Laboratory Standard Operating Procedure for:

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 OSEH Research Health and Safety at (734) 647-1143 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 (313) 593-0921 for information on 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).

Report all work related accidents, injuries, illnesses or exposures to Work Connections within 24 hours by completing and submitting the Illness and Injury Report Form. Follow the directions on the Work Connections 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/Spill Procedure

Any uncontained release of an asphyxiant gas that could lead to oxygen depletion must be referred to Public Safety by calling (313) 593-5333 or 911 from a campus phone. 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:

- Chemical Spill Control Information

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 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** _____