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Revised Yoke assembly for the 50 mm SSC Dipole

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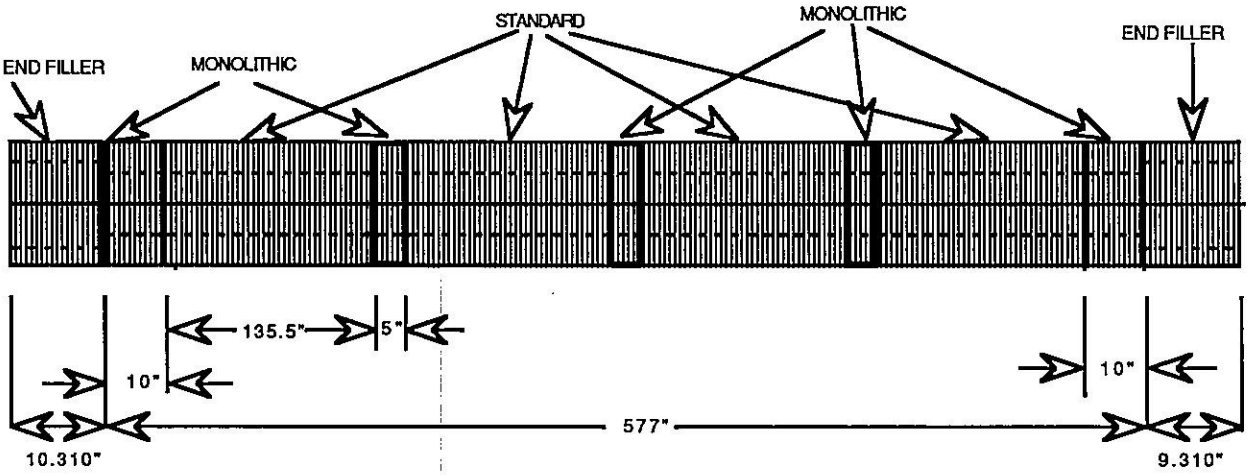
The yoke assembly of magnet DCA-312 chevroned during the skinning operation. The chevroning took place after a second pressing prior to welding. The additional pressing was necessary to verify coil strain gage readings. The magnet has been disassembled, with respect to the yoke, and will be reassembled using a revised yoke assembly. The purpose of the revised yoke assembly is to avoid the chevron effect in future magnets. This note discuses the revised yoke assemble including the axial compliance and packing fraction.

The revised yoke assembly consists of, two pairs of ten inch monolithic epoxied packs, three pairs of five inch monolithic epoxied packs and four pairs of 135.5 inch packs. The arrangement of these packs can be seen in the figure below.



Three pairs of five inch monolithic epoxied packs have been added to the original yoke assembly. The monolithic epoxied yoke packs will not chevron. The extra monolithic epoxied packs will guard against chevroning in their localized areas and resist propagation of the chevron effect from one pack to the next.

The Standard 135.5 inch packs will be packed to a higher density to resist chevroning. Packing to a higher density will increase the axial force required to compress pack. The technical note, Axial Compliance and Packing Fraction of the Yoke for the 50 mm SSC Collider Dipole Magnet TS-SSC 91-143, showed that if the force required to compress the yoke by 1 part in 1000 was $<< 24 \times 10^3$ pounds the axial thermal contraction of the yoke-shell system will be dominated by the shell and there should be little or no effect on the axial mechanics of the magnet from the yoke compliance. A packing fraction of 99% is maintained on each pack by weighing out laminations before assembly into packs. The axial expansion force of the revised standard yoke packs is measured during assembly of each pack and held under 1000 pounds at the length of 135.5 inches. Using this assembly method the axial force stretches the four pins and the pack grows 0.06 inches after assembly. The force required to compress a completed half pack one part in 1000 is < 3000 pounds. In a magnet the force required to compress the yoke assembly is twice this value because there is one pack on the top and one on the bottom. Therefor, the compliance of a yoke assembly packed to 99% is < 6000 pounds.