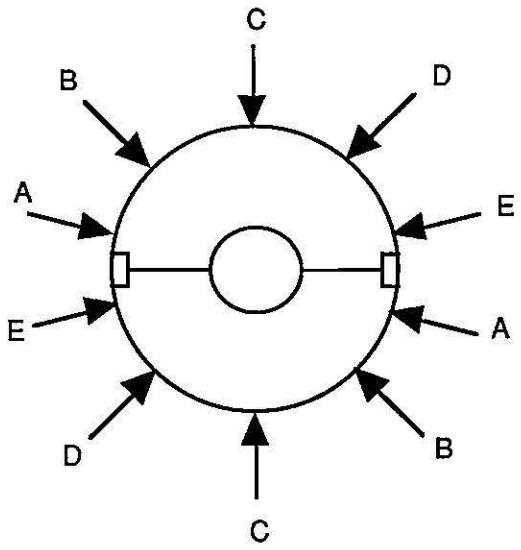
TS-SSC 91-192
9/24/91
M. Gordon

Yoke Chevron Effects

After welding of the shell, diameter measurements are made of the cold mass at one foot intervals along the length. Measurements are made at the five locations shown below. These measurements can be used as an indication of the chevron effects that may have occured during skinnning.



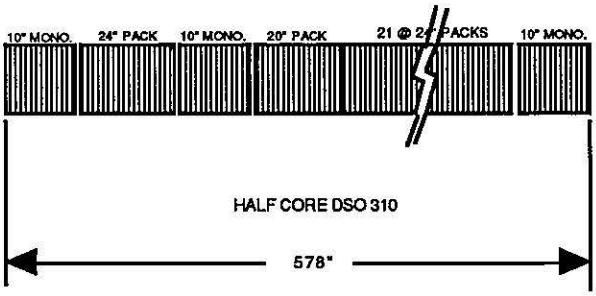
A chevron condition exists when the stacked yokes slide from position as a result of the vertical pressure applied during skinning. The shell is formed around the yoke during skinning. Thus the final diameter of the coldmass follows the shape of the yoke assembly.

SIDE VIEW OF YOKE PACKS

NORMAL CHEVRON

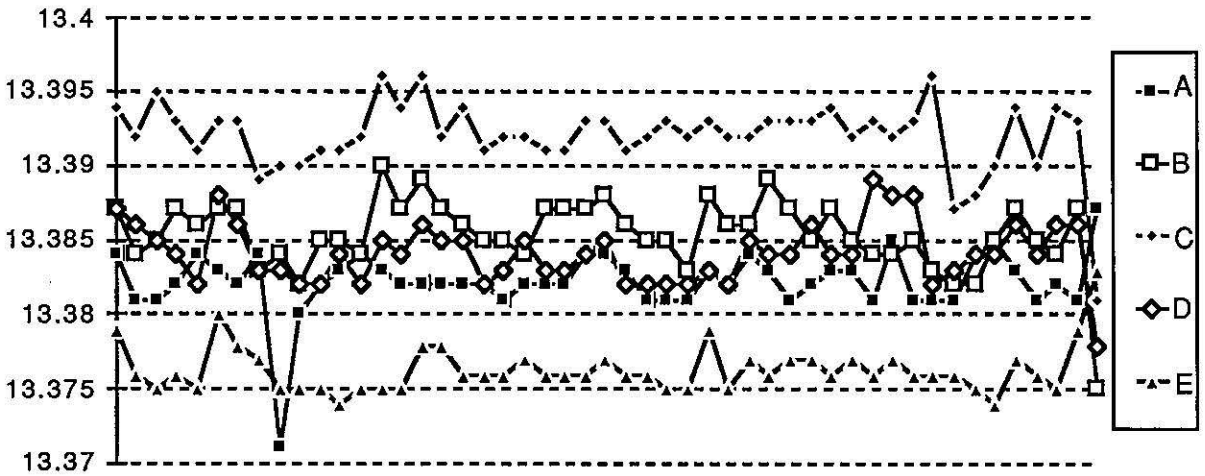
cc: R. Bossert, J. Carson, A. Devred, B. Robotham, P. Sanger, J. Strait

