

# Standard Operating Procedure: Reliquefier for Oxford Dilution Refrigerator

## Removing the Cold Head

1. Before removing the cold head make sure the compressor is turned off and the cold head is at room temperature. (If the cold head will be off for a long time, close the cooling water lines for the compressor: supply first then return).
2. If the fridge is in operation: First open the butterfly valve leading to the "old" 1K pump then disconnect the 1K return line from the cold head intake line and close the butterfly valve leading to the new 1K pump.
3. Close the needle valve on the intake line and connect the helium gas bottle to the intake line using the Aeroquip adapter.
4. Disconnect the intake line from the main bath exhaust
5. Start flowing helium into the cold head (there will be an increase in pressure in the bath which may cause the relief valve to crack)
6. Disconnect the line running from the motor to the top of the cold head using 1 3/16" wrench.
7. Check that the hoist cable is tight and unlock the brakes on the support beam.
8. Raise the cold head until the transfer tube is completely out of the dewar.
9. Cap the transfer port, check that helium is flowing out of the end of the transfer tube, and lock the brakes on the support beam.

## Inserting the Cold Head

1. Continue flushing the cold head with helium gas.
2. Insert the cold head transfer tube until the cold head is low enough to connect the motor line. When the relief valve cracks, stop flowing helium gas.
3. Connect the motor line to the top of the cold head and tighten using 1 3/16" wrench.
4. Check that the cooling water lines are open (open return first then supply) and turn on the compressor. The cold head temperature should begin to decrease.
5. When the cold head temperature reaches ~4.5-5K lower the cold head all the way (the top of the transfer tube should be ~1-2 inches from the top of the transfer port) and lock the brakes on the support beam.
6. Connect the intake line to the main bath exhaust using the Swagelok quick connect and open the needle valve on the intake line.
7. If the fridge is in operation: turn on the 1K pump then open the speedivalve on the wall and close the butterfly valve leading to the "old" 1K pump. When the gauge on the 1K pump cabinet reads positive pressure connect the 1K pump return line to the cold head intake line using the aeroquip connector. Adjust the needle valve on the fridge so the Edwards pressure gauge reads ~7 mbar.