

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 it is the most current version by checking the document issue date on the website.

RHIC-MAG-R-8852-A

Page 1 of 6

1 Scope:

This procedure establishes the handling procedure for RHIC Helical Magnet cable.

2 Applicable Documents:

RHIC-MAG-Q-1000	Procedure for Control of Measurement Test Equipment
RHIC-MAG-Q-1004	Discrepancy Reporting Procedure
RHIC-MAG-R-7227	RHIC Electrical Resistance Measurement
BNL Dwg. 12011005	R.H. Inner Coil Winding & curing Assy.
BNL Dwg. 12011006	R.H. Outer Coil Winding & curing Assy
BNL Dwg. 12011199	L.H. Inner Coil Winding & curing Assy
BNL Dwg. 12011200	L.H. Outer Coil Winding & curing Assy
BNL Dwg. 12000027	Insulated Cable Assy.

3 Requirements:

3.1 Material & Equipment

3.1.1 Material

Cable Spools
Helical Magnet Cable Information Cards
Cable Identification Tags

3.1.2 Equipment:

Test Rack ETS-001
Cable/ Wire Winding Device

3.2 Safety:

3.2.1 See RHIC-MAG-R-7227 for additional safety requirements.

3.3 Procedure:

3.3.1 Inspection

3.3.1.1 Check each delivered spool of cable as received with end item documentation package. The end item documentation shall include the following:

- BNL Cable Map
- Cable Cut Diagram
- Finished cable Map

3.3.1.2 Verify Cable I.D. number on spool matches end item documentation. Mark the cable I.D. number on the outside of the box containing the delivered spool of cable.

3.3.1.3 File original end item documentation package in the inspection files. Forward copies of the end item documentation package to the following personnel:

- Cognizant Engineer Gene Kelly
- Physicist Arup Ghosh

3.3.2 Engineering

3.3.2.1 Cognizant Engineer will review the end item documentation package for each delivered spool of cable and determine the requirements for production to off spool cable onto wiring spools. Information will be contained on 3" by 5" card titled "Helical Magnet Cable".

3.3.2.2 Cognizant Engineer shall fill out the Helical Magnet Cable card indicating the following information: (See Figure 1)

- Segment Letters - Each length to be cut off the delivered spool will be given a segment letter starting at "A" from the outside of the delivered spool.
- Feet –The number of feet to be wound onto wiring spool for each segment.
- Cold Welds- An X shall be marked in the Feet column between and segments where a cold weld is present in the delivered spool.

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 it is the most current version by checking the document issue date on the website.

Figure 1

HELICAL MAGNET CABLE					
CABLE I.D.: <u>14N004</u>			Total Feet: <u>14262</u>		
Coated Cable: <input checked="" type="checkbox"/>			Uncoated Cable: <input type="checkbox"/>		
Segment	Feet	Date Removed	Segment	Feet	Date Removed
A	1600		G	1900	
B	1600		H	1900	
C	1600 X				
D	1900 X				
E	1900 X				
F	1900				

3.3.2.3 Cognizant Engineer shall supply the Helical Magnet Cable information card to the Production Supervisor.

3.3.3 Production

3.3.3.1 Production Supervisor shall withdraw delivered spools of cable from the stockroom that coincides with the cable I.D. on the Helical Magnet Cable card.

3.3.3.2 Check cable I.D. on delivered spool matches cable I.D. on Helical Magnet Cable card.

3.3.3.3 Obtain enough empty wiring spools for the amount of cable segments you plan to remove from delivered spool.

3.3.3.4 Spooling Cable Segments

3.3.3.4.1 Mount the delivered cable spool onto off winding device.

3.3.3.4.2 Fill out identification tag for wiring spool and attach it to spool., then mount spool onto the off winding device. Include cable segment letter with Cable I.D. No. (See Figure 2)

Figure 2

Blank Tag	Example
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: auto;"><p>CABLE I.D. _____</p><p>_____ FEET</p><p>COATED _____ UNCOATED _____</p></div>	<div style="border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: auto;"><p>CABLE I.D. <u>14N004 -A</u></p><p><u>1600</u> FEET</p><p>COATED <input checked="" type="checkbox"/> UNCOATED _____</p></div>