YOKE STACK ASSEMBLY FOR DSO-310



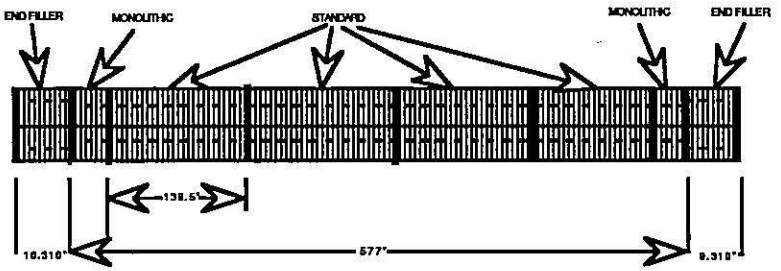
Magnet DCA-310 was built using 24 inch packs instead of the standard length 135.5 inch packs. The 24 inch packs were stacked to a high packing fraction, >99%. In addition to the tight packs, 10 inch epoxied monolithics were placed in between the first two 24 inch packs on the return end and at the ends of the magnet. A plot of the diameter measurements taken every foot on practice magnet DCA-310 is shown below.

DCA-310



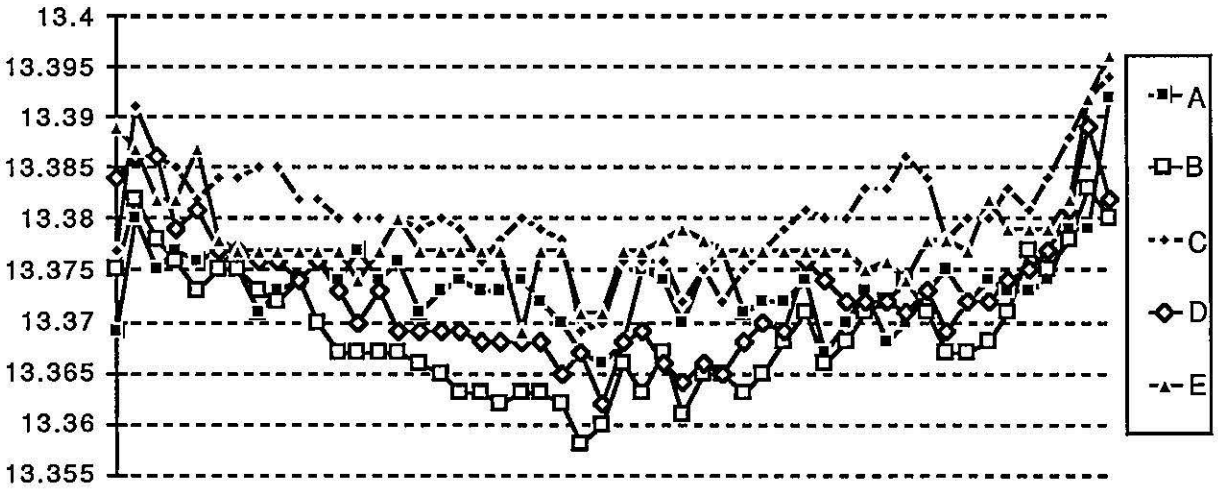
The low point on the A line is likely to be an error in reading the micrometer or recording the data. The low data points at the very end of the graph reflect the crushing of the end filler packs that were used to support the extra length of shell on the ends. The nominal diameter for 50mm magnets is 13.382 inches, the average diameter measured on 310 was 13.384. The horizontal pattern of the plot suggests that chevroning of the yoke packs did not take place.

YOKE STACKING ASSEMBLY(DCA-311)

