

Abstract submitted to the 17th International Conference on Magnet Technology (MT-17) in Geneva, Switzerland, September 24-28, 2001

Batch Testing of BSCCO 2212 Cable in Subcooled Liquid Nitrogen*

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A technique has been developed for the non-destructive testing of long lengths of Rutherford cable made from BSCCO 2212 wires in liquid nitrogen. The cable is wound in a large diameter spiral using Kapton insulation and removable voltage taps so that the conductor can be subsequently recovered for use in making developmental magnets. Since the critical temperature of this material is somewhat lower than 77 K, the liquid nitrogen bath must be pumped to reduce the temperature. As the pressure is lowered the critical temperature of the individual sections defined by the voltage taps can be determined and the critical current measured as a function of temperature. A temperature of 56 K can be readily achieved with the same equipment used for superfluid testing in helium. Two lengths of cable have been tested to date. The first, 30 m in length, was instrumented with copper foil voltage taps every 3 m and exhibited significant variations in critical current and transition temperature over its ten segments. This cable, in the same setup, was also tested in liquid helium at 4.2 K. Good correlation was observed between the 56 K and the 4.2 K measurements. The second cable, divided into eleven two-meter sections, was more uniform than the first and had a significantly higher overall critical current. Results will be presented on these conductors and on new, improved cables currently being heat-treated.

*Work supported by U.S. Department of Energy under contract No. DE-AC02-98CH10886.