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# Study on Heat Transfer of 4.5K Supercritical Helium Coiled Sub-cooler

Helium forced flow cooling was demonstrated as a reliable way for superconducting (SC) magnets. For the large Cable-in-Conduit Conductors (CICC) in high magnetic field, supercritical helium forced flow cooling is utilized. A coiled sub-cooler for 4.5 K supercritical helium, which is the vital component of the system, has been designed and manufactured to supply required helium for the SC magnet. The coiled sub-cooler installed in the valve box has been tested during the experiment process of SC magnet. In this paper, the design details and the heat transfer performance of the coiled sub-cooler are presented. The analysis of test results reflects the design principles for the coiled sub-coolers.

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