

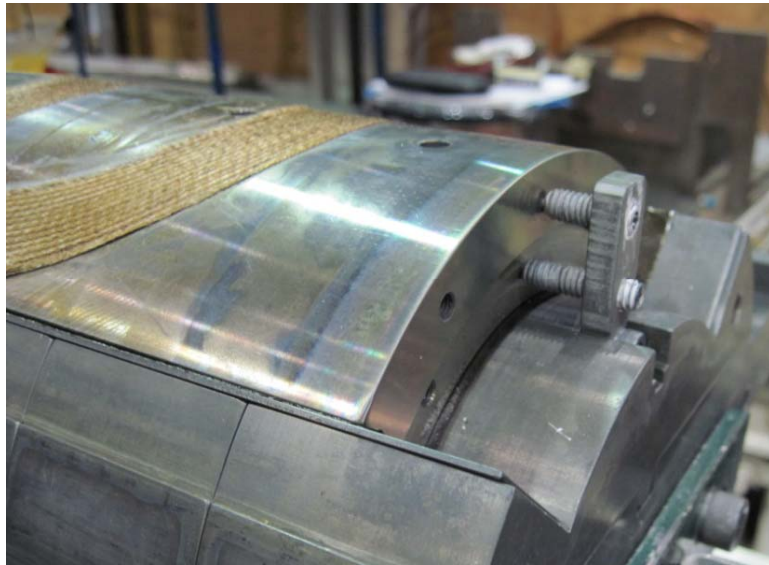
CM16

Coil Fabrication Discussion

Jesse Schmalzle, BNL
5/16/11

- Looking towards LHQ:
 - Differences in reaction and impregnation of LQ and HQ coils.
 - Areas for possible improvement.

- Saddle clamping:
 - HQ: All Saddles clamped to pole (pole layers pinned together).
 - LQ: Both LE saddles clamped, but only L1 at NL because pole pieces are not pinned and layers can move independently.
- Coil length:
 - LQ: L1 significantly shorter than L2.
 - HQ: L1 also shorter but not as severe.
 - Make adjustment to saddle length to make ends more even.



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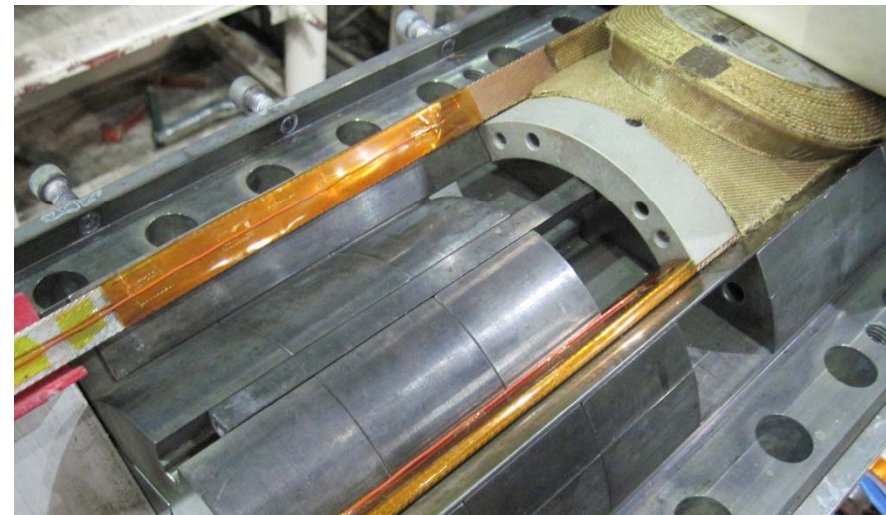


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- Lead soldering:
 - Saddles typically removed to facilitate soldering / cleaning.
 - Insulation on lead is very brittle, requires patching after soldering.
 - Consider making the saddle extension an inch or two longer so that solder joint starts well beyond saddle. This may eliminate the need to remove the saddles.
- Saddle to coil shorts:
 - Numerous coils have required additional insulation between saddle and coil turns.
 - Adjust saddle size to allow for several layers of extra insulation, all the way to the tips. (same for end spacers?)



