26th National Symposium on Cryogenics and Superconductivity

Contribution ID : 127

THERMOHYDRAULIC AND PIPING FLEXIBILITY ANALYSIS FOR CRYOSTAT OF TEST FACILITY FOR PLATE-FIN HEAT EXCHANDERS OF HELIUM PLANT

Content :

The indigenous Helium Refrigerator/Liquefier (HRL) which is under design phase at Institute for Plasma Research (IPR) will have equivalent refrigeration capacity of ~ 1 kW at 4.5 K. The planned indigenous HRL will have 8 plate-fin heat exchangers in its main thermodynamic cycle to produce LHe and these will be manufactured by Indian Company. These 8 heat exchangers will be tested to know its thermal and hydraulic performances. For this purpose, these will be operated with temperature between 80 to 300 K using LN2. and pressure between 14 to 1.2 bar. This test facility will have significant instrumentations. to diagnose the faults, if any and measure the performances. The high performance heat exchangers developed indigenously in future will also be tested in this test facility. This chamber is designed to accommodate different sizes of heat exchangers required for indigenous helium refrigerator/liquefier of cooling capacity 1 kW at 4.5 K. LN2-cooled heat exchanger is kept vertical and all others will be placed horizontally. This paper will discuss about the layout within the cryostat andthermohydraulic and piping flexibility analysis for these.

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Session classification : Poster Session 2: Abstract ID 11,33,34,35,36,38,39,40,43,48,52,54,59,66, 67,70,71,78,88,89,90,92,94,100,102,105,107,108, 109,111,112,115,116, 120,121,124,125,127,128,129,131,190

Track classification : Heat Transfer / Thermal Insulation / Thermal Analysis

Type : --not specified--