

Frozen Spin Target Manual

Document 2: Cooling the 4He System

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This document describes the preferred method to cool the 4He system of the Frozen Spin Target from room temperature to its normal operating temperature.

Risk Assessment

No risk to personnel.

Hazard Control

Not applicable.

A. Pump/purge of 4He system

1. Confirm that EV8215, the JT valve between the LHe buffer dewar and the FROST cryostat, is CLOSED;
2. Insert the LHe transfer line into the buffer dewar and the FROST cryostat;
3. By hand, CLOSE EV8339, the 1K valve. Zero it using the Epics control screen Zaber.adl. Now using FROST.adl, place this valve in manual mode and open it in steps of 10000 until it is about 3 turns open.
4. CLOSE MV8300;
5. Confirm that valve MV8374 is CLOSED. This is the butterfly valve on auxiliary pump MP8374 and is located behind the 3He gas panel;
6. Confirm that MV8372 on the 3He gas panel is CLOSED;
7. OPEN all valves on the 4He gas panel except MV8342 and MV8343;
8. Place the two helium flow controllers FC8340A/B in local mode and open them 100%;
9. turn ON the auxiliary vacuum pump MP8374;
10. Set the 4He gas regulator to about 5 psig;
11. OPEN MV8343 to start pumping on the 4He system;
12. Turn ON the two diaphragm pumps MP8340A/B;
13. Turn ON the 1K dry L70 pump MP8351 and then the 1K blower MP8350;
14. Allow the system to pump for about 5 minutes;
15. CLOSE MV8343 and turn OFF all 4He pumps (MP8340A/B, MP8350, MP8351);
16. OPEN MV8372 and bleed the system up with helium to a pressure of about 1000 mbar and then close MV8372;
17. Repeat steps 10 through 15 for a total of six times to complete the pump/purge procedure. Turn off the auxiliary pump;

C. Cooling 4He System

1. CLOSE MV8345;
2. Alert the Cryo Group that you are about to begin cooling a subatmospheric helium system and will be returning the gas to ESR recovery. Confirm to them that the system is leak tight and has been pumped and purged;
3. If cryo gives the go-ahead to cool down, OPEN MV8300;
4. Turn ON MV8340A/B, MP8350, and finally MP8351;
5. OPEN EV8215 100%;
6. Begin circulating pure 4He through the dilution unit. Refer to the document “Condensing 4He in the Dilution Refrigerator”;
7. Monitor the system thermometry;
8. Begin closing the 1K valve EV8339 as the 1K pot cools and fills with LHe;