

**Standard Operating  
Procedure (SOP)**



**LIQUID NITROGEN**

**Effective Date:** 8/23/2013

**Revised Date:** 8/23/2013

**INTRODUCTION**

- This SOP applies to operation of LIQUID NITROGEN TANKS.

**POTENTIAL HAZARDS**

- Explosion due to pressure build-up.
- Do not use hollow rods or tubes as dipsticks. (When a warm tube is inserted into a cryogen, liquid will spout from the top of the tube.)
- Use and store liquid hydrogen and helium away from flammable materials and ignition sources. (These gases can condense oxygen out of the air, creating a localized oxygen enriched environment.)

**HEALTH HAZARDS**

- Tissue damage (frostbite) from skin exposure.
- Asphyxiation due to oxygen displacement.

**PERSONAL PROTECTIVE EQUIPMENT**

**EYE PROTECTION**

- Safety glasses, goggles or face shields shall be worn during operations using LIQUID NITROGEN.
- Ordinary (street) prescription glasses do not provide adequate protection. Adequate safety glasses must meet the requirements of the Practice for Occupational Education Eye and Face Protection (ANSI Z87.1-1989) and must be equipped with side shields.

**HAND PROTECTION**

- Use disposable nitrile gloves when working with chemicals. Check chemical compatibility chart for breakthrough time when using
- Laboratory personnel should thoroughly wash hands with soap and water before and immediately upon removal of gloves.

**LAB COATS, ETC.**

- Button lab coats, closed toed shoes, long pants and long sleeved clothing shall be worn when handling LIQUID NITROGEN. Protective clothing shall be worn to prevent any possibility of skin contact with LIQUID NITROGEN.

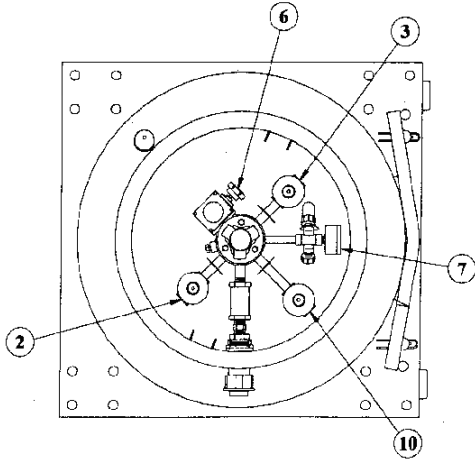


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WORK PRACTICES



**Valve # Description**

- 2 Liquid Use Valve
- 3 Vent Valve
- 6 Pressure Builder Valve
- 7 Pressure Gauge
- 10 Gas Use Valve

**Delivery of liquid nitrogen from a Low Pressure tank (do not use a high pressure tank for liquid delivery)**

- 1) Make sure you are using a low pressure tank. Pressure is clearly stated on the laminated information sheet attached to the upper cage housing.
- 2) Attach a standard fill hose to valve #2. A small triangular identification tag reading "liquid" is attached to the valve/tubing assembly.
- \*\*3) Open valve #2 (counter clock-wise looking down on valve) to deliver liquid. Wait for liquid, it may take a minute to appear.**
- \*\*4) When desired amount is delivered close valve #2.**

**Reading level of liquid**

- 1) Push the on button on the CYL-TEL digital monitor.
- 2) Wait 5 seconds for a reading.
- 3) The number indicates the % full.

**Delivery of Gas (low pressure can deliver 22 psi, high pressure can deliver 230 psi)**

- 1) Connect a regulator approved for nitrogen to valve #10. A small triangular identification tag reading "gas use" is attached to the valve/tubing assembly.



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- 3) Open valve #10 (counter clock-wise looking down on valve) to deliver gas
- 4) Set secondary regulator as needed.
- 5) When finished close valve #10.

**Building pressure (Low pressure can build to 22 psi, High pressure can build to 230 psi) 124**

- 1) To build gas pressure in tank to 22 or 230 psi (low and high pressure tanks, respectively) open valve #6 (green valve). Turning counter clock-wise will open valve and build pressure.
- 2) When pressure is reached close valve #6. This could take minutes to hours depending on initial pressure of tank.

**To Vent tank (If needing to reduce pressure)**

- 1) Open valve #3. A small triangular identification tag reading “vent” is attached to the valve/tubing assembly.
- 2) When pressure is reached close valve #3.
- 3) Unless pressure build valve #6 is closed the pressure will build again.



**\*\*\*PROBLEMS\*\*\*: In case of continuous and vigorous venting of tank**

- 1) Open vent valve #3 (a few turn counter clock-wise looking down on valve). A small triangular identification tag reading “vent” is attached to the valve/tubing assembly.
- 2) After a minute close vent valve #2 and check if still venting. Repeat steps 1 and 2 until tank no longer vents.
- 3) Make sure pressure builder valve #6 is closed (green valve, turn clock-wise to close), otherwise tank will continue to vent.
- 4) If still venting roll to dock and let gas vent.

**EMERGENCY PROCEDURES**

**Emergency Numbers:**

Fire and Medical Emergencies	x5911 (911 on cell phone)
Environmental Health and Safety	x3427
Hillcrest Urgent Care (employees)	336-760-8999
Student Health (students only)	x5218
Poison Control	800-222-1222

 <b>WAKE FOREST</b> UNIVERSITY	<b>Standard Operating Procedure (SOP)</b>		
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<b>FIRST AID</b>			
<ol style="list-style-type: none"> <li>1. If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Call x5911 for medical assistance.</li> <li>2. In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off in safety shower for at least 15 minutes. Call x5911 for medical assistance.</li> <li>3. In case of eye contact: Rinse thoroughly with plenty of water at eyewash for at least 15 minutes and call x5911 for medical assistance.</li> <li>4. If swallowed: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Call x5911 for medical assistance.</li> <li>5. Call x5911 and describe the extent of injuries.</li> <li>6. Report all accidental exposures to EHS and Human Resources (employees) or Student Health (students).</li> <li>7. Complete an <a href="#">online injury/illness report</a> if there is an over-exposure to the chemical or if there is an accident involving the chemical.</li> </ol>			
<b>SPILL AND ACCIDENT PROCEDURES</b>			
Spills over 1 liter can cause an oxygen depleted atmosphere in the area. Leave the area immediately and call x5911 for University Police and x3427 for EHS.			