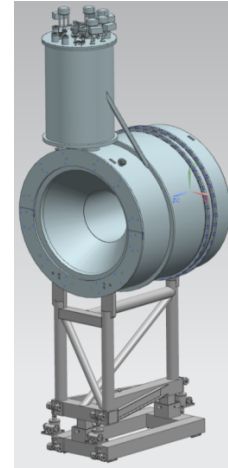


CLAS12 –Solenoid Magnet

The CLAS12 Solenoid is a self-shielded (actively shielded) super-conducting magnet around the beam line to produce a field primary in the beam direction. It has been driven by the following physics requirements:

- Provide field for magnetic field for tracking of central particles
- Moeller electron shield
- Uniform field ($\Delta B/B < 10^{-4}$ in $\phi 2.5 \times 4$ cm cylinder) for polarized target operation



Solenoid - TECHNICAL PARAMETERS

PARAMETER	DESIGN VALUE
Magnet Type	Solenoid
Number of Coils	5
Coil structure	Layer wound
Number of turns in main coils	3704 (2 x 840 + 2 x 1012)
Number of turns in shield coil	1392
S.C. cable	SSC 36 strands
Nominal current (A)	2416
Central field (T)	5.0
Peak Field (T)	6.56
Field homogeneity in $\phi 2.5 \times 4$ cm cylinder	1×10^{-4}
Peak Field Location	Inner turn near warm
B-Symmetry	Yes
$\int Bdl$ @ nominal current (T-m)	7.0
Inductance (H)	5.89
Stored Energy (MJ)	< 20 MJ
Warm bore ϕ (mm)	780
Total weight (KG)	18800
Cooling mode	Conduction cooled
Supply temperature (K)	4.2
Temperature margin	Min 1.5
Conductor Used	SSC outer dipole w 17 mmx2.5mm copper channel
Turn to Turn Insulation	0.004" Glass Tape $\frac{1}{2}$ Lap

- **Construction Strategy and Project Leadership:**
 - Solenoid magnet SOTR: John Hogan
 - Construction strategy:
 - Magnet has been designed and is being fabricated by Everson Tesla Inc. (ETI). ETI is responsible for electromagnetic, thermal, mechanical designs, and quench analysis. In addition, ETI shall provide all QA/QC associated with the manufacturing and assembly of the cryostat.
 - ETI will have an active role in start-up and commissioning the magnet at JLab
 - JLab responsibilities:
 - Provide the SSC cable soldered in Cu Stabilizer to ETI
 - Design the instrumentation, power and control system for the magnet
 - Shipping and delivery of the solenoid magnet to Hall B
 - Install and commission the magnet in Hall B
 - Design & fabrication of cryogenic supply/return system – SST (solenoid-service-tower) for the magnet

- **Significant Dates:**
 - Mar. 2014: FDR at ETI
 - Dec. 2014: MRR (Coil) at ETI
 - Jun. 2015: Inner Coils Wound & Potted
 - Dec 2015: MRR of Cold Mass Assembly
 - Jan. 2016: Intermediate Coils Wound & Potted
 - Jun. 2016: Shield Coil Wound & Potted
 - Dec. 2016: Cold Mass assembly complete
 - Jan. 2017: SST delivered to Hall B for pre-installation
 - Apr. 2017: Factory testing
 - May 2017: Shipment to JLab

- **Project Status:**
 - Final Design Review complete
 - New power supply in delivered onsite and positioned in Hall B
 - All Coils: Winding & potting complete
 - All Manufacturing Readiness Reviews (MRR's) complete
 - Solenoid cold mass assembly complete
 - SST complete and delivered to Hall B
 - Cryogenic & Control systems installed and being tested

Last Updated: March 21, 2017



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