

Common Standard Operating Procedure

for work with

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|-----------------------------|--------------------|----------------|------------------------------|
| Chemical name/class: | Asphyxiants | CAS #: | various |
| PI: Ken Henderson | | Date: | 1-23-2013 |
| Building: Stepan | | Room #: | Laboratory Stepan 386 |

1. **Circumstances of Use:**

Various

2. **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. 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). Examples include **nitrogen, argon, helium, methane, propane, carbon dioxide**. Note that carbon dioxide interferes with the body's regulation of breathing and is hazardous at lower concentrations than simple asphyxiants. Check the PHS list and MSDS to determine if the gas may cause suffocation/asphyxiation, and for additional hazard information (such as flammability). Many asphyxiants will be supplied in compressed gas cylinders; others will be supplied as cryogenes. The SOPs for those hazards must also be followed.

3. **Engineering Controls:**

Store and use in well-ventilated areas. 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 RM&S at 1-5037 to determine if ventilation is sufficient.

4. **Work Practice Controls:**

If you are working with an asphyxiant that is supplied as a cryogenic liquid or solid, also see the SOP for cryogenes. If you are working with an asphyxiant that is supplied as a compressed gas, also see the SOP for compressed gases.

5. **Personal protective equipment (PPE):**

Engineering controls (including general room ventilation) will provide the primary means of minimizing employee exposure to asphyxiants, but in some cases emergency respirators may be advised. Contact RM&S at 1-5037 for advice on respiratory protection. As with all lab work, wear a fully buttoned lab coat, safety glasses, standard nitrile laboratory gloves, clothing covering the legs, and closed-toed shoes.

6. **Transportation and Storage:**

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

If you are working with an asphyxiant that is supplied as a cryogenic liquid or solid, also see the SOP for cryogenics.

If you are working with an asphyxiant that is supplied as a compressed gas, also see the SOP for compressed gases.

7. **Waste Disposal:**

For simple asphyxiants in gas or vapor form, there will be no waste to dispose of. If the asphyxiant is supplied in a compressed gas cylinder, any unused gas will be returned to the vendor from which the cylinder was purchased, along with the cylinder. If the vendor cannot be determined, contact RM&S at 1-5037 for information on disposal.

8. **Exposures/Unintended contact:**

Contact RM&S for medical advice on occupational chemical exposures, **1-5037**. For an actual chemical exposure or injury, complete the work-related injury or illness report found at: <http://chemistry.nd.edu/safety/supervisors-report-of-injury-to-the-health-center.pdf>. If medical attention is needed, see <http://chemistry.nd.edu/safety/procedures-for-injury-illness-or-incident.pdf>.

9. **Emergency/Release Procedure:**

Any uncontained release of an asphyxiant gas that could lead to oxygen depletion must be referred to the Police by calling 911 from a campus or 574-631-5555 from a cell 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

10. **Training of personnel:**

All personnel are required to complete the General Lab Safety session thru RM&S. This session includes an introduction to general chemical safety. Seek training from experienced laboratory personnel before using a compressed gas. Furthermore, all personnel shall read and fully adhere to this SOP when handling compressed gases.