DESIGN OF THE FILL/TRANSFER CRYOSTAT FOR THE OMEGA CRYOGENIC TARGET SYSTEM,* C.R. Gibson, General Atomics, San Diego, California 92121 – General Atomics is designing, testing and fabricating a system capable of filling and inserting cryogenic intial confinement fusion targets for use in the University of Rochester's Laboratory for Laser Energetics OMEGA laser system. A prototype system has demonstrated the filling of 1 mm diameter, 3 μm wall plastic spheres to 1100 atm with deuterium and then cooling them to 16 K to condense the fuel. The production design must be capable of routinely filling and cooling targets with a 50/50 mix of deuterium and tritium and then inserting them into the focus of 60 laser beams. This paper discusses the design and analysis of the production Fill/Transfer Cryostat. The cryostat has two major components, a fixed insulated base and a removable insulated dome. The joint between the base and the dome is similar to a bayonet fitting and is sealed by a room temperature elastomeric o-ring. Since the cryostat must be housed in a glove box, its design is driven strongly by maintenance requirements. To reach the equipment inside the cryostat, the dome is simply unbolted and lifted. The inside of the cryostat is maintained at 16 K by a closed loop helium flow system. Gaseous helium at about 200 psi flows through tubes which are brazed to the inner walls. Cooling is provided by several cryocoolers which are located external to the cryostat. Liquid nitrogen is used as a heat intercept and to precool the helium gas.

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