

Human Immunology Center Core Laboratory
David H. Smith Center for Vaccine Biology and Immunology
Aab Institute of Biomedical Sciences

STANDARD OPERATING PROCEDURE: Operation and Maintenance of the CBS V2300
LN₂ Storage Unit with attached liquid nitrogen tank.

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1. Purpose/Scope:

The purpose of this procedure is to outline the operation and maintenance of the LN₂ storage unit with attached liquid nitrogen tank located in the Human Immunology Core Laboratory (HIC).

2. General Policy:

The HIC will adhere to the specific guidelines recommended by the manufacture for the use and maintenance of the LN₂ storage unit with attached liquid nitrogen tank. The specific policy will be outline below for use and care of the LN₂ storage unit with attached liquid nitrogen tank. This will also include the proper documentation indicating that the maintenance recommended has been completed and also tracking of any issues or problems with the LN₂ storage unit with attached liquid nitrogen tank on the maintenance log worksheet.

3. General Safety Guidelines

- 3.1. BSL2 safety equipment and cryoprotectant gloves must be worn; do not touch metal with hands unless wearing cryo gloves.
- 3.2. LN₂ tanks must be chained to wall supports

4. Specific Policy

4.1. Installation of the LN₂ storage unit with attached liquid nitrogen tank

- 4.1.1. Reference the set-up and technical manual for the specific installation procedure of the LN₂ storage unit with attached liquid nitrogen tank.

- 4.1.1.1. Clean the inside and outside of the unit to remove any debris with a clean cloth.
- 4.1.1.2. Connect the LN₂ supply hose to the liquid nitrogen tank.
- 4.1.1.3. Plug the unit into the appropriate power supply.
- 4.1.1.4. Turn the power key switch to the ON position.
- 4.1.1.5. Adjust the liquid level set points. The set points are outline in step 3.2.1.2. Reference page 18 of the technical manual for instructions to set the liquid levels.
- 4.1.1.6. Open the manual valve on the supply tank and check for leaks.

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4.1.1.7. The program lock key switch on the front panel should be in the locked position.

4.2. Operation of the LN₂ storage unit

4.2.1. Reference the LN₂ storage unit set-up and technical manual for operation.

4.2.1.1. Record all relevant information on the current maintenance log worksheet located on the wall next to the unit.

4.2.1.2. The LN₂ storage unit will be locked at all times. The key is stored in a locked drawer in the HIC laboratory.

4.2.1.3. The operating level for the LN₂ storage unit is 0 to 28 inches. The low level of the unit is set at 10 inches with a high of 20 inches.

4.2.1.4. The maximum operating pressure of the LN₂ storage unit is 22p.s.i. and the minimum is 18p.s.i.

4.2.1.5. When adding or removing material from the LN₂ storage unit, proceed as quickly as possible. Do not leave the lid to the LN₂ storage unit open for long periods of time.

4.2.1.6. A clean glove should be worn on the hand opening the LN₂ storage. Cryogenic gloves should be worn to protect hands from burning the skin when removing racks and boxes from the LN₂ storage unit along with a lab coat and safety glasses.

4.2.1.7. Verify the temperature before use to meet procedural requirements for the material being placed in the LN₂ storage.

4.2.1.8. Verify proper maintenance has been performed as documented on the maintenance log worksheet located on the LN₂ storage.

4.2.1.9. The lid of the LN₂ storage unit should be gently opened and lowered. The lid contains a probe and is sensitive to extreme motion.

4.2.1.10. A trouble shooting guide is located in the set-up and technical manual for the LN₂ storage unit. Reference pages 36-40. Reference the equipment file for technical support information.

4.3. Operation of the liquid nitrogen tank

4.3.1. The liquid nitrogen tank is changed every Friday at the end of the day or more often depending on use and LN₂ levels. The tank should be filled with any remaining LN₂ on Friday before changing the tanks. It should also be changed when the tank is empty which is indicated when the LN₂ storage unit source alarm is detected.

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- 4.3.1.1. Turn the cylinder valve on the tank to the closed position.
- 4.3.1.2. Using a wrench, loosen the nut that connects the liquid transfer hose to the tank.
- 4.3.1.3. Place the hose on the liquid only connector to the new liquid nitrogen tank. Tighten with the wrench.
- 4.3.1.4. Turn the cylinder valve on the new tank to the open position.
- 4.3.2. New liquid nitrogen tanks are delivered on a weekly basis typically on Thursday. Due to the variation in tank life, a new tank may be ordered at any time. The contact information is located in the equipment file.
- 4.3.3. The liquid nitrogen tanks must be chained to the wall in the hallway per fire code.
- 4.4. Maintenance of the LN₂ storage unit with attached liquid nitrogen tank
 - 4.4.1. Daily
 - 4.4.1.1. Record the current liquid level on the LCD display on the front of the LN₂ storage unit on the maintenance log worksheet located on the wall next to the unit.
 - 4.4.1.2. Record the lid temperature on the LCD display of the front of the LN₂ storage unit on the maintenance log worksheet located on the wall next to the unit.
 - 4.4.1.3. Record the system status and tank status (tank status is an estimation) of the LN₂ storage unit with attached liquid nitrogen tank on the maintenance log worksheet located on the wall next to the unit.
 - 4.4.2. Weekly
 - 4.4.2.1. Verify the liquid level on the digital display with the actual level of the liquid nitrogen in the LN₂ storage unit.
 - 4.4.2.1.1. Place the black yard stick in the bottom of the LN₂ storage unit and measure to where there is a slight variation in the color of the tank wall. The wall will look somewhat wet below the liquid level line. Record the level on the maintenance log worksheet located on the wall next to the unit. Verify this level with the LCD display on the unit.
 - 4.4.3. Yearly
 - 4.4.3.1. Verify the low level alarm is operational following the steps below.
 - 4.4.3.1.1. Turn off the valve on the liquid nitrogen tank.

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- 4.4.3.1.2. Adjust the low alarm level above the current level of the liquid nitrogen. Verify alarm operation.
- 4.4.3.1.3. Adjust low alarm to the proper setting and turn the valve on the liquid nitrogen tank on.

4.4.3.2. Verify the high level alarm is operational following the steps below.

- 4.4.3.2.1. Adjust the high alarm level one inch below the current level of the liquid nitrogen. Verify alarm operation.
- 4.4.3.2.2. Adjust high alarm to the proper setting.

4.4.3.3. Temperature probe verification

- 4.4.3.3.1. Place the temperature probe located in a wire sleeve near the lid of the LN₂ storage unit in an ice bath. The temperature display should read 0°C.
- 4.4.3.3.2. Then place the probe into a container with liquid nitrogen. The temperature display should read -196°C.
- 4.4.3.3.3. Place the probe back in the sleeve and resume normal operation.

4.4.4. Calibration of the unit

- 4.4.4.1. This should be performed only if the actual liquid level does not match the LCD display level. Specific instructions can be found on page 33 of the set-up and technical manual.

Reference:

Reference the Set-up and Technical Manual for the 2300 LN₂ storage unit

Attachments:

Maintenance Log Worksheet

Revision History

Version	Change	Impact	Justification	Change Date:
Legacy	No sign off	New/HIC startup		09/23/05

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HIC-4-0010	New		Control document management system	02/21/07