

## **Standard Operating Procedure for Filling a Low Pressure Liquid Nitrogen Dewar - (specific for the equipment in Dupont)**

**Note:** When filling a liquid nitrogen (LN2) Dewar, the **doors must be open at all times and the Ventilation must be turned on** to prevent asphyxiation from the gas displacing the air in the room.

**ALARM:** IF AT ANY TIME YOU HEAR OR SEE THE OXYGEN SENSOR ALARMS SOUNDING PLEASE LEAVE THE AREA IMMEDIATELY AND CONTACT 911 FOR ASSISTANCE.

### **PPE Required:**

**Gloves:** Cryogenic gloves

**Eye Protection:** Goggles **and** face shield

**Additional:** Closed toed shoes, long pants, long sleeves or lab coat.

### **Equipment:**

1. Use only equipment approved for cryogenic liquids.
2. Always ensure that relief valves are not clogged or blocked.
3. **Only fill 160 liter dewar directly from main filling line. If you need to fill a smaller dewar please contact DOHS (x8475) for assistance.**

### **Procedure:** To transfer liquid nitrogen you must:

1. *have attended the Keen liquid nitrogen training session*
  2. *be supervised the first time you fill a dewar*
  3. *always have two people*
  4. *remove cart from aisle way out to the hallway so that egress is not limited*
- *Please contact your supervisor or Kjeld Krag-Jensen at 831-3317 for assistance*

**To Connect and Fill Dewar:**

1. Ensure that the 160 liter LN2 Dewar is set to the 235 PSI (**high** pressure relief setting).
2. Reposition the 160 liter LN2 Dewar so that Liquid Port (with liquid tab) tab is facing the main LN2 filling line.
3. Make sure both hose drain valves are closed (MV-2 and MV-3).
3. Securely attach (hand tight) vent hose to Vent port on the 160 liter LN2 Dewar.
4. Take main filler line hose (liquid line draw) and attach (hand tight) to Liquid port on 160 liter LN2 Dewar (do not over tighten or you will have trouble disconnecting the line).
5. Open the vent tap on the 160 liter LN2 Dewar all the way, then turn back 1/2 turn.
6. Open the liquid tap on the 160 liter LN2 Dewar a few turns.
7. Press “Start Fill” on display Screen of the key punch box.
8. Enter User ID and Password.
9. Press “Enter” on the Keyboard to the right of the screen
10. Cylinder will continue to fill until the vent thermocouple senses liquid @-180 F. The current temperature of the vent line will be displayed on the screen. When Cylinder is filled the display will indicate such. During the fill cycle, you may stop the fill by pressing “STOP FILL”. To continue filling you will have to return to step 7. You may stop the fill early and disconnect cylinder if you desire.

**To Disconnect Dewar:**

10. Close the cylinder valves.
11. Open both hose drain valves (MV-2 and MV-3) and let residual bleed out.
12. Wait about 1 minute before removing the liquid hoses from the Liquid and vent ports on the 160 liter LN2 Dewar.
13. Wait about 10 minutes then switch the dewar relief valve back to 22PSI. If the tank begins to relieve, switch back to high pressure relief valve and wait approximately 5 more minutes before switching back to low pressure relief.
14. Remove the liquid and vent lines after confirming there is no 22PSI relief.
15. Turn both of the hose drain valves off.
16. When moving the 160 liter LN2 Dewar the relief valves should be located on the far side of the Dewar to prevent LN2 from releasing/pouring out on you.
17. Turn off lights/ventilation switch.

**Exposure:** In the case of cold burns (frost bite):

***Eye:*** Flush eye with cold water for 15 minutes and contact 911 for assistance

***Skin:*** Flush affected area with cold water for 15 minutes and contact 911

***Inhalation:*** Remove victim from area to fresh air if it is safe to do so and contact 911

**Spills:** In the event of an accidental release the rapid expansion of nitrogen will displace oxygen, posing an asphyxiation hazard.

***Minor spills*** - (a few drops) Alert others and leave area immediately. Contact your supervisor and the Departmental Chemical Hygiene Officer (Dr. Bulkowski x 2467).

***Major spills*** -

Alert others

Leave area immediately

Activate external emergency shut off valve

Pull the building alarm to evacuate

Exit building

**Emergency/Contact numbers:**

1. Public Safety                      911
2. Department of Occupational  
Health and Safety                      831-8475
3. EE. Lab Coordinator  
(Kjeld Krag-Jensen)                      831-3317