Gas Cylinder Safety Meeting Kit

What’s At Stake

Compressed or liquefied gas cylinders are often used to store chemicals for industrial purposes. The compression of the chemicals allows for a large quantity of material to be stored in a relatively small space. Because cylinder contents are under high pressure (up to 2,500 pounds-per-square-inch, or psi), there can be physical and chemical hazards involved with the use of compressed gas cylinders.

What’s the Danger

COMPRESSED GAS CONSISTS OF THREE MAJOR GROUPS

- Liquefied Gases (such as anhydrous ammonia, chlorine, propane, nitrous oxide & carbon dioxide)
- Non-liquefied Gases (e.g. oxygen, nitrogen, helium & argon)
- Dissolved Gas (Acetylene is the common one)

DANGERS OF COMPRESSED GASES

- Inert gases, such as argon, helium, neon and nitrogen, are not toxic and do not burn or explode. Yet they can cause injury or death if they are present in sufficiently high concentrations. They can displace enough air to reduce oxygen levels. If oxygen levels are low enough, people entering the area can lose consciousness or die from asphyxiation. Low oxygen levels can particularly be a problem in poorly ventilated, confined spaces.
- Some compressed gases are corrosive. They can burn and destroy body tissues on contact. Corrosive gases can also attack and corrode metals. Common corrosive gases include ammonia, hydrogen chloride, chlorine and methylamine.
- Compressed gases are stored in heavy-walled metal cylinders designed, produced and tested for use with compressed gases. Cylinders are made in a wide variety of sizes and shapes.

They range from small lecture bottles, often used for demonstration purposes, to large cylinders over 3 metres long.

- When in proper working order, cylinders are fitted with valves and regulators to control the release of the contents. When there is a failure of the valve or when the cylinder is damaged or punctured, the pressurized contents can release violently. This sudden release can propel a cylinder up into the air 3/4 of a mile, or along the ground up to 30 miles per hour. The energy released may also cause the cylinder to spin, ricochet, or even crash through brick walls. Uncontrolled releases from gas cylinders can pose a severe physical hazard.
- The contents of compressed gas cylinders can also pose a chemical hazard if they are accidentally released. Gases may be cryogenic, flammable, combustible, explosive, oxidizing, corrosive, toxic, poisonous, or inert. The sudden release of these materials can create fire and explosion dangers, worker exposure to toxic or poisonous gases, or even asphyxiation (suffocation) danger if the released gas displaces room air.

HOW TO PROTECT YOURSELF

THE KIND OF INJURIES WHEN COMPRESSED GAS ACCIDENTS OCCUR

- Burns, are one of the most common injuries stemming from these accidents due to the fact that gas pressure increases when gas is heated. Despite that many workers will be wearing protective gear, they could still become severely burned within seconds.
- 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.
- Compressed gases can be toxic, flammable, oxidizing, corrosive, or inert. In the event of a leak, inert gases can quickly displace air in a large area creating an oxygen-deficient atmosphere, toxic gases can create poison atmospheres, and flammable or reactive gases can result in fire and exploding cylinders.

COMPRESSED GASES SAFETY CHECKLIST FOR WORKERS

- Read the MSDSs and labels for all of the materials you work with.
- Know all of the hazards of the materials you work with.
- Know which of the materials you work with are compressed gases and check the label.
- Store compressed gas cylinders in cool, dry, well-ventilated areas, away from incompatible materials and ignition sources. Ensure that the storage temperature does not exceed 52°C (125°F).
- Store, handle and use compressed gas cylinders securely fastened in place in the upright position. Never roll, drag, or drop cylinders or permit them to strike each other.
- Move cylinders in handcarts or other devices designed for

moving cylinders.

- Leave the cylinder valve protection cap in place until the cylinder is secured and ready for use.
- Discharge compressed gases safely using devices, such as pressure regulators, approved for the particular gas.
- Never force connections or use homemade adaptors.
- Ensure that equipment is compatible with cylinder pressure and contents.
- Carefully check all cylinder-to-equipment connections before use and periodically during use.
- Carefully open all valves, slowly, pointed away from you and others, using the proper tools.
- Close all valves when cylinders are not in use.
- Never tamper with safety devices in cylinders, valves or equipment.
- Do not allow flames to contact cylinders and do not strike an electric arc on cylinders.
- Always use cylinders in cool well-ventilated areas.
- Handle “empty” cylinders safely: leave a slight positive pressure in them, close cylinder valves, disassemble equipment properly, replace cylinder valve protection caps, mark cylinders “empty” or “MT”.
- Wear the proper personal protective equipment for each of the jobs you do.
- Know how to handle emergencies such as fires, leaks or personal injury.

FINAL WORD

In most of the workplaces in our society from restaurants, stores and business operations to health, good agencies, compressed gas cylinders are commonplace.