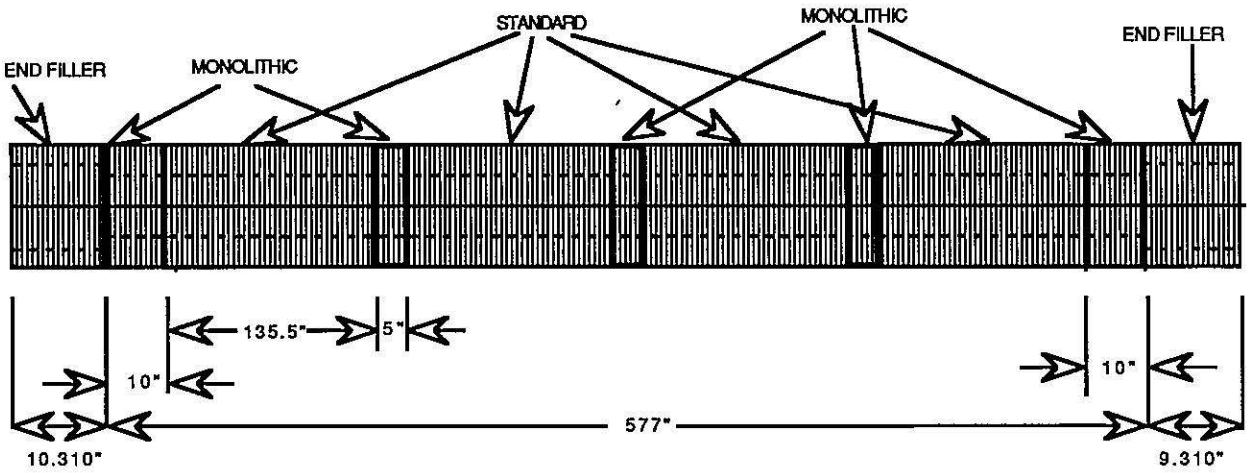


The diameter measurements of DCA-311 is displayed next. This magnet contains 139.5 inch packs stacked to 98% packing fraction. Ten inch monolithic packs were placed at the ends, monolithic packs were not used between the 139.5 inch packs. The average diameter of 311 is 13.375, which is 0.007 inches below the nominal dimension. This data indicates that chevroning did occur, the greatest at the center of the magnet.

DCA-311

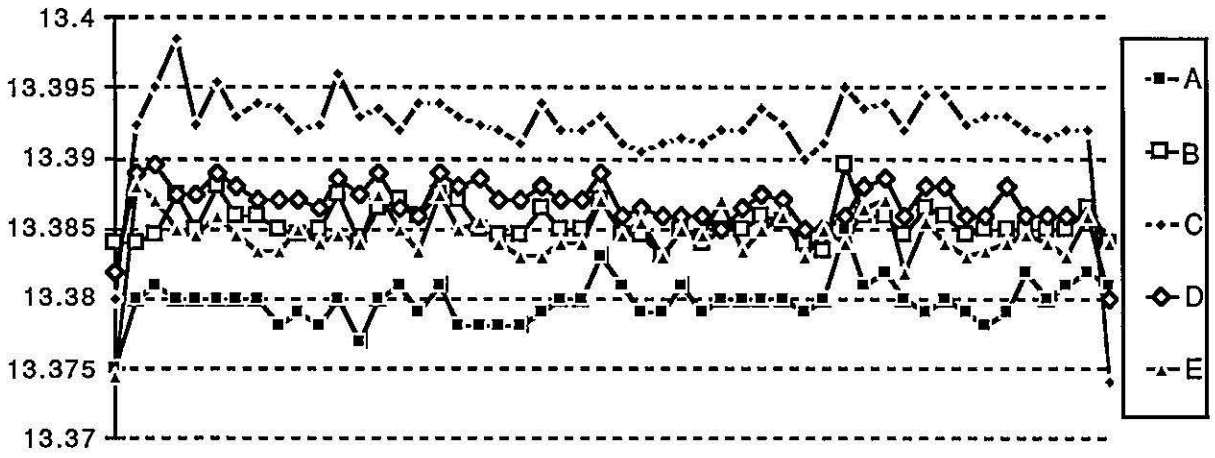


The revised yoke stacking assembly used in DCA-312 is shown below. The 135.5 inch packs used are stacked to 99% packing factor. Details of the yoke assembly used in 312 are discussed in the tech note Revised Yoke assembly for the 50mm SSC Dipole.



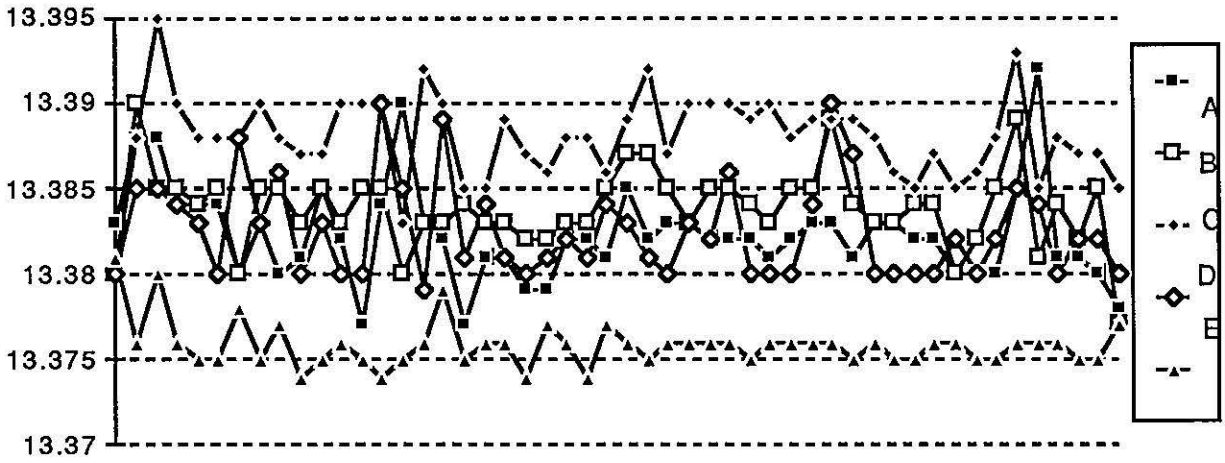
The next graph is the diameter measurements taken every foot on 312. The average diameter was 13.386, 0.004 inches larger than the nominal. The graph indicates that chevroning of the yokes is not occuring in this magnet.

