

TBT cryostats: HOWTO

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Installing the cryostat and cooling down (staff only)

1. Install the cryostat on the sample holder. Connect the pumping cart and pump down the isolation vacuum. The valve is of the seal-off type: do not pull out the axis and do not open it more than three turns.
2. You should reach $1e-4$ before transferring He.
3. Do not connect the helium circulation pump, the plastic tube should not be connected to the pump. The regulation valve must be fully open.
4. The cryostat is closed or a sample holder is inside.
5. Connect the temperature gauge to the BT400 controller and turn it on.
6. [F1] to enter Manual MODE (push * to come back from a wrong MENU).
7. [F2] to enter REGULATION Menu.
8. Temperature shown in item 1 is that of the cryostat. Item 2 is that of the sample holder when it is connected. %PF is the applied heating power. It should be 0% when you cool down and 3-4% when the system is stable.
9. To change the setting point (“Consigne”) use keys F1 or F0.
10. Open the transfer line (Johnston female connection) on the cryostat by removing the blanking flange and the O-ring.
11. Depressurize the He bottle. Then leave the valve open on the bottle when inserting the transfer line in the bottle.
12. Use personal safety protections when working with cryogenics liquids!
13. Open the port on the top of the He bottle.

14. Remove the cap from He transfer line: there is a cap on the transfert line towards the cryostat. This way, you will purge the transfert line during the insertion in the He bottle.
15. Insert GENTLY the transfert line into the He bottle and slowly enough to not produce a big overpressure.
16. You should be able to hit the bottom of the He bottle, move it up of 1cm, do not leave it in contact with the bottom of the Dewar.
17. Slowly close the valve on the He Dewar and wait for He gas blowing out of the transfert line: a very gentle blow, do not wait for ice forming.
18. Insert the transfert line into the cryostat: the O-ring is already on the transfert line. It can be difficult to insert the transfert line, use a little force, but only along the axis of the pipe. Any deformation can make the transfert line unusable and put an end to your experiment (we do not have another transfert line).
19. Connect the plastic tube to the pump and witch it on. Fully open the valve on the plastic tube.
20. Wait for the desired temperature. Typically 1h 30' for 25K.
21. Closer the regulation valve to about 1.1 turns for 25K. Check if the temperature is stable and the %PF is below 10%. Adjust the valve as needed.

Sample change

Follow the check list below:

1. Move the fluorescence detector backward and protect it (put the cap on it if the nylon protection cap is not already mounted).
2. Move up the sample holder: i.e. move towards smaller values or you will not have enough room to dismount the sample holder.
3. Remove the temperature gauge cable from the sample holder: be careful to not unscrew the plug from the cryostat, hold with two fingers the connector and with other two the plug.
4. Decouple the motor shaft from the sample holder pulling the pin (“enlevez la goupille”).
5. Move gently down the sample holder... be careful when using teflon or nylon sample holders, they are fragile.
6. Unscrew one butterfly and rotate the motor stage on one side. Do not let it fall down on one the detectors.

7. Remove the KF clamp on the sample holder and then switch off the He circulation pump (never turn off the pumping station, that is necessary for the isolation!).
8. Remove the sample holder and put the new one or the blanking flange (“mettez le bouchon!”).
9. Put back the KF clamp and switch on the pump. NOTE: If you close the sample compartement and you forget to switch on the pump, you could create an overpressure that can damage the cryostat and put a definitive end to your experiment.
10. Reconnect the sample holder to the motor and connect the temperature gauge cable.
11. Wait for the sample to reach to good temperature... usually 30' for 25K. You can use this time for sample alignment.

End of the experiment

Your experiment is over, leave the cryostat as it is, just remove your sample as for a normal change. Leave it running and do not forget to put a blanking flange or one sample holder. Let the beamline staff to uninstall the cryostat correctly. If any anomaly or damage is suspected or detected, you are strongly advised to report it to the beamline staff as well as any suggestion.

Staff procedure:

1. The new set point must be about 293K (Room Temperature)
2. Reduce the He circulating valve aperture, but do not close it. Leave the pump working as well to avoid overpressure.
3. Use safety protections when working with cryogenics liquids.
4. When the temperature reaches is above 100K, you are ready to remove the transfert line:
 - (a) switch off the pump AND disconnect the pipe from the pump.
 - (b) remove the transfert line from the cryostat: some force is needed, pull straight the pipe and do not go back when extracting.
5. Remove the transfert line from the He Dewar:
 - (a) open a relief valve on the He Dewar.
 - (b) Unscrew the connector of the transfert line on the He Dewar

- (c) move the pipe up fast enough to avoid ice formation and never try to go back in.
 - (d) If the pipe get stuck, completely unscrew the connector and extract it together with the pipe.
 - (e) The transfert line ends are FRAGILE. Avoid shocks and deformations.
 - (f) Close the He Dewar and the relief valve.
 - (g) Protect the transfert line putting the end cap on it, clean from ice before putting the cap.
 - (h) Store the transfert line suspended at the left of the entrance door.
6. Let the cryostat heat up slowly and stop pumping, when room temperature is reached.
 7. Always leave the isolation vacuum under static vacuum when stored.