

From: FNAL::JBS 23-AUG-1990 09:09:19.96
To: KOSKA
CC: BOSSERT,CARSON,DELCHTS,MANTSCH,PEWITT,WAKE,MYSELF
Subj: DC0302 collaring shims

TS-SSC 90-049

I still believe that it is worth waiting for DS0311 collaring results before proceeding with DC0302. My prediction (for what it is worth) for the prestress in DS0311 is 11/9 kpsi in the inner/outer coil. This prediction includes information from collaring of DS0309 and DS0310, so it may be more accurate than my predictions for those magnets. The inner coils of DC0302 are, on the average, 0.8 mils larger than the inners of DS0311 and the outer coils of DC0302 are 3.7 mils smaller than DS0311's, causing me to want to reduce the inner pole shim from 12 (DS0311 value) to 11 mils and increase the outer pole shim from 7 to 11 mils. (I do not yet have the Fortran program up to the point where it can be used to make the same predictions for the long coils, so I am stuck using this more simple-minded method... which may be just as good.)

Since the pole shim thicknesses for DC0302 are based on DS0311, we should try to use the same number of adhesive layers as Imre used on DS0311. (I asked in my memo to him that he use the same tape that will be used on the long magnets. I hope he did.) Presumably for the inner coil he used two layers of 5+1 mil, so on DC0302 the same should be used. On the outer coil I can only guess if he used two layers of 1+1 mils plus 1 layer of 2+1 mil to achieve exactly 7 mils or if he used a layer of 5+1 mils and a layer of 1+1 mils, for 8 mils total or just a single layer of 5+1 mils.

To predict the DC0302 prestress all I can do right now is "fudge" the numbers in the spread-sheet calculation for a short magnet (I choose DS0311) to take into account the average coil size differences. I have made no attempt to put in the correct coil spring rate for the DC0302 coils and simply blindly assume that they are the same as DS0311. With the specified 11/11 inner/outer pole shims the prestress would be 10/9 kpsi in the inner/outer coil. If the inner shim is actually two layers of 5+1 mils and the outer is (5+1) + (2+1) + (1+1) mils (if Imre used three layers on DS0311) then the predicted prestress would be 12/8.5 kpsi. If both pole shims were (5+1) + (5+1) mils then the prestress would be 11/10 kpsi. Any of these is acceptable.

NOTE - (Added by Wayne Koska)

Imery used two layers of 5+1 mil on the inner and a 5+1 mil layer plus a 1+1 mil layer on the outer. He measured the combined thickness of the inner layers to be 12.2 mils and the combined thickness of the outer layers to be 7.4 mils.



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MEMORANDUM

To: Imre Gonczy
From: Jim Strait
Date: August 17, 1990
Subject: Collaring Shims for DS0311

In addition to the normal ground insulation, 12 and 7 mils of adhesive backed kapton should be applied to the pole faces of the inner and outer coils respectively of DS0311. (The thickness includes the kapton plus 1 mil of adhesive per layer.) The same material and procedure as has been used on the long practice magnets should be used from now on for the short magnets as well. The additional kapton should be extended over the end keys, and should be tapered to zero thickness by staggering the ends of different tape layers. If the exact thicknesses specified here cannot be made with the available kapton, please see me before proceeding.

cc: R. Bossert
 J. Carson
 S. Delchamps
 W. Koska
 M. Wake

*I = 12.2 mils
 O = 7.4 mils*

*Inner
 2 x .005 mils
 Inner Kapton
 1.005 mil 1.04 mils
 Kapton outer
 coil.*

JBS005

*CENTER BLDG. LONG MAGS.
 (5 mil + 2 mil Kapton + 2 mil Adhesive)
 (5 mil + 1 mil Adhesive)*



8/22/90

To: Reid Rihel
From: Jim Strait
Subject: DC0302 Collaring Shims and Spot Heaters

In addition to the normal ground insulation 11 mils of Kapton should be added to the pole faces of both the inner coil and the outer coil. (This thickness is the sum of the kapton plus 1 mil of adhesive per layer.) The extra Kapton should be extended as far into the end as possible with the thickness tapering to zero by staggering the ends of the different layers by about 1/2". If the exact thickness specified cannot be made within ± 1 mil, please contact me before proceeding.

It has been decided not to put spot heaters on DC0302 so as to not slow down the assembly schedule and allow the possibility to practice spot heater installation on other (probably short) coils. Spot heaters will be installed on all long magnets starting with DC0303, but the exact locations are not yet set.

cc: Rodger Bossert
John Carson
Steve Delchamps
Wayne Koska
Gale Pewitt
Gary Sliwicki
Masayohsi Wake

SIZE D10kpsi collagen over

Magnet	inner	outer	inner	outer	shim	VP	σ_m	$\langle \Delta v \rangle$	σ_{av}
DS0310	4.6/5.0	7.7/7.6	-7 -9.0 -9.0	-8.5 -7.0 -7.0	13/10 12/6	14.4/10.3 10/14 11/8	9.1/14.7	4.3734	8.4 10.7
DS0309	3.9/4.2	7.0/7.8	-7 -9.0 -9.0	-8.5 -7.0 -7.0	10/8 12/6 13/6 12/5	9.5/9.3 5.7/12.6 9.8/8.5 11.3/8.0 10.4/7.0	7.3/12.6	4.3725	7.6 (9.7)
DCO301 (red DS0310)	3.5/4.4 (-1.1 / -0.6)	3.4/0.3 (-4.3 / -7.4)			6/9		12.0/6.6	4.3667	2.4 (3.1)
DCO302 red DS0310	5.4/5.5 (10.9 / +1.1)	2.5/3.4 (-4.9 / -4.3)	-7		11/11				
DS0311	4.4/5.0	6.8/6.4	-9	-7	12/7 13/10 13/8	10.6/8.7 10.6/12.3 11.8/9.5			

2/11/8