

COMPRESSION BENDING FINDINGS

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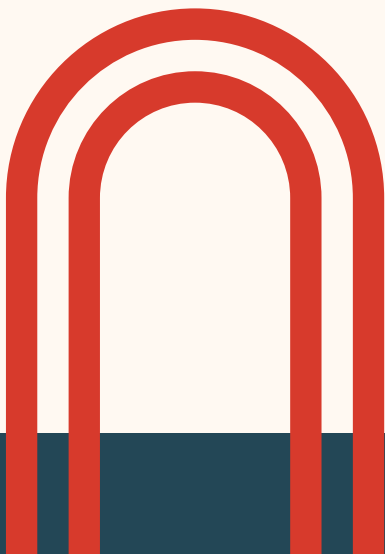
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INTRODUCTION

Pre/Post solder was tasked with taking sample pieces and remaking the bulging regions of the coil from compression. To complete this task 3 samples were used. **Sample 1**, no HTS with copper petals and cooling tube. **Sample 2**, soldered HTS with copper petals and cooling tube. **Sample 3**, HTS with copper petals and cooling tube.

METHODOLOGY

For all samples, the 16.4 die was used on slot 44 on the compression bender. The limit set for compression was 6000 lbs. with a hold of 5 seconds. Sample 1 was bent at two equally spaced regions with only one compression for each region. Sample 2 was compressed at 3 equally spaced regions all compressed two times. Sample 2 also received a 4th compression only one time. Sample 3 was compressed at regions 10 times to simulate the continuous cold working in a day of pre-solder.



KEY FINDINGS



KEY FINDINGS #1

HTS and Solder both help keep the stability of the cable but still suffer from warping even at one or two compressions.



KEY FINDINGS #2

Having only Copper petals leads to immense warping, pulling of copper inside of cable, and crunching even if it is only compressed once. (Weak points are found in each of the samples at varying levels dependent of material filling.)



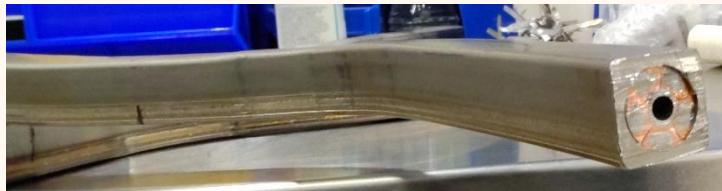
KEY FINDINGS #3

The denser the cable the more bending and twisting of the z axis happens when compressed at the same PSI for all sample pieces, see *images below*.

VISUAL DATA



SAMPLE 1



SAMPLE 2



SAMPLE 3

CONCLUSION

Compression bending is Altering too many variables within the coil which require further testing such as hardness testing from cold working and strain aging.

TAKEAWAY #1

The copper petals and HTS is being tugged from the inside of the jacket and is altering twist pitch and the 40mm window for cable installation.

TAKEAWAY #2

Warping is another concern directly affecting the cable from compression bending. As the images show very clearly the method CFS is currently using for compression bending may be the reason for breaks in fiber.

TAKEAWAY #3

The number of compressions required to achieve correct joggle locations is proportional to the amount of visual and mechanical distortion of the cable.