

## Magnetic AC Loss Characteristics of 2G Roebel Cable

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**Abstract**— Roebel cable has been successfully manufactured using second generation (2G) YBCO wire. Roebel shaped strands of width 2mm and a transposition length of 90 mm were cut from 40 mm wide tape supplied by American Superconductor Corporation. The tape has a weakly ferromagnetic Ni-5at%W alloy substrate. Eleven insulated strands were assembled to form the cable. This paper reports results for the magnetic AC loss as a function of field amplitude for an insulated 2G Roebel strand and insulated multi-strand Roebel cable in perpendicular and parallel field orientation. In parallel field, the loss at the highest field amplitude measured is reduced by a factor of approximately 30 below the losses in the perpendicular field. In perpendicular field, the losses at the low field amplitude of the Roebel cable sample is influenced by the magnetic substrate. At high field amplitudes ( $> 0.1$  T), the cable and total strand loss converge as expected for an insulated cable, where coupling currents are absent.

**Index Terms**— AC loss, HTS coated conductors, Roebel cables.

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