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High-field magnets wound from CORC® cables or wires

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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 of the CORC® cables and wires will be presented, including details about the application of CORC® cables and wires in different types of magnets. Large magnets for fusion require multiple CORC® cables to be bundled into a 6-around-1 cable in conduit configuration (CICC) where large transverse stresses act on the cables. The cable design and test of a 80 kA CORC®-CICC in SULTAN will be discussed.

Four programs are currently ongoing in which CORC® wires will be used to develop high-field insert magnets that will be tested in various background fields within the near future. The first program is developing CORC® wires for canted-cosine-theta (CCT) accelerator magnets that ultimately will generate 5 T in a 15 T background field. The second program is focused on developing a CORC® wire insert solenoid that would about 3 T in a 14 T background field and is scheduled for completion in early 2018. The third program aims to develop CORC® wire racetrack coils that would be tested in FRESCA-2 at CERN. Finally, a fourth program is developing a common coil magnets wound from CORC® cables. We'll provide an overview of the status of each of these magnet programs, starting with modeling of the magnet layout, stresses and performance, their conductor winding, and of the magnet construction and test preparation.

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