



## Lecture Bottles – Compressed Gases

### Description

*This standard operating procedure outlines the handling and use of lecture bottles, which are very small compressed gas cylinders, typically 12-18 inches (300-460 mm) long and 2-3 inches (25-76 mm) in diameter. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when lecture bottles.*

### Potential Hazards

Hazards associated with compressed gases include toxic gas exposures, explosions, oxygen displacement, fires, and physical hazards due to the high pressures inside the cylinders. Check the Safety Data Sheets (SDS) for more information. Safety recommendations provided by the supplier must be followed.

### Engineering Controls

For toxic gases, perform work under a fume hood or ensure that the delivery system or experimental apparatus using hazardous gases is enclosed and connected to an exhaust ventilation system. Ensure that the room where compressed gases are being used has sufficient ventilation, e.g., at least six air changes per hour (ACH).

### Work Practice Controls

All compressed gas cylinders shall be legibly marked with the name of the gas or gas mixture and the primary hazard associated with that chemical, e.g., flammable, oxidizer, etc. Do not accept a cylinder without a proper label. The gas cylinder must also be tagged or labeled with either “full” “in use” or “empty.”

- Inspect lecture bottles and regulators prior to use for integrity. Do not use if corroded, gouged, bulging, pitted, or damaged. Check connections and hosing/tubing for leaks and integrity.
- Lecture bottles must be properly secured and upright during use. Commercially sold lecture bottle standards are available.
- Use engineering controls for toxic gases, e.g., chemical fume hoods.
- Only use regulators and tubing appropriate for the type of gas and that comply with the manufacturer’s instructions.
- Never leave pressure on a hose or line that is not being used.
- Cylinders of flammable gas must be away from sources of heat or ignition, oxidizers, combustibles, and other incompatibles at a distance of at least 20 feet unless separated by a one-hour, fire-rated wall.
- Ensure the nearby availability of an eyewash station and emergency shower when working with corrosive gases.
- Never heat a cylinder to raise the pressure of the gas.
- Refilling, repair, or alteration of the cylinder is prohibited.
- Do not place cylinders where they might become part of an electrical circuit or allow them to come into contact with an electrically energized system.
- Follow purging procedures, if available.
- When using highly flammable or toxic gas, check delivery system using an inert gas prior to introducing the hazardous gas.
- Removed any damaged, defective, unused, or empty cylinders from lab space.

- For lecture bottles of anhydrous hydrogen fluoride, dispose of within 2 years of purchase.
- Refer to [OSEH's Compressed Gas](#) hazard guideline or consult with your OSEH representative regarding maximum allowable quantities of compressed gases.

Restricted hazardous gases **must** be approved by EHS, prior to purchase. See the hazard guideline for [compressed gas](#) use on the EHS website or contact your OSEH representative for more information. This [form](#) can be used to request approval to purchase a restricted gas.

### Personal Protective Equipment (PPE)

Safety glasses must be worn for all work involving compressed gas cylinders. If the compressed gas is corrosive, safety goggles and proper gloves must also be worn. Perform a Personal Protective Equipment (PPE) assessment in accordance with the [OSEH Personal Protective Equipment Guideline](#) to determine the level of protection needed for the task.

### Transportation and Storage

- Lecture bottles must be stored in an upright position because lecture bottles are more susceptible to damage and leaks when stored on their side. Lecture bottle holders can be purchased from compressed gas supply companies.
- Segregate incompatible gases such as flammable and oxidizing gases.
- Store toxic gases in a fume hood or gas cabinet.
- Regulators must be removed during storage.
- Cylinders shall be maintained at temperatures below 125°F (50°C) or within of the temperature range specified by the manufacturer and stored out of direct sunlight.
- Never drop, bang, or strike cylinders against each other or other objects.

### Waste Disposal

Contact the supplier to obtain specific guidelines for shipment of lecture bottles to be returned to them. Avoid purchasing non-returnable lecture bottles, or from suppliers who do not accept returned lecture bottles with unused or empty contents. Contact EHS at (810) 766-6763 to arrange for the removal of lecture bottles that cannot be returned to the supplier. If the cylinder is empty, write "empty" on the outside of each cylinder and place in a cardboard container and attach a completed [hazardous waste manifest](#).

### Exposures/Unintended Contact



***If the employee is in need of emergency medical attention, call 911 immediately.***



Consult Section 4 of an SDS for applicable First Aid information in the event of an exposure or an unintended contact with the contents of a lecture bottle.

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the [Illness and Injury Report Form](#) to

WorkConnections within 24 hours. Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the [EHS Laboratory Incident and Near-Miss Report Form](#). This will be valuable in improving laboratory safety on UM-Flint campus.

**TREATMENT FACILITIES:**

<b><u>MAJOR INJURIES</u></b>	<b><u>MINOR INJURIES –During Business Hours</u></b>	<b><u>MINOR INJURIES –After Business Hours</u></b>
<p><b>Genesys Hospital</b> One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710</p> <p><b>Hurley Medical Center</b> One Hurley Plaza Flint, MI 48503 (810) 262-9000</p> <p><b>McLaren Hospital Flint</b> 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000</p>	<p><b>Genesys Occupational Health Network</b> 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. &amp; Sun. Noon to 8 pm</p> <p><b>McLaren Flint-Burton OCC Center</b> 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat &amp; Sun 10 am to 2 pm</p>	<p><b>Downtown Flint</b> 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550</p> <p><b>Genesys East</b> 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351</p> <p><b>Genesys North</b> 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397</p> <p><b>Genesys South</b> 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. &amp; Sun. 1-10pm</p>

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

**Release Procedures**

- When a release occurs, ***personal safety should always come first.***
- Alert and clear everyone in the immediate area where the release occurred.
- Open outside windows, if possible & safe to do so.
- Wear protective equipment, including safety goggles, gloves and long-sleeve lab coat.
- Avoid breathing gases or vapors from the release.
- Contact EHS at (810) 766-6763 for release assistance.

Also consult Section 6 of an SDS for applicable emergency procedures; protective equipment; proper methods of containment and cleanup.

**Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan-Flint Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.**

**Training of Personnel**

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the **Comprehensive Laboratory Safety** session (**BLS009** or equivalent) via [MyLINC](#), or UM-Flint EHS on-line training or other equivalent approved by EHS. Furthermore, all personnel shall read and fully adhere to this SOP when handling lecture bottles.

**Certification**

I have read and understand the above SOP. I agree to contact my Supervisor or Lab Manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator?       YES       NO

Principal Investigator \_\_\_\_\_

Revision Date \_\_\_\_\_