



## Compressed Gases

### Description

*This standard operating procedure outlines the handling and use of compressed gases. Compressed gases come in a large variety of sizes and pressures. 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 handling compressed gases.*

A compressed gas is any mixture or material in a container with either an absolute pressure exceeding 40 psi at 70°F or an absolute pressure exceeding 104 psi at 130°F. Any liquid flammable material having a vapor pressure exceeding 40 psi at 100°F is also considered a compressed gas.

### Potential Hazards

*The large amount of potential energy contained in a compressed gas cylinder makes it a potential rocket or bomb if the pressure is released through rupture of the valve or container failure.*

**Compressed gases may also be toxic, flammable, or explosive – check the safety data sheet for more information. Safety considerations for these properties must also be followed.**

### Engineering Controls

Storage of compressed gas cylinders requires sturdy chains secured to a wall or cabinet, and/or a cylinder stand. If the process does not permit gas use and/or storage in well-ventilated areas (i.e., lab ventilation having a minimum of 6 air changes per hour), contact Environment, Health and Safety (EHS) at (810) 766-6763 to determine the necessity of an oxygen-deficiency monitor or other alarm devices.

### Work Practice Controls

All compressed gas cylinders shall be legibly marked by stenciling, stamping, or label with at least the chemical name or commonly accepted name of the material contained. In addition, cylinders should bear the approved markings of the Department of Transportation stamped in the metal at the top of the cylinder.

- Check connections and hoses regularly for leaks using a specific monitoring instrument or soapy water (or equivalent).
- When using highly flammable or toxic gas, check the delivery system using an inert gas prior to introducing the hazardous gas.
- When using compressed acetylene: (i) do not exceed a working pressure of 15 psig, and (ii) do not use vessels, piping, or other materials that contain a significant amount of copper (usually considered to be more than 50% copper).
- Replace valve caps when cylinders are not in use or before moving.
- Remove damaged or defective cylinders from service (contact the cylinder vendor for assistance).
- Remove unused or empty cylinders from lab space.
- Refer to the [OSEH Compressed Gas Guideline](#) or consult with UM Flint EHS representative regarding [maximum allowable quantities](#) of compressed gases.

Restricted hazardous gas use **must** be approved by EHS for purchase. Refer to the hazard guideline for compressed gas use on the OSEH website or contact your EHS representative for more information.

### Protective Equipment

Safety glasses must be worn for all work involving compressed gas cylinders. Cylinders must be secured to a gas cylinder mount, bracket, or clamp. These securing devices must be attached to a stable surface such as a permanent bench top or a wall.

### Transportation and Storage

- Cylinders (full or empty) shall be secured by chains, straps, or other sturdy tiedowns during storage and transport.
- Cylinders shall be grouped by type of gas, and the groups segregated as to compatibility.
- Full cylinders shall be separated from empty cylinders within the storage area.
- Flammable gases shall be separated from nonflammable gases.
- Cylinders shall not be stored at temperatures above 125 °F. or in direct sunlight, or outside of the temperature range specified by the manufacturer.
- Cylinder valves shall be kept closed when not in use.
- Removable caps shall be kept on cylinders at all times, except when cylinders are in use.
- Cylinders shall be protected against tampering and damage.
- Cylinders shall not be stored near combustibile materials.
- Cylinders shall not be refilled except by authorized suppliers.
- Open flames and smoking shall not be permitted in areas where oxygen is used or stored. "No Smoking" and "No Open Flames" signs shall be conspicuously posted in these areas.
- Cylinders, except for those containing compressed air, shall not be used or stored in cold rooms or other unventilated enclosures. An exception may be approved by EHS for inert gases when an oxygen monitor is in place.

### Waste Disposal

In most cases, the compressed gas cylinder, including any unused gas, will be returned to the vendor from which the cylinder was purchased. Contact Environment, Health and Safety (EHS) (810) 766-6763 to arrange for the removal of gas cylinders that cannot be returned to the supplier. Write "empty" on the outside of each cylinder and complete a hazardous waste manifest.

### Exposures/Unintended Contact



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



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/Spill Procedure**

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 compressed gases.

**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 \_\_\_\_\_