

SiD Solenoid Weights and Dimensions Relevant to Transportation

SiD Engineering Note: SiD Solenoid Weights and Dimensions Relevant to Transportation

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This note lists the relevant shipping size and mass of the SiD solenoid largest components. For reference the baseline assembly sequence (as detailed in the DBD) is also listed.

SiD SOLENOID DIMENSIONS AND WEIGHTS FOR TRANSPORTATION				
ITEM	QUANTITY	MASS	Diameter	Length
		(metric T)	(O.D. meter)	(meter)
COMPLETED COIL MODULE	2	64	6.578	2.793
CRYOSTAT OUTER VACUUM SHELL	1	16.5	6.858	5.800
CRYOSTAT INNER VACUUM SHELL	1	12.7	5.308	5.800
TOTAL CRYOSTAT WITH END FLANGES	1	33.3	6.858	5.900
NOTES: 1) Each coil winding with its winding mandrel is estimated to be 60.7 m Ton.				
2) Total weight includes DID coils, coil splice ends and tie rods.				
DID coils and tie rods may or may not ship separately				
3) Thermal shields are made from multiple pieces. Their weight and size is small in				
comparison to a coil module or cryostat component.				
4) The OD of the coil module includes the radial distance of the end flanges.				

SiD SOLENOID ASSEMBLY SEQUENCE:

1. The coil mandrels are precision machined with welding of seamless end rings and cooling loops. The cooling loops are extensively leak tested.
2. The solenoid modules are wound with each layer in alternating direction.
3. The four DID coil modules are wound on a 3 mm thick Al sheet that is mounted onto a machined cylinder. The internal coil to coil splices for each of the four modules are completed. A 5 mm sheet is attached to the outer diameter of the DID coils.
4. The DID coils are vacuum impregnated. This is a higher temperature resin than the solenoid resin.
5. The DID coils are mechanically attached on top of the solenoid cooling loops with screws to the solenoid mandrel.
6. The Solenoid modules with attached DID coils are vacuum impregnated.
7. The two mating ends of the solenoid modules are precision machined.
8. The solenoid modules are stacked vertically and joined above ground at the detector site.
9. All 24 solenoid splices are completed above the DID. All DID module to module splices are completed
10. The axial tie rods are attached to the solenoid.
11. The inner and outer thermal shields are mounted to inner and outer vacuum shells.
12. The inner and outer vacuum shells are placed on the solenoid.
13. The vertical and radial tie rods are attached to the outer vacuum shell.
14. All internal plumbing and electrical connections are completed along with the mounting of the thermal shield end plates. Piping extends a short distance past the chimney opening. The solenoid lead ends and DID lead ends extend through the vacuum shell current lead opening and are wrapped in a loop.

15. Top and bottom vacuum end plates are welded.
16. All tie rods are tightened.
17. The completed magnet assembly is rotated horizontal on a shaft parallel to the ground using the overhead crane and two pulling cables.
18. The magnet is moved to the detector cavern and lowered vertically into the bottom half of the magnet iron.
19. The current leads and cryogenic chimney pipe assemblies are completed and welded.