

Tests Results of Nb₃Sn Quadrupole Magnets Using a Shell-based Support Structure

In support of the development of a 90mm aperture Nb₃Sn superconducting quadrupole for the US LHC Accelerator Research Program (LARP), test results of five quadrupole magnets are compared. All five assemblies used key and bladder technology to compress and support the coils within an iron yoke and an aluminum shell. The first three models (TQS01a, b, c) used Nb₃Sn MJR conductor and segmented bronze poles. The last two models (TQS02a, b) used Nb₃Sn RRP conductor, and segmented titanium alloy (TiAl6V4) poles, with no axial gaps during reaction. This presentation summarizes the magnets performance during assembly, cool-down and excitation and compares measurements with design expectations.