

# Instructions for Prepping an Orange Cryostat

## Pumping Vacuum Jacket

1. Connect a turbo pump to the vacuum valve and pump down to the mid  $10^{-5}$  Torr range. If the cryostat has recently been in use and not experienced any problems, you can skip this step.

## Purge the Helium Reservoir and Sample Well

If possible, the sample stick should be in the cryostat before this step is begun.

1. Put 3-5 psi of helium gas on a rough pump, but keep the valve closed.
2. Connect the rough pump to the helium exhaust port and open the red valve.
3. Turn the blue 3-way valve down. This makes the reservoir and sample well common, and allows you to pump both through the helium exhaust port.
4. Pump until at the bottom of the rough pump's scale, then close the valve to the pump and open the valve to the helium gas.
5. Do this three times, ending with 3-5 psi of helium gas in the cryostat.
6. Close the blue 3-way valve (horizontal) and the red valve. Disconnect the rough pump.

## Fill with Cryogens

1. It takes 20 to 30 L of helium to fill a standard 50 or 70 mm cryostat and about 40 L to fill the larger models (DCS, FCS, HFBS).
2. Start by filling with liquid helium through the helium fill port. Also make sure the helium exhaust port (red valve) is open. Open the cold and warm valve slightly.
3. Once the helium is going, fill the nitrogen jacket through any of the three ports.
4. Helium is collecting in the cryostat once a thick white plume is visible at the exhaust port. The helium reservoir is full when this plume suddenly becomes much more intense.
5. After you have put away the transfer tube, close the helium fill port and the helium exhaust port on the cryostat.

## Cooling Down

1. Connect the sensors to a temperature controller. The cryostat and sample stick sensors are either a DT-470 or SI 410 silicon diode. The front page of this manual should have a chart of the cryostats and sticks and their corresponding sensor type. The top of the controller should have a curve number for that sensor.
2. To cool down to 4.2 K relatively quickly, use the cold and warm valves. The cold valve should be opened about a half turn, while the warm valve should be opened several turns. Watch how quickly the temperature falls and vary the valve settings to cool as quickly as possible.
3. To cool below 4.2 K, or to cool very quickly, use one of the large roughing pumps. Connect it to the annulus, close the warm valve, and either close the cold valve or leave it very slightly open. Then start the pump.