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## High-temperature superconducting CORC® magnet cable and wire development and their application

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Advanced Conductor Technologies has been developing Conductor on Round Core (CORC®) cables and wires wound from REBCO coated conductors for use in high-field magnets. An overview of the current status future developments of the CORC® cables and wires is presented. CORC® cables with thickness of 5 to 8 mm have been developed for use in larger magnets that require only very limited bending of the cable. CORC® cables have been bundled into 6-around-1 cable in conduit conductors (CICC) for fusion and detector magnets. The latest results of a 80 kA CORC®- CICC tested at 11 T in SULTAN will be highlighted. Much more flexible CORC® magnet wires are being developed for accelerator magnets that require a current density  $J_e$  at 20 T of at least 300 A/mm<sup>2</sup>. We will outline the development and test results of a 3.7 mm thick, robust CORC® wire wound from tapes with 30  $\mu$ m substrates, that is bendable to diameters of less than 50 mm. The CORC® wire is capable of reaching a  $J_e$  at 4.2 K and 20 T of over 300 A/mm<sup>2</sup>, and likely over 600 A/mm<sup>2</sup> when wound from tapes with even thinner substrates that are expected later in the year. Finally, two high-field insert magnets are being developed using high- $J_e$  CORC® wires. The first is a high-field insert solenoid that is expected to generate at least 3 T in a background field of 14 T, while the second magnet is an accelerator-grade canted cosine theta insert magnet that would generate 5 T in a background field of 10 T. The development of these first two CORC®-based high-field magnets will be discussed.

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