

## Collared Coil Harmonics for DSA330

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A mole measurement was performed on the collared coil assembly DSA330. This is the first real magnet assembly to use the all-kapton insulation scheme in both inner and outer coils. Wedge shims were used to try to increase the coil azimuthal size. The shims were chosen to place the current blocks at about the same locations as in the standard coil insulation design.

### 1) The COIL NUMBERS in the magnet are:

Upper Inner	1M - 50 - 135
Upper Outer	1M - 50 - 235
Lower Inner	1M - 50 - 136
Lower Outer	1M - 50 - 236

### 2) The COIL INSULATION scheme is:

	inner layer	outer layer
Inner coils -	50% lap .001"x.375" H	Butt .001"x.375" LT with .0002" Scotch 2290 adhesive
Outer coils -	50% lap .001"x.375" H	50% lap .001"x.375" LT with .0002" Scotch 2290 adhesive

### 3) The WEDGE SHIMMING scheme is:

Inner coils - #1 and #2 have .015" brass shim on pole side  
#3 (thick wedge) has .015" brass shim on each side

Outer coils - .010" brass shim on pole side

### 4) There are .005" kapton POLE SHIMS on the outer coil poles

### 5) COLLARED COIL HARMONICS:

The harmonics as measured with the mole are attached as Table 1. For each harmonic are given the value measured 12" toward the return end from center (close to the position at which Lab 2 centers the Morgan Coil probe to avoid the strain gage pack), and the standard deviation about the mean of six measurements taken at the center of the coil, to give an idea of the uncertainty in each measurement.

There is a large skew quadrupole moment in this coil, evidence of an asymmetry between upper and lower coils. The skew sextupole is also somewhat large.

b2 is more positive than for the glass tape / kapton insulated coils. This means that the "cold" b2 will be further from zero than before. The same can be said for b4. The 18-pole b8 is somewhat larger than before, which should make mole centering corrections more accurate.

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### Harmonics for magnet DSA330

harmonic name	Value near -9" (mole centered 12" toward the return end from magnet center)	standard deviation about the mean measured with mole centered at magnet center
a1	1.694	0.056
a2	0.655	0.051
a3	-0.050	0.051
a4	-0.006	0.035
a5	0.010	0.016
a6	-0.004	0.008
a7	0.000	0.000
a8	0.019	0.007
a9	-0.004	0.005
a10	0.003	0.002
a11	0.001	0.003
b1	0.204	0.204
b2	-1.986	0.057
b3	-0.015	0.030
b4	0.865	0.053
b5	-0.040	0.012
b6	0.040	0.010
b7	0.000	0.000
b8	0.092	0.002
b9	0.001	0.004
b10	0.022	0.003
b11	0.001	0.002