Contribution ID: **144** Type: **Poster Presentation**

Modelling and Testing of Fin-type Heat Exchangers for the ITER Current Leads

Tuesday 30 June 2015 14:00 (2 hours)

The ITER current leads will transfer large currents of up to 68 kA into the biggest superconducting magnets ever built. Following the development of prototypes and targeted trials of specific manufacturing processes through mock-ups, China is preparing for the series fabrication in ASIPP (Chinese Institute of Plasma Physics). A key component of the ITER HTS current leads are the resistive heat exchangers. Special R&D was conducted for these components at CERN and ASIPP in support of their designs. In particular several mock-ups were built and tested in room temperature gas to measure the dynamic pressure drop and compare to 3D CFD models. The benchmarking of the models on experimental data has helped in defining the proper modelling parameters. Finally this paper will also report on the results obtained during operation under nominal conditions on the heat exchanger sections of the ITER current lead prototypes.

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Session Classification: C2PoN - Cryogenic Power Cables and Leads II

Track Classification: CEC-08 - Cryogenic Power Cables and Leads