

# 26th National Symposium on Cryogenics and Superconductivity

Contribution ID : 16

## Design and fabrication of Vacuum Jacketed Transfer Line for Helium Services

### Content :

As a part of SST-1 up gradation activities, it has been envisaged to make the poloidal field (PF) coils in a superconducting state by providing appropriate hydraulic distribution. Depending upon the path lengths of different PF coils, uniform flow distribution scheme has been prepared with grouping the similar path lengths coils in three different groups. A super insulated vacuum jacketed transfer line has been designed and developed in-house to cool down the three different groups of PF coils to 4.5 K. The salient features of the LHe cryo line includes 3 supply and 2 return process pipes each (3S-2R) having a length of ~13 m with critical bends at three locations. All the process lines are housed in a single outer jacket with Multi Layer Insulation (MLI). Some of the critical design parameters are pressure drop of ~ 0.25 mbar/m for each process lines at 4.5 K and total allowable heat load of < 3 W/m. A detailed layout, fabrication and assembly of this cryo line will be highlighted in this paper along with the quality assurance and control aspects during various processes.

### Summary :

An integrated 3S-2R Liquid Helium cryo line interfaces the main SST-1 tokamak and the IFDC system of the main cryo facility. The first time at IPR, in-house development of (3 supply/2 return) LHe transfer line has been realized. During each stage of manufacturing, installation & commissioning of this cryo line, stringent quality assurance and quality control procedures have been followed by a detailed quality assurance plan. During the recent SST-1 campaign the performance of this LHe transfer line has been found satisfactory.

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