

Helium Liquefier (QT) System at NM4



Operational Settings: [QT_Operational_Settings.pdf](#)

[Configurations for Cooldown and Production](#)

Procedures

1. [Shut Down and Restart Procedures](#)
 2. [HR3 operations](#)
 3. [Filling LN2 to the purifier using a portable Dewar](#)
 4. [QT System Starting Procedure](#)
 5. [Liquefier Cleaning when Dewar contains LHe](#)
 6. [Cleaning QT purifier Helium-space \(pumping-purging the purifier\).](#)
 7. [Cleaning QT purifier LN2 space](#)
 8. [Fixing dewar level indicator \(related to \(9\)\)](#)
 9. [Dewar Cleaning Procedure \(using the transfer line\)](#)
 10. [Cold-helium Circulation Procedure \(Cooldown Transferline\)](#)
 11. [Cleaning gHe outside tank using the purifier](#)
 12. [Resolving Liquefier Blocking Alarm when Liquefier is on Liquefy Mode](#)
 13. [Resolving Liquefier Blocking Alarm when Liquefier is on Idle Mode](#)
 14. [Purifier LN2 Fill Procedure-updated-labels.pdf](#) (Please use this updated one, or the original one on docdb 10337 by Jordan Bohn)
 - 03 Jun 2023 Now, EV-100-N is not functioning well. So, Jordan recommends using the HCV-13 while playing with EV-100-N. [Purifier LN2 Fill Procedure.pdf](#)
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1. [LN2 Shield Fill Procedure-updated_labels.pdf](#)(Please use this updated one, or the original one on docdb 10337 by Jordan Bohn)
 2. [LHe fill procedure using a QT dewar](#)
 3. [LHe fill procedure using a commercial dewar](#)
 - Important Cooldown > Liquefying modes information
 4. [QT Dewar Cooldown Mode from Room Temperature](#)
 5. [Bringing the Dewar Pressure down in Liquefy/Idle mode](#)

Useful information

1. The volume of an outside gHe tank: **1600 cubic feet (V = 45306.95 L)**
2. The pressure increase in the gHe tank per tube (in the tube trailer) is 10psi (i.e. 10 psi difference per tube)
3. **100 slm rate on Magnet FC is equivalent to ~ 192 LHe liters per day (i.e. assuming both LQ A and B are running)**
4. QT recommendation to keep system minimally pressurized: ~20 psi
5. Running from 40 psi down to 20 psi would produce about **80 liquid liters** and we should be able to do that in about 10 hours (assuming both LQ A and B are running).
6. Putting a 2200 psi gas bottle into the system will produce 8 liquid liters per bottle.
7. [HR3.docx](#) (*It's a copyright of QT-technology. Please do not make it public.*)

The following page contains information on the production and transfer efficiency studies

[LHe Production Rate Optimization](#)
[LHe Transfer Efficiency](#)

To check LCW parameters: <https://e906-gat1.fnal.gov/data-summary/e1039/slow-cont-acnet.php>

(click on NM4LCW or select F:NM4LCWFLOW F:NM4LCWP1 F:NM4LCWP2 F:NM4LCWP3 F:NM4LCWT1 F:NM4LCWT2)

To check HMI parameters: <https://e906-gat1.fnal.gov/data-summary/e1039/target-QT-HMI.php> (select: TI502 TI504 TI506 TI508 TI510 for both Liquefier A and B)

Manuals

1. [Helium Compressor Manual.pdf](#)
2. [Cold_Head_Hot_Swap_Procedure.pdf](#)
3. [prosense_qps.pdf](#)

System Logs

Items-Purchased

1. https://www.automationdirect.com/adc/shopping/catalog/process_control_-a-_measurement/pressure_sensors/pressure_transmitters/spt25-20-v30d
2. [https://www.automationdirect.com/adc/shopping/catalog/cables/pneumatic_solenoid_valve_cables_-a-_connectors_\(square_din_style\)/8mm_\(din_43650c\)/sc8-5t](https://www.automationdirect.com/adc/shopping/catalog/cables/pneumatic_solenoid_valve_cables_-a-_connectors_(square_din_style)/8mm_(din_43650c)/sc8-5t)
3. <https://aircompressorservices.com/products/kaeser-oil-filter-replacement-6-3462-1>
4. <https://aircompressorservices.com/products/kaeser-5-gallon-partial-synthetic-oil-replacement-m460-005>