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A 9 T Cryocooler Cooled High current density NbTi superconducting magnet

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We have developed A 9 T Cryocooler Cooled NbTi superconducting magnets. The system has a 60 mm cool bore and 0.1% homogeneity over a 10 mm diameter and 15mm length region. The cooling power of the cryocooler is 1.5 W at 4.2 K. The cool down time from room temperature to operating temperature is 15 hours. Three different diameter NbTi wire was used for winding the magnet. The maximum engineering current density is 795 A/mm². In case of a quench the current density in the copper stabilizer is 1400 A/mm². A network of resistors and diodes was used to protect the magnet. This paper presents the magnet design, construct and the test results.

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