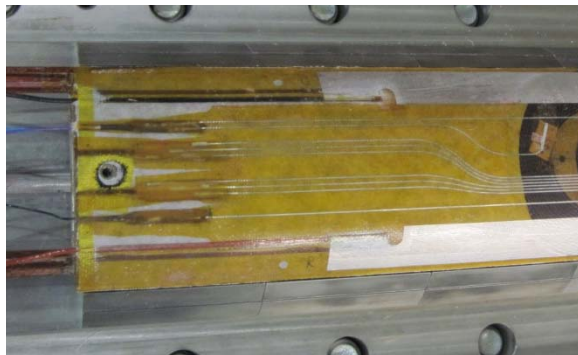
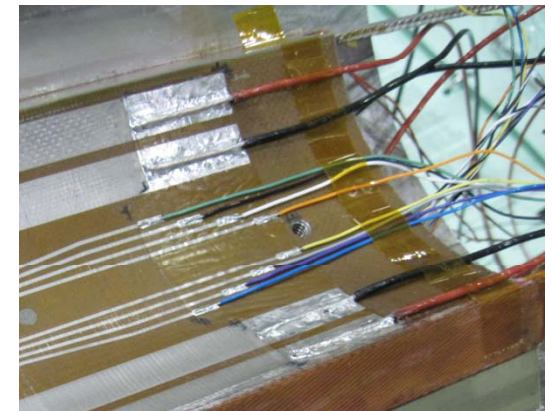
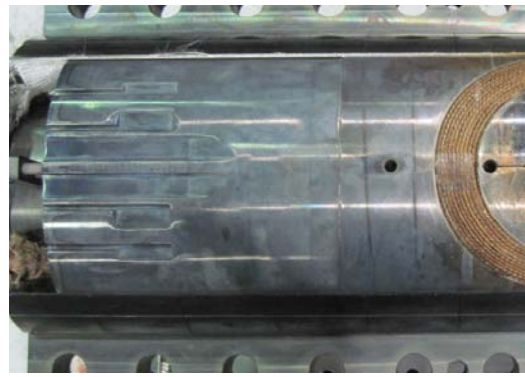
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Wiring

- Instrumentation Wiring.
 - Wiring on OD requires a lot of trimming of the trace, bending and fitting of the stainless foil into grooves, especially for the heaters.
 - Consider simplifying.
 - Perhaps a simple step down, where the last few inches of the saddle extension has the outer surface cut to a smaller radius. This minimize the need to trim / slit the base film of kapton on the trace. Soldering heater would be done as it is on the ID.
 - Or no pockets in saddles but instead relieve collars/pads.



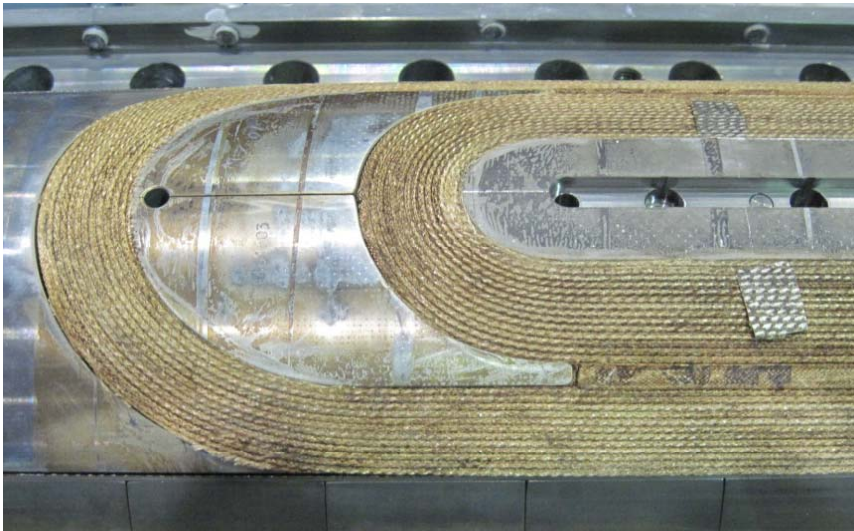
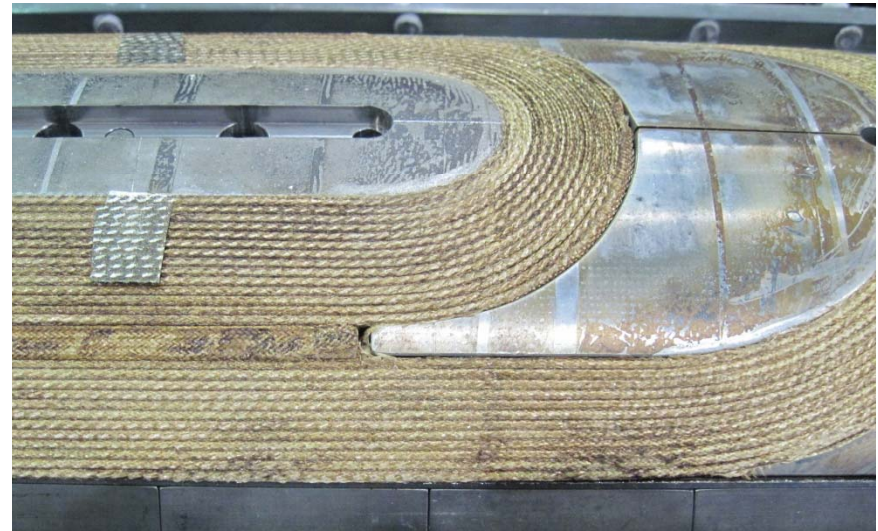
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- Insulation under trace.
 - LQ: 2 mil Nomex added over end saddles only.
 - HQ: 1 mil Kapton under entire trace.
 - Prefer Kapton under entire trace, better protection - end parts, wedges, turns.
- Material on coil OD:
 - LQ: 5 mils of glass cloth.
 - HQ: 15 mils of glass cloth.
- Material on Midplane:
 - LQ: No material added on midplane.
 - HQ: 5 mil G10 shim impregnated into coil.
- Kapton Ground Insulation:
 - LQ: 5 mil caps covering OD and midplane.
 - HQ: No caps.

