

COMPRESSED GAS SAFETY

June 2002

Gas under high pressure can be hazardous if not used properly. The combination of the pressure and the nature of the gas contributes to a highly hazardous situation that many people fail to realize. The information contained in this publication provides some general guidelines for compressed gas cylinder handling, storage, and use.

This publication is intended for Northern Illinois University employees, students, and affiliates only. For additional information or concerns contact the Department of Environmental Health & Safety or the compressed gas cylinder supplier.

DID YOU KNOW?

The Occupational Safety & Health Administration (OSHA) reports its regulations for using gas regulators, manifolds, and cylinders are among the 25 most frequently cited rules in industry.

(BOC Gases)

Usage Guidelines

Safe use of compressed gases involves the following activities:

- Identify contents.
- Prevent abuse.
- Properly use container and valve caps and plugs.
- Tag containers when empty.
- Properly handle leaking containers.

General Handling Guidelines

- Identify a gas and its dangers before using it. Look for information on labels, material safety data sheets (MSDSs), and cylinder markings. If the cylinder contents are unknown, do not use it.
- Always chain gas cylinders upright to a wall, cylinder rack, or post.
- Always replace the cylinder cap when the cylinder is not in use and when it is being moved.
- Never place cylinders in hallways, passageways, or work areas where they could be struck by people or equipment, or tampered with.
- When possible move cylinders with a cylinder cart.
- Do not drop a cylinder.
- Do not allow grease, oil or other combustible materials to touch any part of a cylinder. This rule is especially important when oxygen cylinders are involved. Grease or oil that oxidizes very slowly in air will burst into flame in pure oxygen.
- Never open valves until regulators are drained of gas and pressure-adjusting devices are released. When opening cylinders, point outlets away from people and sources of ignition, such as sparks or flames. Open valves slowly. On valves without hand wheels, use only supplier-recommended wrenches. On valves with hand wheels, never use wrenches. If a valve becomes stuck, call the gas distributor.
- Keep cylinders away from electrical circuits and excessive heat. Cylinders are made of steel and, therefore, they will conduct electricity.
- Never ground a cylinder or place it near an electrical conductor, including piping, plumbing, or anything that might carry stray electric current.

Storage Guidelines

- Store cylinders upright.
- When a cylinder is in storage, keep the steel protective cap screwed on. This precautionary measure reduces the chance that a blow to the valve will allow gas to escape.
- Group cylinders by types of gas.
- To keep cylinders from falling over, secure them with chains or cable to a stationary structure, such as a wall.
- Store cylinders in dry, well-ventilated areas away from exits and stairways. If outside, store containers off the ground and out of extremely hot or cold environments.
- Do not store compressed gas containers in high pedestrian or vehicle traffic areas. (Containers are more likely to be damaged or tampered with there.)
- Store oxygen or oxidizing gas cylinders at least 20 feet from flammable or combustibles or separate them by a five foot, fire resistant barrier.
- Keep oil and grease away from oxygen cylinders, valves, and hoses.
- If your hands, gloves, or clothing are oily, do not handle oxygen cylinders.
- Make sure fire extinguishers near the storage area are appropriate for gases stored there.
- Post signs stating the name(s) of gas present and “NO SMOKING” where gases are stored.

Oxygen

- Never oil or grease torches, regulators, hoses, cylinder valves, or anything else that will come into contact with oxygen. Do not place oxygen cylinders or equipment where oil or grease from machinery can drop on them.
- Never handle oxygen-using equipment with greasy or oily hands or gloves.
- Clean oxygen-using equipment with a clean, dry cloth. If necessary, use soap and water, but rinse the equipment thoroughly and dry it before use. Never use organic solvents.
- Use a lubricant specifically formulated for oxygen service if oxygen-using equipment must be lubricated. Follow the manufacturer's instructions.
- Never allow a jet of oxygen to contact an oily surface or greasy cloth, or to enter a fuel-oil or other storage tank unless it has been thoroughly cleaned according to approved procedures.
- Always refer to oxygen, air, and fuel gases by their correct names. Oxygen is occasionally incorrectly called "air". A worker who wants air may get oxygen. High-pressure oxygen supplied to a well-lubricated air tool can cause the lubricant to ignite, damaging the tool and injuring the operator.
- Never use oxygen to run air tools. Oxygen and other gases should be used only for their intended purposes. Never use oxygen to blow out pipelines or to provide ventilation. The oxygen may cool the operator, but it also increases the oxygen content of the room. A spark that is inconsequential in air can be extremely hazardous in an oxygen-enriched environment.

Fuel-Gas

A number of fuel gases are commonly used: MAPP Gas (methylacetylene propadiene, stabilized), propane, propylene, propylene-based mixtures, acetylene, natural gas, liquefied petroleum (LP) gases, and hydrogen. All but hydrogen are under low pressure. All fuel gases are potentially hazardous. They will burn and can explode when mixed with air or oxygen. Following are general rules that apply to all fuel gases:

- Always call a gas by its proper name. Never refer only to "gas".
- Do not use a fuel-gas for any purpose other than that for which it was intended.
- Follow the correct procedures for assembling and disassembling equipment. Use only regulators and other equipment designed for the gas being used and always follow the manufacturer's instructions.
- Never let a fuel-gas cylinder reach a temperature above 130°F (54°C).
- Always keep fuel-gas cylinders upright. Never use them on their sides. Use, move and secure them with the same care used for high-pressure cylinders.
- Close the cylinder valve of a leaking fuel-gas cylinder, take the cylinder to a safe place outside and away from ignition sources, mark it, and call the supplier or gas distributor.

Acetylene

Special care is needed when working with acetylene because it is highly unstable:

- Never open the cylinder valve more than one turn. Leave the valve key or wrench on the valve whenever the valve is open so that the valve can be closed quickly in case of fire or accident.
- Never use acetylene at a pressure above 15 psig. Withdraw rate from gas cylinders shall not exceed manufacturers recommendations.
- Never allow the temperature of any part of the acetylene system to rise above 130°F (54°C).
- Never use an acetylene cylinder on its side. Keep it upright and chained to a cylinder truck, wall, or other safe, stable object so that it cannot be knocked over or otherwise damaged.

"Harmless" Gases

Under certain conditions, otherwise harmless gases can kill. Inert gases such as argon, helium, carbon dioxide, and nitrogen can asphyxiate a person.

Asphyxiation occurs rapidly and without warning. All possible precautions should be taken to ensure that an adequate oxygen supply is available. Neither respirators nor gas masks supply oxygen. They only filter or purify the air. If asphyxiation is possible, workers should be equipped with supplied air masks, or the area should be well ventilated to assure the availability of air suitable for breathing.

When using compressed gases inside of a confined space refer to procedures in the University Confined Space Program.

Emergency / Accident Procedures

For non-emergency advice or information contact the Chemical Transportation Emergency Center, known as CHEMTREC, which can be reached 24 hours a day by dialing (800)424-9300. This service is provided by the Chemical Manufacturers Association.

Refer to building escape procedures during a compressed gas emergency. After evacuating the building, have a designated person call 911. The 911 operator will send the necessary emergency assistance and notify the University Environmental Health & Safety.

References:

1. BOC Gases Update: Safe Storage and Handling of Compressed Gases.
2. J.J. Keller