



Fermilab

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From: Jim Strait and Dick Sims

Subject: General plan and rough schedule for conductor insulation tests

Yesterday the two of us discussed the general plan for tests that will lead to a "recipe" for molding coils with an all-Kapton plus epoxy insulation system. The objective of this note is to summarize our plans and to solicit any comments or suggestions that you may have on this program.

The objective of the program is to be able to start winding "real" coils, both long and short, with this new insulation as soon as possible. The two candidate insulation systems are DuPont HA and LT Kapton films coated with 3M 2290 epoxy and Allied Signal AV and NP Apical films coated either with 2290 or Cryorad adhesive. The program laid out below concentrates on 10-stack measurement to explore the space of insulation type, amount of overlap of each layer, and molding pressure and hence mold cavity size. The 10-stack properties to be studied are principally the difference in 10-stack heights with different materials and molding pressures and the creep rates. Given the significant number of variables to explore and the limited supply of cable, it is our feeling that we should be cautious about molding any more complete coils without having first layed the groundwork with 10-stacks.

The program and schedule outlined below are "success oriented" in that they assume that there will be no surprises and that all we are doing is a set of systematic experiments to find the optimum recipe for molding coils with each of several insulation schemes. After the optima are found, one or two schemes will be chosen for use in magnets. The program assumes that we will build magnets at least with a system using HA- and LT-film Kapton and leaves the possibility of also using some combination of Apical films. The program looks something like this:

11/7 - 11/15	Mold 10-stacks with a) 50% overlap H-film Kapton plus glass tape, b) 66% overlap H-film + 50% overlap coated H-film, c) 50% overlap H-film plus plus butt wrapped coated H-film. These will be molded at several pressures.
11/18- 11/19	Creep measurements (2 hours each) on several of the above 10-stacks (at least one of each insulation type).
11/20- 11/22	Mold 10-stacks with HA-film plus coated LT-film; overlap amounts, etc. to be determined from earlier studies.

11/25- 11/26 Creep measurements on HA/LT 10-stacks.

11/27 Choose "optimized" Kapton system.

12/2 - 12/13 Wind and mold short test coils insulated with HA/LT Kapton, made with end parts, 1 each inner and outer, to verify the recipes determined from the 10-stack studies and the fit between the 2D cross section (whose azimuthal size may have changed substantially) and the end parts. (These coils will be cut in half, collared and sectioned and therefore should be made of "practice" conductor.)

12/9 Begin to insulate cable for DCA320 and DSA330.

12/16 Begin to wind DCA320 and DSA330.

12/2 - 12/13 Studies with 10-stacks insulated with AV- and NP-film Apical.

12/16- 12/20 Evaluate Apical data and compare with Kapton results. Decide if Apical is worth pursuing and, if so, choose "optimized" system.

1/6 - 1/17/92 Wind and mold short test coils insulated with Apical films, made with end parts, 1 each inner and outer, to verify the recipes determined from the 10-stack studies. (These coils will be cut in half, collared and sectioned and therefore should be made of "practice" conductor.)

1/20 Begin to insulate cable for DCA322 and DSA332.

1/27 Begin to wind DCA322 and DSA332.