



LP 4.6

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Policy Owner:
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VP for Finance &
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Affected Parties:
Employees

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Compressed Gas Cylinder Safety (LP4.6)

LANDER UNIVERSITY POLICY

11/24/2023

References: OSHA 29 CFR 1910.101; 1910.253; 1910.110; NFPA 58

1 Purpose

This Compressed Gas Cylinder Policy has been established to ensure a safe and healthful working environment and to act as a performance standard for all Lander University employees.

2 Scope

This policy addresses the safe handling and use of compressed gas cylinders on Lander University property.

3 Responsibilities

3.1 Safety and Regulatory Compliance Officer

The safety and regulatory compliance officer is responsible for administering and maintaining compliance with this policy and related procedures.

3.2 Managers and Supervisors

Managers and supervisors are responsible for ensuring that:

3.2.1 This policy is effectively implemented in their areas.

3.2.2 The policy is understood and followed by the employees reporting to them.

3.2.3 Any employee who has not received the required training to handle compressed gas cylinders is not exposed to the hazard.

3.3 Employees

Each Lander University employee has the responsibility to:

- 3.3.1 Follow the requirements of this policy.
- 3.3.2 Request assistance from their supervisor when warranted.
- 3.3.3 Comply with all applicable guidelines contained in this safety policy and procedure.
- 3.3.4 Report any defective or damaged cylinders to their supervisor.

4 Safe Handling Guidelines

Lander University employees assigned to the handling of cylinders under pressure should follow general safe handling guidelines. Serious accidents can result from the misuse, abuse, or mishandling of compressed gas cylinders.

4.1 Inspection

Compressed gas cylinders should be visually inspected daily for leaks, cracks, etc.

- 4.1.1 This visual inspection shall include the cylinder, safety relief devices, valves, protection caps, and stems.
- 4.1.2 If a cylinder is thought to be defective, it should be returned to the supplier for replacement.
- 4.1.3 Under no circumstances should employees attempt to repair defective cylinders.
- 4.1.4 Gauges should be checked to ensure that the gas under pressure is not left in hoses when operations are completed.

4.2 Usage

All Lander University employees must adhere to the following procedures:

- 4.2.1 Use cylinders only in an upright position and secure them to prevent them from falling.
- 4.2.2 Only install regulators or other unions to a cylinder when their threads correspond to those on the cylinder valve outlet.

- 4.2.3 Avoid the use of connections that do not readily fit, and avoid the use of adapters.
- 4.2.4 Before using a cylinder, read the label to identify the cylinder's contents and verify that the contents are proper for the intended service.
- 4.2.5 Observe all safety precautions set forth on the cylinder label.
- 4.2.6 If the label is illegible or missing and the product contained in the cylinder cannot be verified, return the cylinder to the supplier.
- 4.2.7 Before a regulator is connected to a cylinder valve, clear the valve by cracking it (i.e., open it slightly and close it immediately).
- 4.2.8 Before cracking the valve, stand to one side of the outlet rather than in front of it.
- 4.2.9 Avoid cracking the valve of a fuel gas cylinder in any area where the gas could reach a possible source of ignition.
- 4.2.10 Always open a cylinder valve slowly.
- 4.2.11 Avoid the use of a hammer or wrench to open cylinder valves.
- 4.2.12 In the event that a valve cannot be opened by hand, notify the supplier.
- 4.2.13 When using manifolds, ensure they are rated for the cylinder pressure and are compatible with the product.
- 4.2.14 Avoid connecting cylinders of different working pressures to the same manifold, as this could result in a backflow of high-pressure gases into a cylinder designed for lower pressures.
- 4.2.15 Avoid attempting to fill a cylinder, transferring gas from one cylinder to another, or mixing any gases in a cylinder.
- 4.2.16 Avoid the use of cylinders for rollers, for supports, or for any other purpose than to hold gas.
- 4.2.17 Identify defective cylinders and return them to the vendor for repair.
- 4.2.18 When working inside tanks, vessels, or other confined spaces, avoid taking cylinders inside a confined space or excavation.

- 4.2.19 At the end of the workday or prior to a prolonged absence from the job, remove the regulator, secure the cylinder valves, and replace the protective caps on cylinders.
- 4.2.20 When returning empty cylinders, close the valve and install the cap before moving the cylinder.
- 4.2.21 Avoid tampering with the safety devices on valves or cylinders.
- 4.2.22 Avoid dropping cylinders or allow them to strike against each other.
- 4.2.23 Avoid attempting to repair or alter cylinders or valves.

