**Cavity HB60 & HB62 BCP processing requirements**

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HB62 and HB62 are SNS high-beta cavities with their end groups modified (HOM couplers removed and end group reactor grade Nb replaced with high RRR Nb). Vertical qualification testing carried out at ORNL showed strong field emission in both cavities. Repeated high pressing water rinsing had no effect field emission reduction. Inspection revealed sharp edges anear the irises between the end cells and the beam tubes. Mechanical polishing was carried out at ORNL giving desirable smoothed surfaces where the sharp edges were present.

A light BCP processing is needed for the purpose of eliminating the polishing media embedded into the Nb inner surface. The required removal amount is 20 micron on average as measured at the equators of the cavity. It is anticipated that this would give the irises between the end cells and the beam tubes a removal of about 30 micron, needed for eliminating the embedded polishing medium.

**Wall removal measurements**

8 locations shall be selected along the same meridian of the cavity,

* One each on the equator for a total of 6 equator locations.
* One each on the beam tube for a total of 2 beam tube locations.

Each location should be permanently inscribed with circular marks for controlling the thickness measurement locations. Prior to the BCP processing, the starting wall thickness should be measured three time at each of the 8 locations. The average value at each location should be used as the starting wall thickness at that location. After the BCP processing, the local wall thickness measurement should be repeated at each location. The difference between the “after” measurement and the “before” measurement at each location is the local removal. All values should be captured and reported in a spreadsheet document.

**BCP processing process and in-situ removal monitoring**

BCP processing shall be done with the cavity oriented with the RF input coupler port at the lower side. In-situ removal monitoring shall be implemented with the ultrasonic thickness probes mounted at the equatorial marks mentioned above. 6 probes are desired. If only 4 probes are available, the the cell 1,2,5,6 shall be monitored. In any case, the average removal of all the installed probes shall reach 10 micron then the BCP processing shall be terminated. This is to be followed by cavity flipping and another 10 micron removal as controlled by the average value all the installed probes. The in-situ removal data shall be recorded and reported in a spreadsheet document.

**Post BCP cleaning, packaging and shipping**

After the BCP processing, the cavity shall be high pressure rinsed for two cycles (use the standard JLab HPR processing parameters and the identical wand head for SNS PPU cavities). Then the cavity shall be drip dried overnight in the clean room. Then the cavity shall be bagged in clean room compatible plastic bag back filled with dry nitrogen gas and shipped back to ORNL using the original shipping container.

**Orders of cavity**

HB62 shall be BCP processed first. HB60 shall be later.

**Work report**

A final report shall be furnished to ORNL within 2 weeks of completion of each cavity (two reports total). The content of the report shall include the process data as well as the actual cost numbers (direct and indirect).