Other Issues

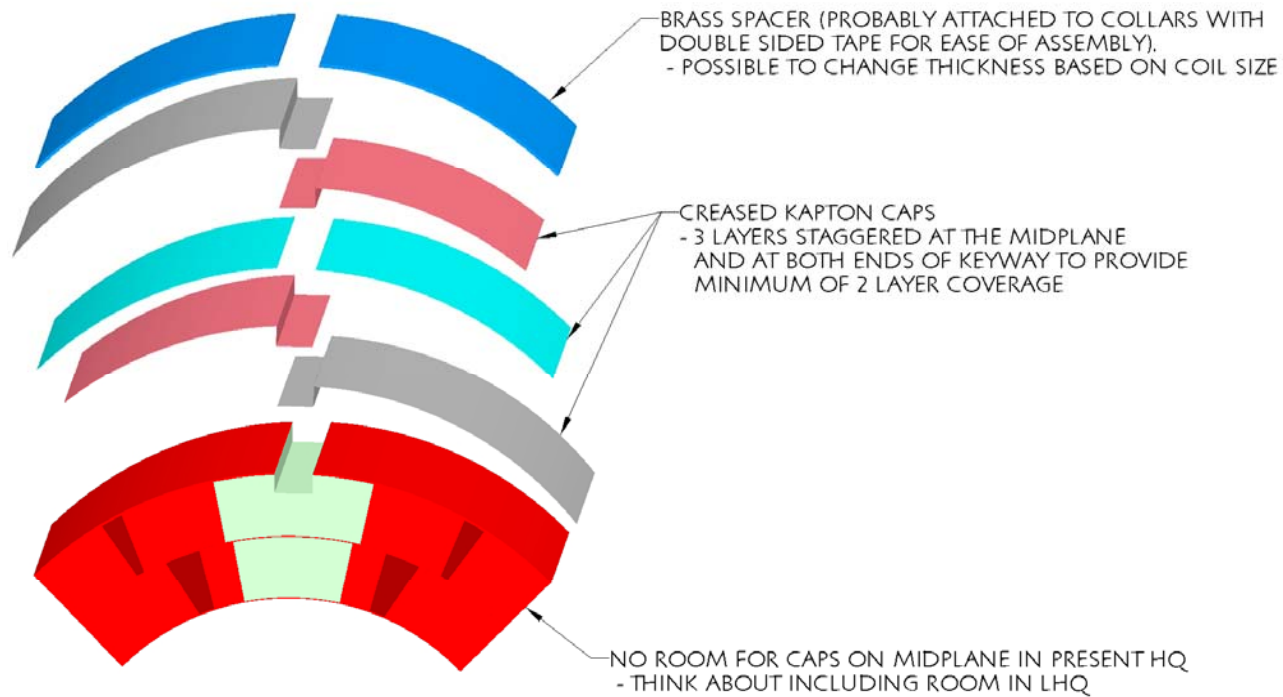
- Large gaps at end of HQ wedges.
- Misalignment of HQ wedge and end spacers.



- Backup slides....

Ground Insulation

- Ground Insulation layout for alternate structure:



- LHQ: Could eliminate need for 3rd cap layer by wrapping caps around midplane as on LQ.