Wire Spool Acceptance Process

Wire spools are received from Little Falls Alloy (LFA) in batches of approximately 40 spools once per month. Before re-shipping these to the factories, the manufacturer certificate will be copied and passed to the Compliance Office (CO). CO will confirm from the certificate that the wire meets the specification based on the information provided. Using the specified wire diameter and the measured wire strength, CO will extract the expected range for wire break test results.

With CO confirmation of manufacturer certification, Fermilab will ship wire spools to factory. Prior to being used, each spool will be tested to ensure conformance with the certification. Five breakage measurements will be performed and recorded in the Hardware DB. In addition, a measurement of the wire diameter will be taken and recorded in the Hardware DB. In the DB, these measurements will be associated with individual spools. If any of the wire breakage measurements sit outside the expected range provided by the CO, the spool in question will be set aside pending further analysis and discussion.

One roll typically provides enough wire for winding one-half of a single APA layer. To assess the consistency of the wire contained within individual spools, an additional five breakage measurements will be made and recorded in the Hardware DB after the completion of each layer. These measurements will be made using trimmed wire segments, which are removed post-soldering. Assuming that wire from multiple spools has been used in the winding of the layer in question, five breakage measurements will be taken from trimmed segments associated with each of the spools. These measurements will be associated with individual spools and there is expected to be one or two sets per spool. Measurements falling outside the expected range need to be brought to the attention of the APA Technical Board and the CO.

When the wire spool is removed from the machine a final set of five breakage measurements will be made and recorded in the Hardware DB from the remaining wire in the spool. One additional wire diameter measurement will be taken and recorded in the Hardware database. These measurements will be associated with individual spools and there should be one set per spool. Measurements falling outside the expected range need to be brought to the attention of the APA Technical Board and the CO.

Suggested format for Information in Hardware DB:

Spool #num

Diameter #startroll #endroll

Break Measurements (Start) #m1 #m2 #m3 #m4 #m5

Break Measurements (End Layer 1) #m1 #m2 #m3 #m4 #m5

Break Measurements (End Layer 2) #m1 #m2 #m3 #m4 #m5 [Empty for some spools]

Break Measurements (Finish) #m1 #m2 #m3 #m4 #m5

APA #num

Layer #layer [x, v, u, or g]

1st Spool #num

2nd Spool #num

3rd Spool #num [Empty for some layers]

4th Spool #num [Empty for some layers]