DSA-312

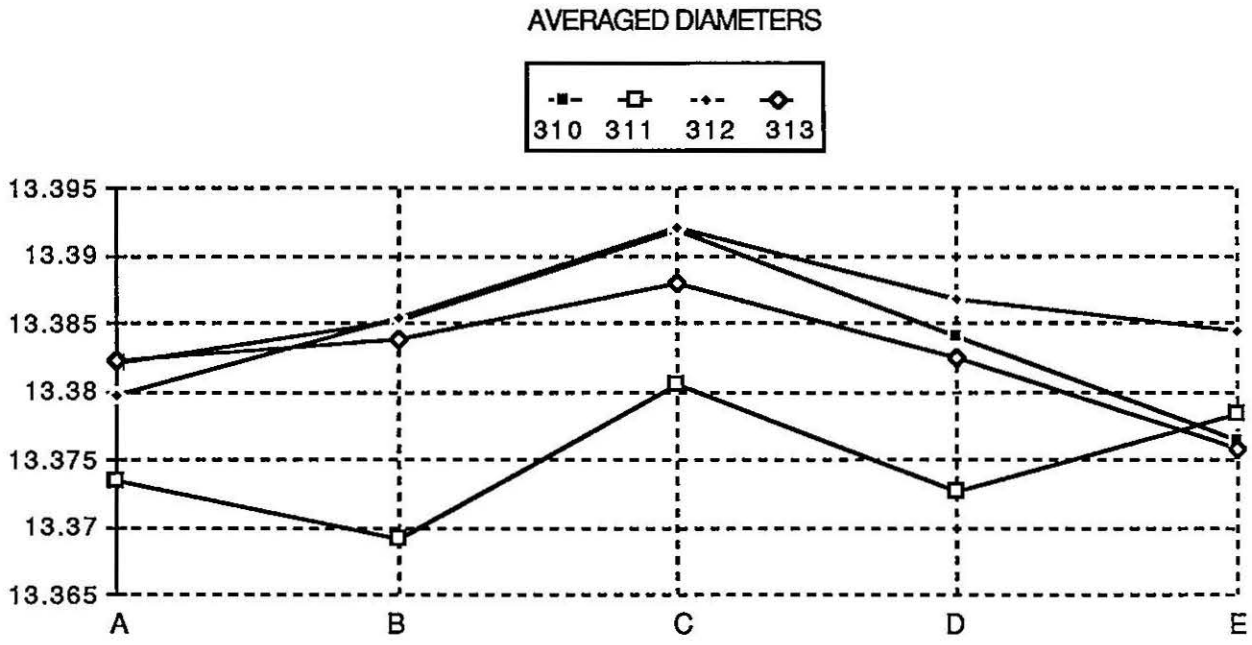


The graph of 313 is shown below. This magnet has the same yoke assembly as 312. The average diameter of this magnet was the nominal dimension of 13.382. Chevroning is not suspected in this magnet.

DCA-313



Averages of the five different positions were computed for each magnet. This data is displayed in the graph below. The conclusion is that magnets 310, 312 and 313 are not chevroned. Magnet 311 is chevroned because the diameter measurements are below the nominal design dimension of 13.382. The revised yoke assembly used on 312 and 313 will be used on future magnets. The diameter measurements will continue to be monitored for signs of chevroning. Note that the C position is the largest diameter in all the magnets. This effect merits further investigation, but is not the subject of this paper.


AVERAGED DIAMETERS
310
311
312
313
13.395
13.39
13.385
13.38
13.375
13.37
13.365
A
B
C
D
E