compressed gas cylinders.

become a harmful projectile. Falling cylinders can land or roll on your foot, leaving you with several broken bones.

Never try to catch a cylinder that is falling, no matter how confident you may be in your ability to stop it. It often is a natural reflex to attempt the save, but the risk of injury far outweighs the potential damage to the equipment.

Do not move a cylinder by its attached regulator or attempt to drag it by the cap. Besides losing your grip, you also could strain your back or fall. It also is unwise to move cylinders by laying them down and rolling them, as this subjects the cylinder to side-wall damage. Instead, move the cylinder using an approved cylinder cart and ensure that the cylinder is strapped on securely.

Secure cylinders upright so that they cannot move, even when traveling in a truck. Chains are the best way to do this, as straps and table clamps often fail due to improper use and set-up. Clamps generally are not kept tight and are placed on articles that are not secure, such as movable desks, tables, etc. Straps can be buckled incorrectly and provide little to no restraint. Instead, fasten restraints on the upper half of the cylinder, above the center of gravity, as well as the bottom approximately 8 inches to 1 foot from the base.

Never heat a cylinder. If a cylinder is stuck in ice, use hand tools to carefully chip away at the ice, making sure the hand tools never come in direct

contact with the frozen cylinder. If the cylinder contents have stratified in a mixture such as CO₂ and NO_x, bring the cylinder into a safe building to slowly warm up while it is chained to the wall before rolling it to mix the contents.

When inspecting compressed gas cylinders, look for burn marks, dents or corrosion, and check to see if the valve cap is attached and that the contents are properly labeled by name. It is the receiver's responsibility to do this inspection as noted in CFR 29 1910.101. Be sure to log this inspection to help guard against a hefty lawsuit.

Securely attach protective valve caps on cylinders when idle or in transport. Many cylinders contain pressures in excess of 2,000 psi. A broken valve resulting from a falling cylinder is all it takes for the cylinder to become an unguided missile. Any uncontrolled release of gas under pressure can create a dangerous environment.

Once the cylinder cap is removed, always inspect the valve for odors, visible plumes or hissing sounds. If you detect any of these, take the cylinder outside to a well-ventilated area and have your vendor pick it up.

When moving cylinders, do not move them with oily hands or gloves. This is very important when moving oxidizers, as they could react violently with the oil or grease if it comes into direct contact with the valve.

Store cylinders in a fire-resistant

area that is well ventilated, cool (less than 125 F) and dry. A fire extinguisher should be available where compressed gases are stored, and have an emergency response and evacuation plan in place in the event of a fire.

Cylinders should not be stored in areas where they can come into contact with objects of extreme temperature, such as a furnace or cryogenic liquid, as these conditions will weaken containers or cause a gas release. They also should be kept a safe distance of at least 20 feet from electrical sources including electrical switches, outlets and extension cords, as they could become part of an electrical circuit. The contents of each cylinder should be clearly marked and the full cylinders separated from empty ones.

When moving cylinders on an elevator, place the cylinder chained securely to the cart in the middle of the elevator with the cart handgrip. Do not attempt to ride in an elevator with a compressed gas cylinder. This is a confined space that would be impossible to escape from if there were an accidental release of gases.

Check the purchase order to ensure that you are not receiving cylinders that contain incorrect contents. The distributor should collect any incorrect cylinders immediately. Finally, never force a cylinder valve open. Only use your gloved hands to open and close the valve on the regulator.

Compressed gas cylinders are a common tool for manufacturing and construction jobs, and their hidden dangers easily are addressed with proper equipment and handling. Follow these tips to ensure that all tasks involving compressed gas cylinders are completed efficiently and safely.

Bob Davis is the director of utilities at Airgas Inc. and is based in Allentown, Pa. He can be reached at 610-675-6854 or Bob.Davis@Airgas.com. To learn more, visit <http://www.Airgas.com>.

