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REBCO Tape Performance Specification and Performance vs. Production for the Muon Collider

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***Abstract*—The Muon Collider, under study at CERN and laboratories associated in the International Muon Collider Collaboration, is one of the options considered by the European Strategy for Particle Physics and now the focus of an active R&D program in physics and technology. The challenges of a Muon Collider are many, not least on high-field superconducting magnets. After an initial reflection on muon beam needs and magnet characteristics, use of high-temperature superconductors is unavoidable and thus the preferred technology. The reasons are not only the required magnetic field performances (e.g. in the wide bore target solenoid more than 20 T, and in excess of 40 T in the series of solenoids for the final cooling of the muon beam), but also the importance of improving cryogenic efficiency (operation at 20 K) and reducing electricity consumption. In this context, we provide a summary of the performance requirements for REBCO tapes, which we then compare to the Ic(B,θ,T) characterization results of state-of-the-art tapes from leading manufacturers, highlighting the key technical challenges that remain to be addressed.**

***Keywords (Index Terms)*—REBa$_2$Cu$_3$O$_7$, Coated Conductors, High Field Magnet**

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