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**STANDARD OPERATING PROCEDURE**

**Liquid Nitrogen – Dispensing and Sample Storage Use**

**(Cryogenic Liquid)**

**Updated 1/2011**

A cryogenic liquid is one with a normal boiling point below -150C, as defined by the National Bureau of Standards.

Designated Area:

Liquid Nitrogen is located in room \_\_\_\_\_\_\_\_\_. Dewar sizes range from 160L to 240L.

Liquid Nitrogen - CAS # 7727-37-9

Personal Protection:

Wear cryogenic gloves located \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Lab coat and safety goggles or face shield.

Training:

Do not dispense without prior instruction.

Read MSDS on Liquid Nitrogen

Read EH&S fact sheet, <http://www.ehs.berkeley.edu/pubs/factsheets/77cryogenic.pdf>

To take a short on-line training (approximately 20 minutes) on the Safe Use

of Cryogenic Materials, go to the UC Learning Center at https://blu.berkeley.edu and type “cryogens” in the search field. Non-employees go to http://ehs.berkeley.edu/trainnonemploy.html and click on the cryogenic training listed under Health & Safety.

Process:

Make sure the room is well ventilated or leave door open to avoid depleting oxygen content in room.

Check to see if pressure in tank is below 20 psi, if not slowly open vent

valve (make sure vent is not directed toward face) and lower pressure to 10-20 psi. Close when done.

Check transfer hose for cracks and breaks.

With dewar on floor, place hose in dewar to a depth of approximately one

inch. Note: Hose will freeze during fill and takes 10-40 minutes to thaw.

Open liquid valve slowly and start fill at very slow rate to cool dewar.

At this time there will be a very high boil off of cold N2 gas.

Once dewar is cooled you may increase fill speed gradually. Never

open valve totally. It may freeze open.

When dewar is full, close liquid valve, let hose warm .

Remove hose and place lid/cover on dewar.

Check liquid and vent valves to confirm they are closed.

Adding and Retrieving samples from liquid nitrogen storage:

Wear a face shield and loose fitting insulated gloves when retrieving samples. Rapid changes in temperature can cause a rupture in a sample container, causing containers to explode (if LN has leaked inside).

Remove lid of dewar, grasp the wire hook and maneuver the sample container to the centre of the opening.

Slowly lift the sample container straight up, then tilt slightly to allow excess liquid to run off before lifting the item fully out of the dewar.

Gently set the sample container in a suitable location and retrieve the desired samples.

When returning the sample container to the dewar, ensure the wire hook is affixed securely, then lower slowly to into the dewar to minimize splashing.

Replace the lid.

Spill and Accident Procedure:

**Spill** -

Evacuate all personnel from area. Shut off flow if without

risk. Avoid contact with spilled liquid and allow it to evaporate.

Ventilate area. Gas may cause asphyciation due to oxygen deficiency (displacement of air with nitrogen).

**Accident-**

Inhalation: Leave room and seek fresh air.

Skin contact: Warm frostbite area with warm water (less than 105 F). Always seek medical attention for frostbite injuries.

Eye contact: Immediately flush eyes with warm water for 15 minutes. And get medical attention

Contact EH&S at 642-3073 for concerns with oxygen deficiency.

After hours contact 642-6760 or Emergencies 911 (643-3333 from a cell phone)

File a department Accident/Incident Report - Forms available outside room­­­­­­­­­­­\_\_\_\_\_\_.

Hazards involved in procedure:

**EXTREMELY COLD** liquid and gas under pressure-

Never allow any unprotected part of your body to touch uninsulated pipes

or vessels containing cryogenic liquids. Flesh will stick to the extremely

cold metal and will tear when you try to pull free. Exposure to liquid

cryogens or the cold “boil off” gases can result in extensive tissue damage

or severe skin burns. Recommend removal of jewelry (i.e. rings and watches) when working with cryogens.

**OXYGEN DEFICIENCY**

The release of cryogenic liquids in the work area can result in the rapid

displacement of air and the potential for asphyxiation (suffocation)

by reducing the concentration of oxygen in air below levels necessary

to support life. Work in well ventilated area.

**PRESSURE BUILD-UP**

Over-pressurization will develop in inadequately vented pressurized

systems due to the expansion of cryogenic liquid vaporizing into large

volumes of gas. Sudden release of this pressure can cause personal injury by issuing cold gas or liquid. In some instances pressure relief valves are needed.

NOTE: If a large quantity of ice has formed on top of the cylinder do not attempt to decant.

Special Handling Requirements:

Use care and caution when transporting a dewar to lab area. Lid is not tight.

Store in cool dry place.

Approval Required:

Cryogens are a recharge and you must have approval from the lab owning the tank before use.

Training Documentation

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