HAZARD COMMUNICATION

Liquid Nitrogen is a hazardous material. Before using any hazardous material always refer the Safety Data Sheet (SDS) and any Lab Specific Standard Operating Procedures for information on proper chemical usage. Safety Data Sheets may be found in the following locations: Hard Copy Safety Data Sheets Books, MSDS Online, or the product vendor’s website. MSDS Online is a North Carolina Research Campus resource for on-line Safety Data Sheets. It can be accessed at the following link: https://msdsmanagement.msdsonline.com/company/45A9A263-F671-479C-8926-CBEC9A73C02C

In addition, your Lab Safety Plan should have safe handling procedures for Liquid Nitrogen.

WHAT IS LIQUID NITROGEN?

Liquid nitrogen is atmospheric nitrogen which has been cooled to below -321°F (-196°C).

HOW IS LIQUID NITROGEN STORED

This material is a nonflammable gas. It requires special storage container called a “Dewar”.

WHAT CAN HAPPEN TO YOU

Health Hazard Information:
1. Nitrogen is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure.

2. Effects of exposure to high concentrations so as to displace the oxygen in air necessary for life may include any, all, or none of the following:
   • Loss of balance or dizziness;
   • Tightness in the frontal area of the forehead;
   • Tingling of the tongue, fingertips, or toes;
   • Weakened speech leading to the inability to utter sounds;
   • Rapid reduction in the ability to perform movements;
   • Reduced consciousness of the surroundings;
   • Loss of tactile sensations;
   • Heightened mental activity.

3. It should be recognized that it is possible that none of the above symptoms may occur in nitrogen asphyxia so that there are no definite warning symptoms.

4. Contact with the cryogenic liquid or cold piping containing the liquid can cause tissue freezing or frostbite on dermal contact or if splashed into the eyes.

Toxicological Properties:

1. Nitrogen is non-toxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

2. Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

3. Nitrogen is not listed as carcinogen by the NTP, IARC, or OSHA.
WHAT TO DO –IF YOU ARE EXPOSED TO LIQUID NITROGEN - FIRST AID
Prompt medical attention is mandatory in all cases of overexposure to nitrogen. Rescue personnel should be equipped with self-contained breathing apparatus.

Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

For dermal contact or frostbite, flush affected area with lukewarm water. Do not use hot water. A physician should see the patient promptly if the cryogenic burn has resulted in blistering of the dermal surface or deep tissue freezing.

WHAT PERSONAL PROTECTIVE EQUIPMENT IS REQUIRED WHEN HANDLING LIQUID NITROGEN?
Liquefied compressed gases can cause frostbite injury on contact with unprotected skin.

Personnel handling liquid nitrogen shall wear safety glasses with side shields and goggles, insulated "cryo" gloves with gantlets, long sleeves shirt or lab coat, long pants, and closed toe shoes.

Personnel dispensing liquid nitrogen into Dewars shall wear safety glasses with side shields and goggles or face shield, insulated "cryo" gloves with gantlets, long sleeves shirt or lab coat, long pants, and closed toe shoes.

Personnel observing people handling liquid nitrogen should wear equivalent protection.

ARM AND HAND PROTECTION
Cryo-Gloves are required for dispensing, handling and transporting Liquid Nitrogen. These may be purchased from Fisher Scientific or similar vendors.

BODY PROTECTION
Persons dispensing, transporting, and/or handling shall wear long sleeve shirts and long pants.

EYE PROTECTION
Personnel handling or transporting Liquid nitrogen shall wear safety glasses with side shields and goggles.

Personnel dispensing liquid nitrogen into Dewars shall wear safety glasses with side shields and goggles or face shield.

RESPIRATORY PROTECTION
Nitrogen is 76% of all atmospheric gases. During normal operations, no engineering controls are necessary to adequately control NITROGEN concentrations.

During normal operations and under emergency conditions a CHEMICAL CARTRIDGE RESPIRATOR is useless for protection in any Nitrogen atmosphere.
In an emergency situation, SELF-CONTAINED BREATHING APPARATUS is normally employed by trained personnel and will provide protection in atmospheres containing less than 19.5% oxygen and in high concentrations of nitrogen materials.

RESEARCH TASKS INVOLVING LIQUID NITROGEN

DISPENSING LIQUID NITROGEN:
DO NOT transfer liquid nitrogen from high pressure outside bulk storage containers to low pressure transportable vessels or Dewar containers unless the low pressure container is fully designed and designated to accept high pressure material. Transferring high pressure nitrogen to incompatible containers is very dangerous.

Liquid Nitrogen are to be dispensed only into smaller Dewars which either have carrying handles or are on wheels, and which have pressure relief valves or pressure venting lids. A wide-base Dewar which is stable on a wheeled cart qualifies as "on wheels".

Persons filling Dewars should wear full length trousers/pants or full length apron, and footwear that covers the entire foot, along with goggles, face shield and cryo-gloves. Persons filling must be in constant awareness of the filling operation.

To prevent splashing, place the filling hose at or below the mouth of the receiving vessel.

TRANSPORTING LIQUID NITROGEN BY HAND OR CART THROUGH A BUILDING OR BETWEEN BUILDINGS:
Large mobile Dewars or liquid nitrogen refrigerators (or the trolleys carrying these) used for transporting cryogens within a building or between buildings should be equipped with a braking mechanism. Do not use feet to "brake" wheels. Take care to avoid crushing hands or fingers between the vessel and walls or door frames. Do not transport Liquid Nitrogen or other Cryogenic Materials in open containers.

Outside transport of wheeled vessels containing any cryogenic material should be undertaken by no less than two persons, and care must be taken to stay completely clear of sewer grates, large cracks in the pavement, or any other hazards which could catch the wheels and cause tipping.

Inside buildings the best transport from room to room is by using a Dewar that is equipped with carrying handles or is on wheels, and which have pressure relief valves or pressure venting lids. Note: A wide-base Dewar which is stable on a wheeled cart qualifies as "on wheels".

TRANSPORT OF LIQUID NITROGEN:
Care must be exercised when transporting pressurized liquid cryogenic material containers on an elevator. Due to the confined nature of an elevator, a nitrogen gas or other cryogenic material leak from a pressurized container could produce an oxygen deficient atmosphere in a very small amount of time through the displacement of oxygen.
When a **pressurized container** has been placed on an elevator, the elevator must travel between floors unoccupied. All elevator doors must be manned to prevent entry by person/s. Person/s must be stationed at all “in-between” floors to prevent riders from entering elevator. The sender should remain outside the elevator and activate it to the desired floor. Another person should be available on the receiving floor to take the liquid container off the elevator at its destination.

If it is absolutely necessary to have an attendant in the elevator with the container, an escape pack supplemental breathing apparatus must be carried in the elevator.

**DO NOT** transport a pressurized container of Liquid Nitrogen or Cryogenic Material at any time in an elevator with any other person/s in the elevator car.

**FOR MORE INFORMATION:**
Contact your servicing EHS department or NCRC EHS at (704)250-5056.