

**National Compact Stellarator Experiment (NCSX) SubC# S-04344-F
Vacuum Vessel Manufacturing Development and Prototype Fabrication**

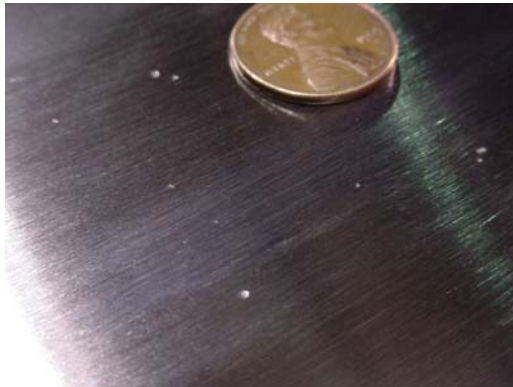
Weekly Status Report 02/02/04 thru 02/13/04

Project Management

- MTM enjoyed hosting the visit from Mike and Frank this week, the visit was a tremendous help in understanding the needs of PPPL and MTM.
- MTM will be sending in different reports from our system in the attempt to find a better way of communicating our MIT which is created in our Visual Manufacturing software. Along with this will be a map (picture) of the operations laid out as seen on our system.

Process Engineering

- We are looking into the surface irregularities uncovered during polishing of the panels. We are working with the mills to see what the best surface we can get is. We will compile the cost and risk of; the material coming directly from the rollers vs. having the mills start with thicker material then removing the surface so the base material we start with will have a good surface finish.



PVVS Fabrication

- Although the test panel weld configuration was successful, and results are within specified tolerance (approx. $-.065$ " to $+.097$ "), we continue to make slight adjustments to the weld preparation geometry and our distortion control techniques. The first PVVS production weld joint (panels 1 and 3) was altered from the original concept to slightly increase the included angle and incorporate an approximate $1/16$ " root opening in order to provide an approximate $1/4$ " weld face opening. This provided profile inspection results of $(-.057$ to $+.090$ " (over a longer, more "distortion prone" weld / profile configuration)). The second production weld (2 and 5) has been altered by increasing the root opening to $.080$ -. 100 ". The second weld joint (2 and 5) is near complete and is now on course to finish closer nominal geometry when complete. The number of welds per joint has been reduced from 7 passes to 5. Currently, it appears the (2 and 5) weld joint configuration will be the optimum geometry to provide our best effort in distortion control. After completion, it will be evaluated by Manufacturing, Engineering, and Q/A. Changes / improvements will continue to be made if deemed necessary. The successful weld joint / distortion control technique developments demonstrate the number of in-process profile inspection operations is both excessive and redundant. The current plan of recording profile at each weld pass will be reduced to one check when tack-welded, one check after the interior cover pass is complete, and one check after the exterior cover pass is complete.



Panels 2 and 5 after welding (started weld 2/12 finished weld 2/13)

Quality Control

- Vacuum testing hardware has been procured, and expected to arrive within the next few days.
- A destructive weld test was performed this week on a sample of rolled and welded tube per the requirements of ASTM B705 (8.2). The test was successful and confirmed the plasma arc welding process provided a mechanically acceptable weld for the port extension tube (64880-33/1). The test sample will be retained, and made available to Princeton if desired.

