Compressed Gas Cylinder (CGC) Safety Meeting Kit

WHAT ARE COMPRESSED GASES

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.

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.

HEALTH HAZARDS ASSOCIATED WITH COMPRESSED GASES

Avoid Skin Contact: When using gases that are harmful by skin contact, wear protective gloves, aprons or other clothing depending on the risk of skin contact. Choose clothing made of materials that resist penetration or damage by the chemical. The MSDS should recommend appropriate materials. If it does not, contact the gas supplier for specific information.

Protect Your Eyes and Face: Always wear eye protection when working with compressed gases. Avoid ordinary safety glasses. Use chemical safety goggles instead. In some cases, you should also wear a face shield (with safety glasses or goggles) to protect your face.

Avoid Breathing Harmful Gases: If respirators must be used for breathing protection, there should be a written respiratory protection program to follow.

COMPRESSED GASES SAFETY CHECKLIST FOR WORKERS

- Read the MSDSs and labels for all the materials you work with.
- Know all the hazards (fire/explosion, health, chemical reactivity, corrosivity, pressure) of the materials you work with.
- Know which of the materials you work with are compressed gases and check the label, not the cylinder colour, to identify the gas.
- 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, to be sure they are tight, clean, in good condition and not leaking.
- 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,” and store them separately from full cylinders.
- 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.
- Follow the health and safety rules that apply to your job.

FINAL WORD

Gases contained and housed cylinders are very toxic. In contact with skin, eyes, face and breath, serious health problems will occur. Take all precautions in use, handling

and storage of cylinders.