3.3.3.4.3 Off wire the first segment “A” of cable from the outside of the delivered spool onto the wiring spool.

3.3.3.4.4 Visually inspect the cable segment as it is being wound onto wiring spool for splices, repairs or cold welds. Splices and repairs are marked with a black mark and cold welds are marked with a red mark. Stop the unwinding at each of these marks and check for the following:

- Splices & Repairs: Check diameter of splice or repair using gauge tool. Splices or repairs 0.050” or less are acceptable and winding operation can resume, if splices and repairs larger than .050” stop the off spooling operation and notify the production supervisor. Production supervisor shall have the repair or splice dispositioned.
- Cold Welds: No cold-welds should appear at any point in the length of a segment if present stop the off spooling operation and notify the production supervisor. Production supervisor shall have the delivered spool dispositioned.

3.3.3.5 Completing Wiring Spool

3.3.3.5.1 Cut the cable at the designated length indicated on the Helical Magnet Cable information card and remove the segment spool from the off winding device..

3.3.3.5.2 Enter the “date removed” on the Helical Magnet Cable information card.

3.3.3.5.3 Check the Helical Magnet Cable information card to see if there is an “X” marked on the card between the segment that was off spooled and the next segment. An “X” indicates there is a cold weld between the two segments, which must be removed.

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 it is the most current version by checking the document issue date on the website.

RHIC-MAG-R-8852-A

Page 5 of 6

3.3.3.5.3.1 To remove cold-weld, load waste spool onto off winding device. Off spool the cable onto the waste spool until red mark of the cold weld appears. Cut out the cold weld and remove the waste spool from the off winding device.

Note: Uncoated waste cable can be used for stabilizing leads.

3.3.3.6 Repeat paragraphs 3.3.3.4 & 3.3.3.5 for each segment of cable to be removed from delivered cable spool.

3.3.3.7 Remove the delivered cable spool from the off winding device after the segment spooling is completed.

Note: Residual cable may be left on the delivered spools after last cable segment has been off spooled and should be handled as follows:

- All residual uncoated cable should be spooled off onto waste spools.
- All residual coated cable should be left on the delivered spools unless they are of minimal length, then off spool.

3.3.3.7.1 Check the Helical Magnet Cable information card. If all segments have been removed, forward the card to the cognizant engineer; if there are still segments remaining, attach card to the delivered spool.

3.3.3.8 Cable Kits

3.3.3.8.1 Kit a set of wiring spools to fulfill requirements for winding a complete coil. Pick wiring spools with the closest length called for on Table 1 of drawing to complete a kit. Each kit shall contain the same part number cable.

- P/N 12000027-01 (Uncoated Cable) Hand Wound Coils
- P/N 12000027-02 (Coated Cable) Machine Wound Coils

3.3.3.8.2 Enter Cable I.D numbers from the kit into table on Coil Block Winding Production Traveler MDC No. 625.

3.3.3.8.3 Cable Kit Resistance Measurements

3.3.3.8.3.1 Measure the Resistance and Temperature of the cable on each wiring spool for each coil block using test equipment in ETS-001 and running program "Rspool" Opcode 716. Enter actual spooled cable lengths into the computer database.

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 it is the most current version by checking the document issue date on the website.

RHIC-MAG-R-8852-A

Page 6 of 6

3.3.3.8.3.2 Record check marks on the table in Coil Block Winding Production Traveler MDC No. 625 for each spooled cable which has been measured for resistance, temperature and length..

3.3.3.8.3.3 Verify table for spooled cable measurements is complete and sign off operation. in Coil Block Winding Production Traveler MDC No. 625.

3.3.3.8.4 Place the Coil Block Winding Production Traveler MDC No. 625 with the cable kit.

4 Quality Assurance Provisions:

4.1 The Quality Assurance provisions of this procedure require that the technician shall be responsible for performing all assembly operations in compliance with the procedural instructions contained herein and the recording of the results on the production traveler.

4.2 The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with RHIC- MAG-Q-1004.

4.3 Measuring and test equipment used for this procedure shall contain a valid calibration label in accordance with RHIC-MAG-Q-1000.

5 Preparation for Delivery:

N/A