

Cryogenic Liquids SOP

SCOPE/PURPOSE

Scope: Any academic department that uses the types of chemicals defined herein

Purpose: The purpose of this plan is to define and set out the guidelines for the proper handling of cryogenics.

DEFINITION

Cryogenic liquids (liquefied gases with temperatures below -73°C) and their boil-off vapors rapidly freeze human tissue and cause embrittlement of many common materials. Cryogenic liquids also produce large volumes of gas when they vaporize (700 gas:1 liquid for helium; 694:1 for nitrogen) and may create oxygen-deficient conditions.

CRYOGENS IN USE

Liquid	Storage Location	Use
Helium	Robinson 326	NMR magnet cooling. Liquid helium is ordered a few times a year in order to fill the NMR and is not usually kept on hand, except for in the NMR itself.
Nitrogen	Robinson 326	NMR magnet cooling (keeps the helium cool) There is almost always a cylinder of liquid nitrogen on hand in the NMR room.
Nitrogen	Robinson 337	Liquid nitrogen is used to cool a cell storage Dewar in this room. It is refilled when necessary from the large cylinder used to fill the NMR.

PRECAUTIONS

- 1) When transferring cryogenic liquids, dress appropriately and use proper personal protective equipment as noted below.
 - a. Standard lab attire: shoes that cover entire foot and long pants
 - b. Goggles & face shield
 - c. Insulated gloves
 - d. Lab coat

- 2) Use the proper transfer hose to minimize boiling and splashing of cryogenic fluid during transfers to open cryogenic containers (i.e. Dewars). Follow all manufacturers' instructions during cryogen transfers.
- 3) Avoid clothing that could trap spilled liquid.
- 4) Be alert for the condensation of oxygen from air. Liquid oxygen is extremely hazardous and may explode on contact with oxidizable materials.
- 5) Use high quality Dewars with protective covers, not standard 'thermos' bottles, for cryogen storage.
- 6) Avoid excessive ice buildup on equipment. Excessive ice buildup could result in the discharge of excessively cold gas or structural damage to the cryogenic container or surroundings.
- 7) All cryogenic systems (including piping) must be equipped with pressure relief devices that are pointed in a safe direction, away from people and sensitive equipment.
- 8) Hot air should be used to thaw frozen equipment. DO NOT use water to thaw liquid helium equipment.

EMERGENCY RESPONSE

- 1) If skin contact occurs, do not rub skin to warm it. Instead, place the affected part of the body in lukewarm water and seek medical advice.
- 2) In the event of a NMR magnet "quench" or a large spill of cryogenic liquid, EVACUATE the room immediately and close the door. Call Facility Services (x3254) or the Campus Safety Manager (x3236) and ask that they respond with the confined space gas monitor. Do not allow anyone to enter the room until it has been tested and shown to contain enough oxygen for safe entry (at least 19.5%).

REVIEW

Dean, College of Arts and Sciences:	Noelle Wiersma	Nov 7, 2016
Chemical Hygiene Officer:	Joy Diaz	Nov 1, 2016
Department of Chemistry Chair:	Deanna Ojennus	Nov 11, 2016
Department of Biology Chair:	Craig Tsuchida	Nov 7, 2016