

# Standard Operating Procedure

---

## Use of liquid nitrogen filling station

---

Date: 02-12-13

SOP Title: Use of liquid nitrogen filling station

Principal Investigator: \_\_\_\_\_

Room and Building: B304B – Stanley Hall

Lab Phone Number: \_\_\_\_\_

### Section 1 – Process

Filling of liquid nitrogen dewars from automatic fill station located in B304B.

### Section 2 – Hazardous Chemicals

Liquid nitrogen

### Section 3 – Potential Hazards

- ***Liquid cryogenics pose a potential asphyxiation hazard. Nitrogen expands by a factor of 680 and helium expands by a factor of 740 when changing from the liquid to gas phase. The expanding gas displaces breathable oxygen. To limit the asphyxiation hazard, liquid nitrogen and liquid helium should only be handled in well ventilated areas. Immediately evacuate the room if oxygen sensor audible alarm sounds.***
- ***The extreme cold of liquid nitrogen and helium can cause oxygen to condense from the air, resulting in fire danger. Keep cryogen use areas free of combustible materials (paper, cardboard, machine oil, etc) and eliminate any other sources of ignition.***

## Section 4 – Approvals Required

Wemmer group members must be trained by Jeff Pelton and sign the SOP.

## Section 5 – Designated Area

Fills are to occur in Rm B304B.

## Section 6 – Special Handling Procedures and Storage Requirements

## Section 7 – Personal Protective Equipment

The main hazards associated with handling liquid nitrogen and liquid helium are: A) burns when skin comes into contact with cold pipes or liquid, and b) asphyxiation if nitrogen or helium has expanded from its liquid form and the gas has displaced oxygen. To reduce the potential for injury, follow these guidelines:

- ***Avoid contact with cold unprotected pipes and vessels when working with liquid nitrogen or liquid helium.***
- ***Wear proper protective equipment:***
  - ***Dry leather or cryogenic gloves must be worn to avoid cold burns. The gloves must be loose fitting so that they can be removed easily.***
  - ***Goggles or a face shield must be worn to protect the eyes and face.***
  - ***Wear close-toed shoes and long pants while handling cryogenics to protect feet and***

*legs from accidental spills.*

- *Metallic objects (e.g. jewelry) should be removed from those parts of the body that may come into contact with the liquid.*
- *Never accompany cryogenics in the elevator. If the elevator were to malfunction, the expanding gas could fill the elevator and pose a serious risk of asphyxiation.*

*Load dewar on elevator, post “No Passengers” sign on the dewar, and retrieve it after using separate route (stairs or another elevator).*

- *When transferring cryogenic liquids, always direct the flow away from others.*

## Section 8 – Engineering/Ventilation Controls

The door to B304B into B304 should remain open during the fill in order to provide adequate ventilation

## Section 9 – Spill and Accident Procedures

In case of a liquid nitrogen spill, provide plenty of ventilation and wait for the liquid to vaporize.

## Section 10 – Waste Disposal

No waste is generated.

## Section 11 - Decontamination

--

## Section 12 – Process Steps

Process Steps	Safety Measures
Attach liquid line to liquid port on dewar	Wear a face shield and gloves
Attach vent line to vent port on dewar	
Fully open vent and liquid valves on dewar	
Pull the red “STOP” button out to “on” position	Push the red STOP button in the halt the fill
Press the fill button and hold for several seconds	
After the fill is complete, close the liquid and Vent valves on the dewar.	
Disconnect the hose at the vent port of the dewar	Wear a face shield and gloves
Disconnect the hose at the liquid port of the dewar Do this slowly and beware that cold gas trapped in The line will escape	Wear a face shield and gloves -
Troubleshooting	
If the filling light turns off after releasing the fill Button, the system isn't sensing the proper pressure Check the connections and make sure that both valves are open and connected in the right orientation – Vent to vent and liquid to liquid.	

## Training Documentation

Name (Printed)	Signature	Date

