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C3Po1A-06 [19]: Testing of Heat Flux Sensors at Cryogenic Temperatures

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Normally, in order to characterize multilayer insulation installed onto a test tank, the boil-off of the tank is measured and then heat loads from structural and fluid penetrations are calculated from temperature measurements throughout the system. For the Structural Heat Intercept, Insulation, and Vibration Evaluation Rig testing, it was determined that this approach would have significant uncertainties (over 50%) and that another method was needed to characterize the heat load through the blanket. Heat flux sensors are widely used to measure heat loads and characterize insulation systems at room temperature, however, the heat fluxes measured are usually two orders of magnitude higher than high performance MLI. Three different heat flux sensors were initially checked out on a liquid hydrogen calorimeter. One was chosen for actual implementation and 20 sensors were ordered. Of those sensors, calibration was attempted on 7 of the sensors. The results from testing and calibration are discussed.

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