

# Asphyxiants

## Description

*This standard operating procedure outlines the handling and use of asphyxiants. 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 and personal protective equipment when handling asphyxiants.*

Many asphyxiants will be supplied as compressed gases in cylinders; others will be supplied as cryogenic liquids in dewars. The SOPs for [compressed gases](#) and [cryogenic liquids](#) must also be followed.

## Potential Hazards

An asphyxiant is a gas or vapor that can cause unconsciousness or death by suffocation (asphyxiation). Asphyxiants with no other health effects may be referred to as simple asphyxiants. Examples of simple asphyxiants include nitrogen, argon, helium, methane, propane, and carbon dioxide. Note that carbon dioxide interferes with the body's regulation of breathing and is hazardous at lower concentrations than simple asphyxiants.

Chemical asphyxiants, which interfere with the transportation or absorption of oxygen in the body, include hydrogen cyanide and carbon monoxide. These should be treated as toxic gases (meaning that a lab-specific SOP is required).

Check the safety data sheet (SDS) to determine if the gas may cause suffocation/asphyxiation, and for additional hazard information (such as flammability).

## Engineering Controls

Store and use asphyxiants in well-ventilated areas with a minimum of six air changes per hour. Closets and small rooms should be avoided to prevent displacement of oxygen.

If you are using large quantities, especially if the chemical you are using has no warning properties (such as odor), contact Environment, Health and Safety (EHS) at (810) 766-6763 to determine if ventilation is sufficient.

## Work Practice Controls

- If you are working with an asphyxiant that is supplied as a cryogenic liquid or solid, also refer to the [SOP for cryogenic materials](#).
- If you are working with an asphyxiant that is supplied as a compressed gas, also see the [SOP for compressed gases](#).

## Personal Protective Equipment (PPE)

Engineering controls (including general room ventilation) will provide the primary means of minimizing employee exposure to asphyxiants.

As with all lab work, wear a fully buttoned lab coat, safety glasses, standard nitrile laboratory gloves, long pants, and closed-toed shoes.

## Transportation and Storage

Store and use in well-ventilated areas. Closets and small rooms should be avoided to prevent displacement of oxygen.

## Waste Disposal

For simple asphyxiants in gas or vapor form, there will not be any waste to dispose of. If the asphyxiant is supplied in a compressed gas cylinder, any unused gas must be returned to the vendor from which the cylinder was purchased. If the vendor cannot be determined, contact EHS at (810) 766-6763. Also refer to UM-Flint Hazardous Waste Management Program and the EHS webpage <http://www.umflint.edu/ehs/environment-health-and-safety> for more information on hazardous waste disposal.

## Exposures/Unintended Contact



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



- In case of *inhalation*: Assist conscious persons to an area with fresh, uncontaminated air and then seek medical attention (see below).

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 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 Work Connections within 24 hours. Follow the directions on the Work Connections 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>
<b>Genesys Hospital</b> One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710  <b>Hurley Medical Center</b> One Hurley Plaza Flint, MI 48503 (810) 262-9000  <b>McLaren Hospital Flint</b> 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000	<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. & Sun. Noon to 8 pm  <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 & Sun 10 am to 2 pm	<b>Genesys East</b> 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351  <b>Genesys North</b> 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397  <b>Genesys South</b> 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm

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

### Release/Spill Procedure

Any uncontained release of an asphyxiant gas that could lead to oxygen depletion must be referred to University of Michigan-Flint Department of Public Safety (DPS) by calling 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Examples include a spill or leak of a liquid cryogen, or an uncontrolled leak or release of an asphyxiant gas from a compressed gas cylinder.

### Additional Spill Links:

- [www.oseh.umich.edu/pdf/chemspil.pdf](http://www.oseh.umich.edu/pdf/chemspil.pdf)
- <http://www.oseh.umich.edu/emer-chemical.shtml>.

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 the 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 asphyxiants.

### 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 \_\_\_\_\_