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

Contribution ID: **1103** Type: **Poster Presentation**

Wed-Af-Po3.19-02 [48]: Performance Test of a Geometrically Symmetrical Strand Fabricated by 2G Wires at 4.2 K

Wednesday, 25 September 2019 14:00 (2 hours)

Because of the well mechanical property and high current capability, geometrically symmetrical strands made from second generation (2G) wires are promising for large scale high-field magnets typically operated at 4.2 K. This paper performs the first tests of a geometrically symmetrical strand in liquid helium and magnetic field of up to 6 T. The critical current and its anisotropy under background direct current (dc) magnetic field are measured and compared with the estimated value from single tape data. The impacts of transverse Lorentz forces on the current carrying capability of the strand is characterized by the repeatedly cycled magnetic background field. To lower the total resistance of whole circuit, three stacking methods of wires on strand terminations are measured and contrasted at 77 K. The testing results have great significance for using high-temperature superconducting (HTS) geometrically symmetrical strand in high-field magnet applications.

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Session Classification: Wed-Af-Po3.19 - REBCO Wires & Cables IV