SAFELY USING CRYOGENIC LIQUIDS

Potential Chemical Hazards

- Displacement of oxygen
- Flammable
- Toxic
- Corrosive and/or irritating
- Oxidizing
- Explosive
- Health hazard

About Cryogens: A cryogen or cryogenic liquid is generally defined as any liquid with a boiling point below approximately 120 K (-153°C or -248°F) at 1 atmosphere of pressure (NIST). Cryogens have very large liquid-to-gas expansion ratios and can undergo flash vaporization to quickly fill the surrounding area. The most encountered cryogens are liquid nitrogen, liquid argon, liquid helium, liquid hydrogen, and liquid oxygen. At Iowa State University (ISU), liquid nitrogen is the most frequently used cryogen.

Personal Protective Equipment (PPE)

- Eye protection
- Face shield
- Lab coat
- Cryogenic gloves
- Fully-enclosed shoes
- Full-length pants

Physical Hazards: Heavy dewars and cylinders can cause crush injuries.

General Safety Guidelines

First Aid in the Event of a Skin Exposure

- Seek medical assistance immediately!
- Remove any clothing that is not frozen to the skin.
- Do NOT rub the frozen skin as tissue damage may result.
- Place affected body part in warm water bath (not above 40°C/104°F). Do not use dry heat.

Cryogenic Liquid Hazards:

- Frostbite/cold burns.
- Overpressure/container rupture during rapid expansion.
- Oxygen displacement during rapid expansion.
- Nitrogen and Helium can condense oxygen from ambient air, creating an explosion hazard.

NEVER

- Store cryogens in confined areas; rooms without ventilation, walk-in freezers, environmental chambers, or in sealed containers at temperatures above their boiling points.
- Place cryogenic liquids in sealed, non-vented containers.
- Ride in an elevator with a cryogenic liquid container.
- Consume or directly touch cryogenic liquids.
- Wear jewelry, watches, or other similar items when handling cryogenic liquids.

Recommended EH&S Online Training for All ISU Cryogenic Liquid Users: Laboratory Safety: Compressed Gas Cylinders