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THERMOHYDRAULIC AND PIPING FLEXIBILITY ANALYSIS FOR CRYOSTAT OF TEST FACILITY FOR TURBINES 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 3 turbines as expansion machines to produce cooling effect and these will be purchased from global market. These 3 turbines will be tested at its operating temperature between 35 to 6 K and pressure about 14 to1.2 bar. This test facility will have significant instrumentations and controls along with appropriate heat exchangers to help to reach to required low temperature and to diagnose the faults, if any and measure the performances. The turbines developed indigenously in future will also be tested in this test facility. This chamber is designed to accommodate turbines of both horizontal and vertical configurations with provision of testing the operation, control and performances of turbines having series and parallel connection configuration. This paper will discuss about the layout within the cryostat and thermohydraulic and piping flexibility analysis for these.

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