

Environmental Health & Safety Policy Manual		
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Compressed Gas Policy		

1.0 PURPOSE:

Provide guidelines concerning the safe handling and use of portable compressed gas cylinders. Compressed gases are unique in that they represent both physical and potential chemical hazards. The gases contained in these cylinders vary in chemical properties, ranging from inert and harmless to toxic and explosive. The high pressures of the gases constitute a serious hazard in the event that the cylinders sustain physical damage and/or are exposed to high temperatures.

2.0 SCOPE:

All laboratories and other areas (e.g., Facility Services shops) where compressed gas cylinders are used. This policy and EHS-200.3b (Cryogenic Liquid Policy) supersede EHS-200.3, Compressed and Liquefied Gas Cylinder Policy.

3.0 RESPONSIBILITIES:

Environmental Health & Safety Department (EH&S) shall:

- Provide technical assistance when necessary.
- Assess compressed gas cylinder safety during routine inspections.

Principal Investigators/Supervisors shall:

- Ensure that employees understand the contents of this policy are instructed on the means of implementation and are provided with equipment and controls.
- Ensure that appropriate personal protective equipment (PPE) supplies are maintained.

Employees shall:

- Handle compressed gas cylinders only if properly trained.
- Check the identity of the gas labeling before use. If the cylinder content is not identified, if hydrostatic test date is past due, or if the cylinder is in any way damaged, the cylinder should be returned to the supplier (Airgas) at 568-6543 or <mailto:gas@lsuhsc.edu>
- Not modify, tamper with, paint, deface, obstruct, remove or repair any part of the cylinder, including the pressure relief device, the container valve, or the valve protection device.

4.0 HAZARDS ASSOCIATED WITH COMPRESSED GASES:

Many hazards are associated with compressed gas use. Gases have properties which, if proper precautions are not followed, may cause injury, and possibly death. Special storage, use, and handling precautions are necessary in order to control these hazards. It is imperative that users read and understand the compressed gases' associated Material Safety Data Sheets (MSDS, also known as Safety Data Sheets (SDS)). Compressed gases that are used, or have the potential to be used at LSUHSC are listed below, and include hyperlinks to their associated Airgas MSDS. If you need additional information, consult the [OSHA standards](#) and/or contact EH&S for assistance.

- **Asphyxiating gas:** Is usually inert, that may cause suffocation by displacing the oxygen in the air necessary to sustain life. Examples: [Acetylene](#), [Argon](#), [Carbon Dioxide](#), [Helium](#), [Hydrogen](#), [Liquid Nitrogen](#), [Methane](#), [Nitrous Oxide](#)
- **Flammable gas:** A gas which, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less, or a gas which at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit, or one for which the DOT requires their red flammable gas label. Examples: [Acetylene](#), [Carbon Monoxide](#), [Hydrogen](#), [Methane](#)
- **Oxidizer gas:** A gas that is nonflammable but can support and vigorously accelerate combustion in the presence of an ignition source and fuel or is labeled by the DOT as an oxidizer. Examples: [Compressed air](#), [Nitrous Oxide](#), [Oxygen](#).
- **Toxic gas:** A gas that has a lethal concentration (LC 50) in air of 2000 ppm or less by volume of gas (Highly Toxic has an LC 50 of 200 ppm or less). Example: [Carbon Monoxide](#)

5.0 PERSONNEL PROTECTIVE EQUIPMENT (PPE):

Perform a hazard assessment to determine appropriate PPE when working with a compressed gas. Potential PPE includes:

- **Safety Glasses (preferably with a face shield):** Use especially when connecting and disconnecting gas regulators and lines.
- **Foot Protection:** Closed-toed shoes are a laboratory requirement. They provide protection when moving cylinders.
- **Gloves and Clothing:** To protect against frostbite and corrosives.
- **Ear Plugs/Muffs:** To protect from loud pressure sounds.

6.0 SPECIAL HANDLING PROCEDURES:

The following precautions shall be taken when handling the following classes of gases:

Flammable Gases

- Separate these cylinders (empty or full) from cylinders containing oxidizing gases. Separate via a minimum distance of 20 feet or by use of a noncombustible barrier at least five feet high having a fire-resistance rating of at least one-half hour. (OSHA standard 1926.350(a)(10))
- Storage in a ventilated, fire resistant enclosure is recommended.
- The quantity held in a laboratory/workspace should be kept to a minimum.

