

In-Vessel component design guide lines
Mach 7, 2007

- 1) All non-metal components must be able to withstand a 150 C bake for several hours
- 2) All plasma facing components (TZM) must be baked to 600 C before installation (when installed for the first time)
- 3) All coated components (ceramic, etc) must be baked
- 4) All components secured with studs must have a weld relief c'bore.
- 5) Design components to use 5/16 studs, typically the studs are 0.625 inches long.
- 6) Design components to permit shimming for final position adjustments.
- 7) Studs are typically welded to Inner and Outer walls meaning that engaging components must have slotted holes.
- 8) Design components with greater clearances holes than indicated in design tables.
- 9) Avoid designing components with bolts smaller-than 8-32s, best is to design everything using 1/4-20 bolts.
- 10) Complete model to its fullest state, this helps see conflicts/interferences with washers, nuts or other components.
- 11) All bolts and nuts must have a locking mechanism, (spot welded shim stock, or Belleville washer okay)
- 12) All threads must be vented
- 13) All engaging thread must be silver plated, either the bolt or the nut.
- 14) Although we have pretty good models always double check in-vessel location with survey pictures. Each time the machine is closed a complete picture survey is done, please check these pictures. Also please check with others in the group and or with the physicist with whom you are working.
- 15) All in-vessel components must be design to fit through an horizontal port.
- 16) Be generous with clearances between components and vessel surfaces try to maintain a minimum of 0.125" clearance. When this is not possible alert me or the people you are working.
- 17) Check the PSFC/Alcator web site for in-vessel allowed materials.
- 18) Typically in-vessel work takes four to five times longer to perform when compared to working on a lab.
- 19) Design components stronger than needed,
- 20) Double check everything, don't rely only on models, make sure that critical dimensions are verified.