



## 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 an 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 EHS's [Compressed Gas](#) hazard guideline or consult with your EHS 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 EHS representative for more information.

### 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 EHS's [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 (313) 593-0921 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.

### 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.

Report all work related accidents, injuries, illnesses or exposures to WorkConnections within 24 hours by completing and submitting the [Illness and Injury Report Form](#). Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

Complete the [EHS Laboratory Incident and Near-Miss Report](#) form.

### **TREATMENT FACILITIES:**

#### **Midwest Medical Center -- *Campus Employees (including student employees)***

Mon-Fri 7:30 am - 4:30 pm

**9301 Middlebelt Road**

Romulus, MI 48174

Phone: 734-941-1000

After hours - go to:

#### **Midwest Medical Center**

Open 24/7

4700 Schaefer

Dearborn, MI 48126

Phone: 313-581-2600

#### **Henry Ford Medical Center-Fairlane -- *University students (non-life threatening conditions)***

19401 Hubbard Drive

Dearborn, MI 48126

**Phone: 313-928-8278**

Click [here](#) for more information.

### **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 (313) 593-0921 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 Public Safety by calling at (313) 593-5333 or 911 from a campus phone. Register with the University of Michigan-Dearborn [Emergency Alert System](#).**

### **Training of Personnel**

All personnel are required to complete the ***Comprehensive Laboratory Safety*** session (**BLS009** or equivalent) via [MyLINC](#). 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 \_\_\_\_\_