Oxygen and Oxidizing Gases

- Do not permit oil or grease to come in contact with compressed oxidizing gases. Regulators and tubing used with oxidizing gases must be specially cleaned to remove oil and other reducing agents. Explosions may occur when pressurized oxidizers come into contact with grease or oil.
- Separate these cylinders (empty or full) from cylinders containing flammable gases.
- Do not store cylinders near flammable solvents, combustible materials or near unprotected electrical connections, heat sources or sources of ignition.

Corrosive Gases

- Cylinders should be checked periodically to ensure that the valve has not corroded. If a cylinder or valve is noticeably corroded, contact Airgas, the LSUHSC supplier, immediately.
- The user should be cautious if flow does not immediately start when a valve is opened slightly, as there could be a plug in the valve. If there is a plug in the valve and the valve is opened more, the plug could clear suddenly, with unexpected excessive flow.

Poison Gases

- Cylinders must be stored in ventilated enclosure.
- The quantity of poison gas in a laboratory should be kept to a minimum.
- Flow restrictors should be on poison gas cylinders.
- Ensure that pressure-relief devices vent directly to a laboratory exhaust system.

7.0 TRANSPORTATION, STORAGE, USE AND DISPOSAL:

Transportation

- The valve-protection cap should be placed on the cylinder before transporting it and left on until it has been secured and is ready to use.
- Cylinders should not be:

- moved by dragging, rolling or sliding. Use a suitable hand truck or similar device with the cylinder secured for transporting.
- dropped or permitted to strike against each other or against other surfaces violently.
- moved with the cylinder valve open, and a regulator or gauge attached. Always close the cylinder valve when not in use.
- Do not transport compressed gases in closed vehicles. Cylinders must be chained or otherwise secured during transport. All gas cylinders should be secured with a strap or chain, whether at rest or in transit.

Storage

- Cylinders should be stored in an upright position in a well-ventilated area away from sparks, flames or any source of heat or ignition.
- Cylinder should not be stored:
 - near exits, stairways, or areas normally intended for safe exit of people.
 - near flammable or combustible substances, or near corrosive chemicals.
 - where they may become part of an electric circuit.
- Cylinders can be stored on cylinder carts if they are properly secured.
- Full and empty cylinders should be stored separately.
- Where gases of different types are stored at the same location, cylinders should be grouped by types of gases, and the groups arranged to take into account the gases contained; for example, flammable gases must be separated from oxidizing gases.
- Inert gases can be stored with any other types of gases.
- Cylinders should be used by the “first in, first out” guideline.
- All medical grade gases, (e.g., nitrous oxide) should be under lock and key. Contact EH&S or Airgas at 568-6543 or email gas@lsuhsc.edu should you have unsecured medical grade gas in your area.

Use and Disposal

- Cylinders must always be secured against falling over.
- Cylinder caps should be kept in place until time for connecting cylinder to equipment.
- Cylinders should be clearly marked with the identity of the gas. Cylinder color should not be relied upon for content identification.
- Eye protection should be worn when changing regulators or manipulating tubing or equipment potentially under pressure.
- Regulators, gauges, hoses, and other appliances provided for use with a particular gas or group of gases should not be used on cylinders containing gases having different chemical properties unless information obtained from the supplier indicates that this can be done safely.
- Before connecting a valve gauge or other fitting to a cylinder valve outlet, “crack” the valve for an instant to clear the opening of particles of dust or dirt.
- Before a regulator is removed from a cylinder, the cylinder valve shall be closed and the pressure removed from the regulator/gauges.

- Keep connections to piping, regulators, and other appliances tight to prevent leakage. If leakage occurs, first close cylinder valve tightly before attempting to stop the leak.
- Cylinder valves should be opened slowly with the valve outlets and face of the gauge pointed away from yourself and other persons.
- A cylinder valve should never be forced. If a valve cannot be opened by hand, the cylinder should be returned and another obtained.
- Cylinders not having a hand wheel valve should be opened with a spindle key, special wrench, or other tool provided or approved by the gas supplier.
- Connections that do not fit should not be forced.
- Do not attempt to repair or alter cylinder, valves, or attachments. This work must be performed by the current vendor.
- Never tamper with safety devices in valves or cylinders.
- Once a cylinder is empty, it should immediately be capped, marked **EMPTY** and reported to the Airgas technician at 568-6543 for pickup and disposal.

8.0 TRAINING:

Personnel who use compressed gases shall receive site-specific training that addresses proper storage, use, and any special precautions. This training shall be documented in writing and be retained for the duration of employment.