

DCA318 Production Report

TS-SSC 92-059

May 26, 1992

S.A. Gourlay

DCA318 is the last SSC 50 mm aperture collider dipole string test magnet built at Fermilab. Its assembly followed the baseline as stated in the 50 mm Collider Dipole Magnet Requirements and Specifications Book (the "Yellow Book"). This report will summarize the production history of DCA318 and any relevant discrepancies from the baseline design. Particular attention will be made to describe anomalies that are judged to have a possible influence on performance. More detailed information on all assembly and testing steps may be found in the Specific Data Summary Traveler (SDST) and to the Fermilab Advanced Magnet R&D Group's technical note series. Notes in the latter series are indicated by the prefix TS-SSC.

Coil winding and Inspection

Coil winding was performed successfully.

Collared Coil Assembly

Arcing occurred while hi-potting at 4kV on coil strip heater QPH#4. It occurred at full vertical press pressure and zero horizontal pressure. The entire collared coil assembly was rebuilt [1]. It was decided that new heater strips should be used in recollaring. The only strips available were BNL heaters which have excess Kapton. During trimming, one of the heaters was cut and it was replaced with one of the original heaters [2,3]. A puncture was found in the Kapton ground wrap [4]. It was replaced. Voltage tap 16B is open on the lower inner coil (1018) [5,10]. A partial short occurred while installing the lead end clamp. It was caused by incorrect installation of voltage tap 19A in upper inner coil 15M-50-1017 [6,7,8]. The collared coil assembly was subsequently dismantled and the coil was repaired. Heater strip S/N 254 failed the wand hi-pot. One mil of Kapton was placed over the pin-hole to repair heater. The following 2kV hi-pot was successful [9].

Yoking and Shell Welding

End of yoke and skin assembly was out of round. Lead and return plates were modified to fit [11].

Final Assembly and Cryostatting

Instrumentation bundle has TQ7 purple wire open and the power bus was slightly over length [12]. The end domes did not have the correct radius [13]. The KPY-46A mounting P.C. board was not wired as per drawings [14]. The drawings were modified to reflect the board circuitry. Grooves were found in the vacuum vessel connector rings [15]. They were not believed to be a problem but the grooves at the seam joint were filled with weld as a precaution.

Final Status of Magnet

The electrical data exhibited erratic behavior from measurement to measurement [16]. An historical summary follows:

Pre-weld electrical - open taps LI 14B,16B [5,10]
compensating gauge (LE outer bottom right) SBC-262 was shorted to ground.

Post-weld electrical - Strain gauge still shorted, tap LI 16B open.

Testing at MTF (first thermal cycle) - LI 16B open prior to cooldown. LI 14B open after cooldown. Strain gauge shorting as before.

Testing at MTF (2nd thermal cycle) - LI 14D, 17D,15B, 16D, UI 18C voltage taps open.

Final Warm Test at MTF - Strain gauge still shorted. LI 13A was the only tap open.

References

1. DR281
2. DR297
3. DR362
4. DR298
5. DR318
6. TS-SSC 91-246
7. TS-SSC 91-234
8. DR327
9. DR361
10. DR371
11. DR413
12. DR419
13. DR425
14. DR427
15. DR470
16. DR507