TS-SSC 91-059 J. Brandt and R. Bossert
4-5-91

50mm Measuring Master Cross Calibration

SSC 50mm coils are measured by comparing the coils to a steel master manufactured to the design size of a compressed coil quadrant (see coil azimuthal measuring procedure #1012-ES-292238). Three sets of masters have been manufactured, all to the same specification (a set being one inner and one outer coil master). Unfortunately they are not identical. As a result we have made only one set available to measure coils so there would be no confusion about coil sizes. This set has been used to measure all 50mm short coils.

The long term solution for this problem is to order two new sets of masters (one for short coils and one for long) which will be measured and authenticated by the Bureau of Standards. These masters will be accurate to within .0001 inch. They will not be available for the beginning of the 50mm long magnet project. When they do become available, we will cross calibrate the present masters with the new ones and retroactively adjust all coil measurements to the correct size. We must meanwhile use the masters which we have available.

There are therefore a total of five sets of masters. We presently are using set #1. Sets #3 and #4 are the sets which will be authenticated by the Bureau of Standards. They are presently on order. The two remaining sets (#2 and #5) are being stored. They are clearly marked "Do not Use". There are no plans to use them at any time. They were nevertheless cross calibrated with the present set "for the record" on 4-3-91. Cross calibration was done twice, once in the short coil measuring fixture and once in the long coil fixture. The two fixtures are supposed to be identical, but calibration was done in both to verify the readings and to ensure there are no unknown differences in either the fixtures or the operating techniques of the different crews. Short coil calibration was supervised by Imre Gonczy. Long coil calibration was supervised by Wally Zimmerman.

The procedure used for cross calibration follows:

1.) Using inner master #1 in short coil gage, increase to full measuring pressure (12000 coil psi). Set Sony probe to zero.
2.) Remove inner master #1 and install #2. Increase to full measuring pressure and record difference. Remove and install #5 and repeat.
3.) Repeat in short coil gage for outer coil.
4.) Take masters #1, #2 and #5 to the long coil gage. Repeat steps 1,2 and 3 in this gage.
5.) Return master sets #2 and #5 to Jeff Brandt. Leave them marked "Do Not Use".

SSC 50mm Coil Measuring Master Calibration Data

Inner Coil Masters - Long Coil Fixture

Reading No.	Master #1	Master #2	Master #5
1	0.0000	0.0018	-0.0006
2	0.0000	0.0020	-0.0006
3	0.0000	0.0020	-0.0006
4	0.0000	0.0020	-0.0006
5	0.0000	0.0020	-0.0006
Mean	0.0000	0.0020	-0.0006

Outer Coil Masters - Long Coil Fixture

Reading No.	Master #1	Master #2	Master #5
1	0.0000	0.0003	0.0012
2	0.0000	0.0003	0.0013
3	0.0000	0.0003	0.0013
4	0.0000	0.0003	0.0013
5	0.0000	0.0003	0.0013
Mean	0.0000	0.0003	0.0013

Inner Coil Masters - Short Coil Fixture

Reading No.	Master #1	Master #2	Master #5
1	0.0000	0.0021	-0.0009
2	0.0000	0.0022	-0.0009
3	0.0000	0.0022	-0.0009
4	0.0000	0.0021	-0.0006
5	0.0000	0.0021	-0.0007
Mean	0.0000	0.0021	-0.0008

Outer Coil Masters - Short Coil Fixture

Reading No.	Master #1	Master #2	Master #5
1	0.0000	0.0002	0.0010
2	0.0000	0.0002	0.0011
3	0.0000	0.0004	0.0013
4	0.0000	0.0005	0.0012
5	0.0000	0.0005	0.0012
Mean	0.0000	0.0004	0.0012

50mm master drawing numbers (for reference): Inner coil #0102-MB-293189
Outer coil #0102-MB-293190