

Reference Document 2.2. NASA-KSC Calorimeter

The contractor shall provide a test article (coupon) for use on the cylindrical test instrument Cryostat-100, located at NASA-KSC. After installation on the 6.6-inch diameter of the cryostat cold mass, the coupon shall be approximately 40 inches in length and 1 inch in thickness. The layer density of the coupon should be identical to the proposed MLI blanket for the test tank. Special consideration shall be made for the design, preparation, fit up, and installation assembly of the single seam of the coupon so as to minimize its effect on the total heat leak through the coupon.

The coupon should be designed for application to the cryostat on site at KSC. All materials shall be maintained and packaged using clean handling methods as per required specifications. Materials should be baked out (if required/preferred) before they arrive at KSC. One pumping and backfill cycle will be performed with GN2 before testing. The installation of the temperature sensors is necessarily integral with the assembly and installation of the coupon. Installation must be performed in the vertical direction and therefore provision must be made in the coupon design for all layers to remain in their correct locations, radially and vertically. The installation can be performed by NASA or the vendor. Figure 1 shows a simplified schematic of Cryostat-100.

A maximum of 8 type E thermocouples (30 gauge) should be embedded within the coupon similar to the actual test blanket and at one location. The size and lengths of all thermocouple lead wires shall be specified and calculated for heat leakage rates into the coupon. The total heat leakage of these wires from the warm side vacuum shell at 293K shall be less than 2 mW.

Absolute thermal performance in terms of apparent thermal conductivity (k-value) and heat flux will be measured for the boundary temperatures of 293 K and 77 K and under high vacuum conditions in the range of 1×10^{-4} to 1×10^{-6} torr.

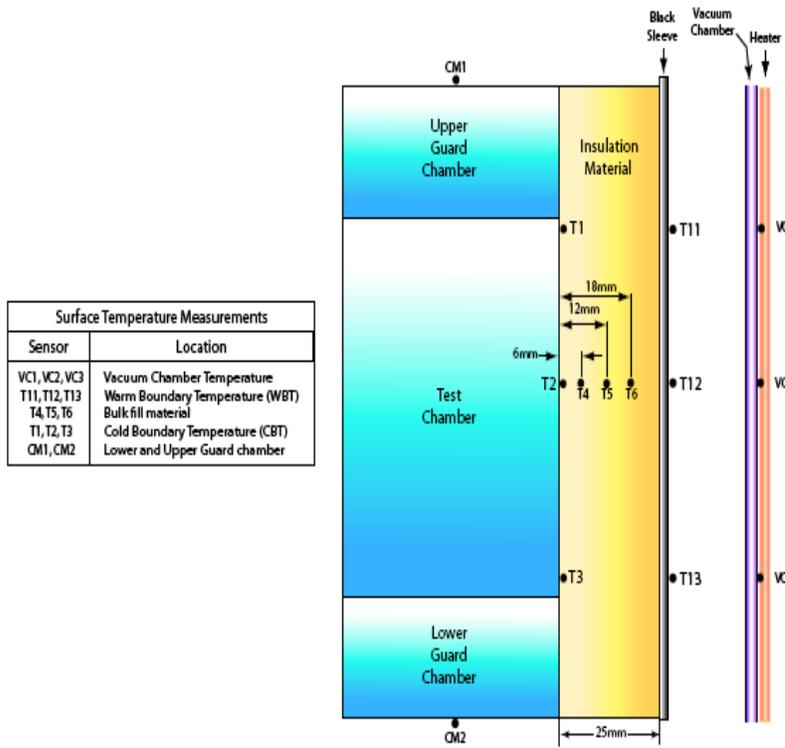


Fig. 1. Schematic of Cryostat-100. Cold mass assembly is 6.6-inch diameter by 40-inches in length.