4.3 Special Procedures

4.3.1 Oxygen Cylinders

- 4.3.1.1 Separate any oxygen cylinders from fuel-gas cylinders (e.g., acetylene), and any other petroleum product (e.g., oil and grease), by at least 20 feet or by a non-combustible barrier when stored.
 - 4.3.1.1.1 This barrier must be at least five feet high and have a fire resistance rating of at least one half hour.
 - 4.3.1.1.2 This requirement also applies to welding and cutting apparatuses. When not in use for more than one shift, oxygen and acetylene cylinders must be separated or have a non-combustible barrier between them.
- 4.3.1.2 Avoid having oil or grease come in contact with oxygen cylinders, valves, regulators, gauges, or fittings (e.g., by handling with oily gloves), as a violent reaction will occur.
- 4.3.1.3 Open the cylinder valves fully when the cylinder is in use in order to properly backseat the valve.
- 4.3.1.4 Avoid the use of oxygen to run pneumatic tools, blow out pipes, dust off clothing, or ventilate an area as a violent reaction may occur.

4.3.2 Acetylene Cylinders

- 4.3.2.1 Never use acetylene at a pressure exceeding 15 psig or 30 psia.
- 4.3.2.2 Avoid opening the valve of an acetylene cylinder more than three-quarters of one full turn.

- 4.3.2.2.1 In the event of a fire, the valve can be closed quickly.
- 4.3.2.3 Purge the oxygen and acetylene passages individually before lighting the torch.
- 4.3.2.4 Avoid performing any welding, burning, heating, or cutting operation without the flashback arrestors.
 - 4.3.2.4.1 Install flashback arrestors internal to the torch head or separately at the inlet to the torch head.
- 4.3.2.5 Always store and use acetylene cylinders in a vertical position.
- 4.3.3 Propane Cylinders
 - 4.3.3.1 Store liquified petroleum gas (propane) at least 20 feet from other flammable liquids.
 - 4.3.3.2 When storing propane inside a building, limit cylinder capacity to one pound and total quantity stored to 200 pounds.
 - 4.3.3.3 Propane cages shall be marked with the following signage/placarding.
 - 4.3.3.3.1 Propane
 - 4.3.3.3.2 NFPA Diamond
 - 4.3.3.3.3 Flammable
 - 4.3.3.3.4 No Smoking
 - 4.3.3.4 Smoking shall be prohibited within 25 feet of propane storage areas.
 - 4.3.3.5 All propane cylinders for fueling powered industrial trucks, both empty and full, shall be stored in a propane storage cage.
 - 4.3.3.6 Propane valves shall be completely closed while stored.
 - 4.3.3.7 Propane cages shall be stored outside.
 - 4.3.3.8 Buildings in which propane canisters are stored shall have walls, floors, and ceilings constructed of material with at least a two-hour fire resistance rating.

4.3.3.9 Propane canisters shall not be stored within 10 feet of a building

4.4 Marking

Compressed gas cylinders shall be legibly marked with either the chemical or trade name of the gas and the GHS hazard pictograph.

4.4.1 Such marking shall be by means of stenciling, stamping, or labeling, and shall not be readily removable.

4.4.2 Whenever practical, the marking shall be on the shoulder of the cylinder for easy identification.

4.5 Transportation

(NOTE: This section does not include shipment of cylinders via DOT or DOT hazardous materials standards.)

Transporting gas cylinders requires careful consideration and appropriate precautions.

4.5.1 Motor vehicle transport of cylinders shall only be done with vehicles equipped with racks or other means of securing the cylinders.

4.5.2 Cylinders containing liquefied hydrogen or toxic gases shall be transported in open body vehicles and shall have the means of being secured and transported upright.

4.5.3 Cylinder transport precautions include:

4.5.3.1 Having the cylinder valve protection cover(s) in place while being transported (inter- and intra-building transport).

4.5.3.2 When moving cylinders, avoiding the rolling of cylinders or the lifting of cylinders by the valve or valve cap.

4.5.3.3 Having cylinder valves shut off and valve caps in place during transit from location to location.

4.5.3.4 Taking any cylinders that are dropped during transit out of service and returning them to the supplier for inspection.

