MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **885** Type: **Contributed Oral Presentation**

Thu-Af-Or24-07: Small solenoid made from round HTS superconducting cable

Thursday, 26 September 2019 18:15 (15 minutes)

In the previous systematic research on short models of round CORC-like cables the range of design parameters like the core diameter, lay angle, pulling force etc. have been identified that should be respected in long-length cable production. Based on this knowledge we have manufactured 40 m long cable with two layers each comprising four Furukawa-SuperPower tapes 4 mm wide. Tapes are laid in helical manner with lay angle of 35 degrees on Cu tube with outer diameter 6.35 mm with production rate of 6 m/hour. The cable was then used to wind the solenoidal coil with four layers each containing 20 turns. The solenoid outer diameter was 18 cm. Measurements of individually energized tapes have been performed to check the retention of critical currents during cabling and coil winding procedures. Our tests confirm that one can completely exclude critical current degradation of any tape due to handling procedures.
Because of our CORT (Conductor-On-Round-Tube) design the central tube can be used for the flow of a coolant. We report on the measurements of coil performance at different temperatures and cooling regimes.

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Session Classification: Thu-Af-Or24 - Diagnostics and Test Results of Coils