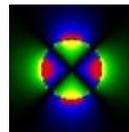


**The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website**

Magnet Division Procurement Specification

Specification Number: SMD-KEK-2001

Revision: A



Superconducting  
Magnet Division

Procurement Specification For Insulation and Adhesive Coating of .018” SuperKEK Corrector Coil Wire

- Prepared by: Signature on File  
A. Marone
- Production Section Head: Signature on File  
M. Anerella
- Electrical Engineering: Signature on File  
J. Escallier
- Q. A. Approval: Signature on File  
E. Perez
- ES&H Review: Signature on File  
W. Czekaj

### Revision History

Rev. A: Initial Release 11/15/11

1 Scope:

This procedure establishes and defines the requirements for insulating and adhesive coating material applied to .018” single superconducting wire used for SuperKEK corrector coil fabrication.

2 Applicable Documents:

The following documents in effect on the date of invitation to quote form a part of this specification to the extent specified herein:

Dupont-Summary of Properties E-72087	Kapton Polyimide film – General Information
Dupont General Procedures Bulletin GS-85-3	Procedures for the film properties and characteristics of Kapton Polyimide Film
3M Company	Scotch weld epoxy adhesive 2290 data sheet

3 Process Materials:

<b>Procedure Reference</b>	<b>Technical Reference</b>	<b>Source /Control</b>
Polyimide Film, 0.001-in. thick, 0.093-0.156 wide	Kapton Film Type HN	E.I. DuPont Co. Polymer Products Dept. Industrial Films Div. Wilmington DE
Scotch-Weld™ 2290 Epoxy Adhesive	Scotch-Weld 2290 Data Sheet	3M Company

4 Requirements:

- 4.1 General – Any and all conflicts among the requirements listed in this procedure are to be brought to the attention of the buyer for resolution prior to the commencement or continuation of work. Under no circumstances is the seller to take any initiative without this resolution.
- 4.2 Insulation Material – The insulation material shall be a polyimide polymer in the form of a film with electrical and mechanical properties that equal or exceed those listed for Kapton H film in DuPont Bulletin GS-85-3.

4.3 The adhesive coating shall be a B-stage application of Scotch-Weld™ 2290 epoxy adhesive. Any other adhesive will require review and consent by BNL.

4.4 Handling – Insulated wire must be handled with care during fabrication, packing, shipping and usage so as not to damage the insulation and/or wire.

5 Procedure:

5.1 Wind the polyimide film on the wire in a spiral manner with 40-49% overlap, single wrap. The tensile force on the film during winding shall be 5.0 – 10.0 ounces.

5.2 Adhesive Coating: Following insulation, the cable is to be dip-coated with B-stage Scotch-Weld™ 2290 Epoxy Adhesive. The coating thickness shall be 0.0015 in. (0.038mm) +0.0005/-0.0000 in. The coating thickness shall be measured at both the beginning and the end of each spool, using the procedure contained in Appendix C. The coating must be completely dry before spooling, to prevent sticking of adjacent turns.

6 Quality Assurance Provisions:

The Quality Assurance Provisions of this procedure require compliance with the procedural instructions described herein.

7 Preparation for Delivery:

Packaging – The insulated wire will be shipped on non-metallic spools so that adequate protection is provided during shipment. The spool outer diameter shall be 6.0 in. The maximum and minimum unbroken footage per spool shall be established at the time of the purchase order.

Marking /Identification Requirements – Spools and exterior packaging shall be identified with the following information in the order shown. Note: BNL supplied wire will be identified with a spool number. That spool number shall be included in the below label as shown:

Superconducting Wire

Part No.: As noted on Purchase Order

Buyer P.O. \_\_\_\_\_

Length: \_\_\_\_\_ ft.

Weight: \_\_\_\_\_ lbs.

Spool No. of BNL supplied wire \_\_\_\_\_

Date of Insulation: \_\_\_\_\_

Name of Company Performing Insulation: \_\_\_\_\_

## APPENDIX C

### Inspection Method No. 4009-1 - Epoxy Coating Thickness Measurement

1. Purpose:

This procedure establishes a standard method for measuring the thickness of the epoxy coating on polyimide insulated superconductor cable.

2. Materials Required:

Kapton tape, 0.5 in. wide  
clear plastic tape

3. Equipment Required:

2 inch parallel blocks (2)  
0-1 inch tenths micrometer  
single edge safety razor blade  
scissors

4. Applicable Documents:

None.

5. Procedure:

- 5.1 Unwind approximately 20 inches from the spool and wrap at this location with a piece of 0.5 inch wide Kapton tape (to prevent unraveling of the insulation). Using sharp scissors, cut the cable adjacent to the tape, leaving the taped end on the spool.
- 5.2 Straighten the removed segment, and identify the wrap direction of the insulation. Locate the trailing end (last wrapped layer) of the insulation.
- 5.3 Using a single edge safety razor blade, slit the Kapton insulation at the trailing end for a distance of approximately 0.5 inch.
- 5.4 Lay the segment on a clean sheet of paper, and gently roll it in the direction opposite that of the insulation wrapping, until the wrap begins to loosen from the cable. Once the insulation has loosened, gently unravel approximately 6 inches, and remove from cable using scissors.

- 5.5 Using ordinary clear tape, secure each end of the insulation to a separate 2 inch parallel block. The two blocks should be laid side-by-side on the surface plate. Pull the insulation taut by gently separating the parallel blocks, being careful not to stretch it.
- 5.6 Identify the coated edge and the non-coated edge of the insulation. Note that the coated edge appears more wrinkled in appearance.
- 5.7 Using a 0 - 1" tenths micrometer (smallest increment equal to .0001 inch), measure and record the thickness of the coated edge and the non-coated edge. Subtract the value obtained for the non-coated edge from the coated edge and record on the data sheet. This is the coating thickness.
- 5.8 Repeat steps 5.4 through 5.7 twice more for the remaining insulation on the insulated cable segment. This will yield a total of three measurements.
- 5.9 Calculate and record the arithmetic mean for the three readings obtained from the sample. Verify that the three readings and the mean are within the specified range of .0015 to .0020 inch.
- 5.10 Using an eye loupe, visually inspect the epoxy coating for evidence of bubbles, voids, or any other condition that may cause doubt about the integrity of the coating.