R. Bossert 7-3-90

TS-SSC 90-037

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DS0312 Pole Shims

This is the result of our attempt to determine the amount of extra kapton to add at the poles in magnet DS0312. Our previously determined criteria for decision is:

We consider the shim sizes in DS0310 to be our "standard". We compare the coil sizes in DS0312 to DS0310. If the sum of all coils in DS0312 is larger than those in DS0310, decrease the outer shims in DS0312 by that amount (with respect to DS0310). If sum of all coils is no larger than 310 but no more than 6 mils smaller, use the same as 310. If sum is more than six mils smaller, add shims.

We have recently switched from an old reworked NC9 coil measuring fixture to a new one made for C358 coils. All coils for magnet DS0310 were measured with the old fixture. The inner coils for magnet DS0312 were also measured with the old fixture. The outer coils for DS0312 (coils 318 and 319) were measured with the new fixture. We must therefore make a comparison between the old and new fixtures before determine the coil sizes.

New vs. Old Measuring Fixture Comparison:

Two outer coils were measured with both the new and old fixtures. They are numbers 316 and 317.

Outer 316 old fixture - (6.60 side A and 6.41 side B) = 6.50 mils
Outer 316 new - (4.3 side A and 4.42 side B) = 4.36 mils

Outer 317 old - (5.7 side A and 6.4 side B) = 6.09 mils
Outer 317 new - (2.8 side A and 3.5 side B) = 3.15 mils

The new fixture appears to be measuring approximately 2 1/2 mils smaller than the old fixture.

However, the two fixtures have different masters. If both masters are measured on the new fixture, the new master measures larger by 3.6 mils than the old master. This would make coils measured with the new master appear 3.6 mils smaller than if measured with the old master.

If we take the difference between masters into account, the new fixture now measures about 1 mil larger than the old fixture. We will (for now) ignore this 1 mil discrepancy. We will also assume for the moment that the old master is right (at least it keeps our measurements consistent with all our past measurements) and look into the problem of which master is correct later. Future coils will be measured with the old master and the new fixture until the issue is resolved.

DS0312 Pole Shims

All coils in DS0312 were measured with old fixture/old master except 318 and 319, which were measured with new fixture/new master.

DS0310 pole shims: .013 on inner and .010 on outer.

DS0310 coils: Inner 111 - 3.85 mils
Inner 112 - 4.05 mils Average = 3.95 mils

Outer 310 - 6.65 mils
Outer 311 - 6.60 mils Average = 6.625 mils

DS0312 coils: Inner 115 - 4.32 mils
Inner 116 - 3.683 mils Average = 4.00 mils

Outer 318 - 2.6 mils + (3.6 master diff.) = 6.2 mils
Outer 319 - 2.95 mils + (3.6 master diff.) = 6.55 mils
Average = 6.38 mils

So the difference is .05 mils on the inners and .25 mils on the outer. So use same pole shims as DS0310.

Before packaging the coil, remeasure coils 318 and 319 with new fixture and old master to verify results.