Heater Construction

1. Before putting the heater on your aluminum heater block you should use the 3/8-24 NF tap to ensure that the threads extend all the way through the block. If you don’t do this now, you may have to do it later, and it is much easier to do if the heater hasn’t been put on yet.

2. Wrap the outside of the aluminum heater block with brown adhesive-coated, 3-mil Teflon sheet to electrically insulate it. It is only necessary to have a single layer of tape but be sure there are no gaps in it.

3. Select a strip of 0.005” Hastelloy X stock for your heater. The strip is 5/16” wide and needs to be cut down to about 1/8” to 5/32” wide. You should be able to get two heater strips from a single piece 33” to 36” long. You can cut the strip using regular scissors. CAUTION: these strips can have sharp edges from the cutting process. Be VERY CAREFUL with them to avoid cutting your fingers or other important parts of your body.

4. Measure the resistance of your heater strip using a 4-lead measurement technique.

5. Using small copper crimp sleeves attach a 6-8” length of 18-gauge Teflon-insulated wire to each end of the heater coil. You may need to fold the end of your heater strip to fit into the sleeve. The sleeves can be crimped on using a pair of pliers. Be sure that you have good contact with both the wire and the heater strip in the sleeve. You will need to compress the sleeve fairly hard. Using just the corner of the pliers to compress a small region at a time will help.
6. Carefully wrap the heater around the heater block. If your heater strip has a noticeable ridge along one edge, place the strip so that ridge is placed facing out so that it will not puncture the 3-mil Teflon tape. Be sure that the individual wraps are separated to avoid contact between them. Also, do not wind the heater all the way to the end of the aluminum block. After the heater is placed on the block you need to wrap it with a layer of white Teflon tape to hold it in place. It is almost guaranteed that it will take at least two people to do this.

7. Lay the wires down along the cryostat and wrap everything with another layer of white Teflon tape to hold it all in place. You will want to cover the crimp sleeves to avoid electrical contact with them as well.

8. Attach the leads to a binding post connector to facilitate connection to the power supply.

9. Again measure the resistance of your assembly using a 4-lead technique to be sure that you haven’t introduced any high-resistance junctions in the connections or short circuits between the coil windings.

[Modified: February 10, 2017]