

Instructions for filling liquid Helium for the 800 MHz magnet

This is a two-person job and will require 2 x 100 liter tanks of liquid helium if filling from 207 mm (41%).

- Move the ladder to the side and place the helium tank to the right of the leg facing the 500 system and as close to the magnet as possible.
- Cut all ties from the helium tanks
- Hand tighten the home-made fitting to the vent port of the helium tank and connect the regulator to the grade 5 ultra high purity helium gas cylinder. After checking the pressure and flow rate shut the gas flow off with the small blue valve on the left to conserve gas.
 - NOTE: Make sure that there is at least 1000 psi left in the helium gas cylinder for filling the 800. 600 psi is sufficient for filling other magnets.
- At the top of the magnet close the green valve, remove the pressure release valve and set aside, and then open the green valve slowly to vent the Dewar to atmosphere.
 - NOTE: The helium manostat will show an error when the pressure drops below 1040 mbar and the helium flow rate drops to zero during the vent. This is normal. If an audio alarm sounds on the manostat you can hit the down arrow to silence the alarm (the red error light indicator will stay lit).
- Retrieve the transfer line for the 800 (it is thicker than the Oxford magnets and has a longer transfer line to place into the helium tanks). Make sure that the extension and the nipple on both ends of the transfer line are tight. Loosen the white plastic fitting and slide to the middle of the transfer line just above the markings.
 - NOTE: This is deep enough to get liquid through the transfer line and high enough that the short end will fit into the magnet without having to pull the transfer line out of the helium tank.
- Set the Helium manostat to fill mode by hitting the following buttons:
 - Center → Down → Down → Center → Right → Center (wait) → Center → Center
 - When in fill mode the reading under “Helium 1” will read mmF rather than mm. The F means fill mode. In fill mode the manostat makes a helium reading approximately every 2 minutes and 50 seconds.
 - NOTE: Leaving the magnet in fill mode will cause helium to boil off and could cause a quench if left for several days.
- Once the magnet has vented to near atmosphere remove the screw cap from the helium fill port (tallest port on the top of the magnet) and remove the baffle along with the o-ring and washer. Carefully place on top of magnet and cover the fill port with a plastic cap.
- On the helium tank place the large red hose tubing over the top nipple of the tank and push down as far as possible. Close the 5 psi valve, and vent the tank through the vent port (may need to open the red valve on the home-

made fitting as well). Once vented open the top valve and insert the transfer line into the tank and push the white fitting into the red hose tubing.

- NOTE: At this point you need two people. One by the tank and one up the ladder by the magnet.
- While the transfer line is cooling remove the plastic cap from the helium fill port and open the green valve on top of the magnet to vent the magnet Dewar fully if it is not open already.
- Once liquid comes out of the transfer line, vent the system from the home-made fitting. Once vented quickly place the transfer line into the magnet and tighten the screw cap. Immediately after inserting the transfer line into the magnet slide the transfer line to the bottom of the helium tank and make sure the white fitting is tightened so no gas leaks out.
 - NOTE: The bottom of the transfer line is angled so it is fine to push the transfer line to the bottom.
- Immediately after inserting the transfer line to the bottom of the helium tank go and turn the gas flow on by rotating the small blue valve on the left hand side of the regulator.
- Using the larger blue valve on the regulator adjust the pressure to achieve around 4 psi of pressure inside the system.
 - NOTE: The pressure valve on the home-made fitting needs to be whacked a bit to get it to read properly.
 - NOTE: Check the system for leaks especially near where the red hose tubing fits over the top of the helium tank.
- Start monitoring the helium level from the manostat and maintain pressure at 4 psi. If the pressure continues to drop and there is plenty of helium there is likely a leak.
- When the helium tank empties the pressure will drop quickly and a whistling sound will appear. At this point slowly vent the system from the red valve on the home-made fitting, pull the transfer line out of the helium tank and at the same time pull the transfer line out of the magnet.
- Near the helium tank quickly shut the vent valve, open the green safety valve, close the top valve and disconnect the home-made fitting. At the top of the magnet place a plastic cover on the helium port and close the green valve.
- Move the empty tank out of the way, bring in the second tank, close the 5 psi pressure release valve, vent the tank, place the red hose tubing on top of the tank, adjust the white plastic fitting on the transfer line to near the center again, open the top valve, and place the transfer line into the helium tank after wiping off any condensation.
- Once liquid comes out of the transfer line open the green valve at the top of the magnet, remove plastic cap from helium port, wipe off condensation from short arm and place in magnet after venting the helium tank.
- Quickly close the vent port on the tank, push the transfer line to the bottom of the helium tank, and connect the home-made fitting to start gas flow and build up pressure to 4 psi. At the same time seal the transfer line to the magnet with the screw cap

- When the magnet is full or the second helium tank runs out slowly vent the system from the home-made fitting and remove the transfer line from the magnet and helium tank and put aside. At the top of the magnet close the green valve, re-insert the baffle along with O-ring and washer and tighten with screw cap. Replace the pressure release valve making sure the valve is pointing towards the magnet. Then open the green valve on the magnet.
 - NOTE: It is critical that the green valve be open when done to make sure the magnet does not over pressurize if the manostat were to fail.
- Shut the helium gas off, remove the home-made fitting from the helium tank and remove the pressure regulator from high pressure cylinder and put away.
- Check that the helium tanks have the vent and top ports closed and the 5 psi safety valve open. Replace the plastic caps on the top port and make sure the tags read empty. Place in hallway.
- Adjust the manostat back to normal by pressing the following buttons:
 - Center → Down → Down → Center → Left → Center (wait) → Center → Center
- After a few minutes retighten the fittings at the top of the magnet and repeat about an hour later.
- Make sure the quench pipe is not touching the magnet and adjust if necessary.