4.5.3.5 Having cylinders securely supported at all times during transport.

4.5.3.6 Smoking being prohibited during loading, unloading, and hand transportation of flammable gas cylinders.

4.6 Storage

4.6.1 General cylinder storage precautions include:

- 4.6.1.1 Securing cylinders, to prevent accidental tip over, in an upright position in a safe, dry, and well-ventilated place that is prepared and reserved for the purpose.
- 4.6.1.2 Avoiding the storage of cylinders in unventilated enclosures (e.g., lockers).
- 4.6.1.3 Avoiding the storage of cylinders in the same area as flammable substances (e.g., oil and volatile liquids) or near sources of heat (e.g., radiators or furnaces).
- 4.6.1.4 Avoiding the storage of cylinders near elevators, gangways, stairwells, or other places where they can easily be knocked down or damaged.
- 4.6.1.5 Having cylinders stored on a level, fireproof floor.
- 4.6.1.6 Having cylinders stored in the open, with protection from contact with the ground and against extremes of weather.
- 4.6.1.7 Having cylinder storage planned such that cylinders are used in the order in which they were received from the supplier.
- 4.6.1.8 Storing empty and full cylinders separately, with empty cylinders plainly identified as such to avoid confusion.
- 4.6.1.9 Grouping empty cylinders that have held the same contents together.

4.6.2 Specific gas cylinder storage guidelines include additional precautions and guidelines for oxygen, hydrogen, and acetylene and liquefied fuel gas cylinders, including:

- 4.6.2.1 Avoiding the storage of oxygen cylinders within 20 feet of highly combustible materials, oil, grease, wood shavings, or cylinders containing flammable gases (e.g., acetylene or propane).
 - 4.6.2.1.1 In the event that oxygen cylinders must be storage within 20 feet of highly combustible materials, separating those cylinders by a wall with a fire-resistance rating of at least 30 minutes.

4.6.2.2 Hydrogen cylinders storage locations shall be permanently placarded as follows:

4.6.2.2.1 “HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES,” or equivalent.

4.6.2.3 Acetylene and liquefied fuel gas cylinders must be stored with the valve end up.

4.6.3 Cylinder storage room guidelines include:

4.6.3.1 Ensuring that storage rooms for cylinders containing flammable gases are well-ventilated to prevent the accumulation of explosive concentrations of gas.

4.6.3.2 Ensuring that storage rooms contain no ignition sources.

4.6.3.3 Ensuring the installation of signage that states, “NO SMOKING PERMITTED”.

4.6.3.4 Ensuring that smoking is not permitted in such storage facilities.

5 Training

5.1 Training Procedures

5.1.1 Lander University employees who use and handle compressed gas cylinders shall be trained in these policy requirements before initial job assignment and/or job reassignment.

5.1.2 Employees shall be trained in the safe use, inspection, handling, and storage of compressed gas cylinders.

5.1.3 Refresher training shall be provided to employees at the discretion of the supervisor and as new hazards or processes are introduced.

6 Appendix A: Compressed Gas Safety Checklist

The following Compressed Gas Safety Checklist shall be available for use as an optional tool, as needed.

Compressed Gas and Cylinders

- Do cylinders with water-weight capacity over 30 pounds equipped have a means for connecting a valve protector or device, or a collar or recess, to protect the valve?
- Are cylinders legibly marked to clearly identify the gas contained?
- Are compressed-gas cylinders stored in areas protected from external heat sources (e.g., flames, intense radiant heat, electric arcs, or high-temperature lines)?
- Are cylinders located or stored in areas where they will not be damaged or tampered with by unauthorized persons?
- Are cylinders stored or transported in a manner that prevents them from creating a hazard by tipping, falling, or rolling?
- Are cylinders containing liquefied fuel gas stored or transported such that the safety relief devices are always in direct contact with the vapor spaces in the cylinders?
- Are valve protectors always placed on cylinders when the cylinders are not in use?
- Are all valves closed off before cylinders are moved, when cylinders are empty, and at the completion of each job?
- Are low-pressure fuel-gas cylinders checked periodically for corrosion, general distortion, cracks, or other defects that might indicate a weakness or render them unfit for service?
- Does the periodic check of low-pressure fuel-gas cylinders include inspection of the bottom of each cylinder?
- Are regulator-pressure adjusting screws released when welding or cutting is stopped for an extended period of time?
- Are cylinders containing oxygen maintained separately, in storage, from cylinders containing fuel gas and other petroleum products by at least 20 feet or a 30-minute, five foot high, firewall?

7 Policy Revision History

- First draft of policy submitted by the Vice President for Finance and Administration on 11/2/2023.
- Prepared for board review by Policy Coordinator on 11/9/2023.
- Reviewed by board of trustees Policy Committee on 11/16/2023.
- Policy Committee suggestions approved by Vice President for Finance and Administration on 11/24/2023.
- Final Draft for Policy Committee board report prepared by policy coordinator on 11/27/2023.

- Approved by Lander University Board of Trustees on 12/12/2023.