

Princeton Plasma Physics Laboratory Procedure

Procedure Title: **Modular Coil Fabrication-Winding Form Preparation Activities**

Number: D-NCSX-MCF-001	Revision: 02	Effective Date: August 2, 2005 Expiration Date: <i>(2 yrs. unless otherwise stipulated)</i>
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Procedure Approvals

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Responsible Division: **NCSX Project**

Procedure Requirements Designated by RLM

LABWIDE:

X	Work Planning Form # WP-1188 & 1138 (ENG-032)		Lockout/Tagout (ESH-016)
	Confined Space Permit (5008,SEC.8 Chap 5)		Lift Procedure (ENG-021)
	Master Equip. List Mod (GEN-005)	X	ES&H Review (NEPA, IH, etc.) NEPA 1283
	RWP (HP-OP-20)		Independent Review
	ATI Walkdown	X	Pre-Job Brief
X	Post-job Brief *		

D-SITE SPECIFIC:

X	D-Site Work Permit (OP-AD-09)		Door Permit (OP-G-93)
	Tritium Work Permit (OP-AD-49)		USQD (OP-AD-63)
X	Pre-Job Brief (OP-AD-79)		T-Mod (OP-AD-03)
	** DCA/DCN (OP-AD-104) # _____		

* Required for installations involving internal vacuum installations, critical lifts, and for the initial installation of repetitive work.

** OP-AD-104 was voided by procedure ENG-032. However, DCA's that were open at the time of adoption of ENG-032 are still considered valid for work approval purposes.

REVIEWERS (designated by RLM)		Rec'd/ Incorp. Comments
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Health Physics.....		
RLM Larry Dudek		X

TRAINING (designated by RLM)			
No training required _____		Instructor <u>Jim Chrzanowski</u>	
Personnel (group, job title or individual name)	Read Only	Instruction Pre-job Briefing	Hands On
Lead Tech.		X	
Technicians performing task		X	
Field Supervisors		X	
Quality Control Representative		X	
Training Rep.			
RLM Larry Dudek			

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RECORD OF CHANGE

Revision	Date	Description of Change
00	11/22/04	Initial release
01	5/19/05	Release for Revision 1
02	8/2/05	Release for Revision 2 -General description of changes: 1)Included the fitup and installation of the lead terminal and filler blocks [6.19] 2)More detail for winding form inspection [6.7] 3)Addition of Kapton tape on edges of casting [6.15] 4)Added reference to winding form product specification

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1 Scope

1.1 Introduction

The Modular Coil Manufacturing Facility is divided into 5 workstations. Each workstation has a specific set of tasks that will be performed as part of the overall fabrication process. The fabrication procedures will address the manufacturing, inspection, test and QC inspection points for a specific workstation.

- **Station No. 1...** **Winding Form Preparation & Post VPI Activities**
- Station No. 2... Winding Station / Molding and VPI Preparation [TRC coil prep & Winding operations]
- *Deleted Reference to Station 3*
- Station No. 4... Winding Station / Molding and VPI Preparation
- Station No. 5... VPI and Autoclave Activities
- Station No. 7... Coil Testing Facility [Reference only]

1.2 Scope

This procedure prepares each Modular Coil Winding Form (MCWF) or Twisted Racetrack Coil winding form (TRC) for winding. It includes:

- Mounting the winding form to the turning fixture
- Verification of electrical integrity of poloidal break
- Installation of measurement monuments
- Winding Form inspection and measurements
- Installation of clamp studs
- Cleaning of winding form
- Fitup and installation of terminal blocks
- Installation of winding clamps
- Installation of the inner cladding plates

1.3 Identification of winding form being prepared:

Station Number: _____ (Location where work will be performed)

Winding Form Type: _____ [Type A, B, C or Twisted Racetrack Coil (TRC)]

MC Winding Form ID No: _____

Modular Coil Identification Number: _____

2 Applicable Documents

2.1 NCSX-MIT/QA-142-01:

All applicable documents associated with this procedure, are identified in the MIT/QA Plan, document number **NCSX-MIT/QA-142-01**.

2.2 NCSX-PLAN-CMFOP-00:

All Modular Coil work processes are governed by the “Coil Manufacturing Facility Operations Plan”, document number **NCSX-PLAN-CMFOP-00**.

2.3 D-L-NCSX-983 Lifting Modular Coil Winding Forms

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- 2.4 **D-L-NCSX-984** Lifting Modular Coil Assemblies
- 2.5 **NCSX-CSPEC-141-03-08** Product Specification for MC Winding Forms
- 2.6 **D-NCSX-MCF-005** Dimensional Control & Metrology for the NCSX MC
- 2.7 **D-NCSX-PLAN-MCWDC** Modular Coil Dimensional Control Plan

3 Safety Requirements:

All work will be performed in a safe manner in accordance with the PPPL Environmental, Safety and Health Manual **ES&H 5008** and the “Integrated Safety Management” (ISM) policy.

3.1 Job Hazard Analysis:

A JHA will be generated for each workstation, identifying existing or potential workplace hazards and to evaluate the risk of worker injury or illness associated with job tasks. (Reference document **ESH-004 “Job Hazard Analysis”**) The IH representative will review the JHA’s for accuracy as well as completeness. It will be reviewed with all activity participants at the Pre-Job briefings.

4 Prerequisites and Conditions

4.1 Pre-Job Briefing:

A pre-job briefing will be held, describing the processes and safety issues prior to starting any part of this procedure. Attendance shall be documented via training sign-in sheet.

Pre job Briefing complete: _____
MC Field Supervisor **Date**

4.2 Daily Operations Startup and Shutdown:

Each working day, it is required to complete and initial the daily operations startup log to ensure that the station is ready to commence work activities for the day. The signoff log is located in the Daily Station Log. See section 6.1 and 6.2 for details.

4.3 Torque Values:

Unless a torque value is specified, the following values shall be used whenever the procedure requires a torquing operation: (Low carbon steel hardware)

3/8-16UNC	18 ft-lbs	3/8-24UNF	19 ft-lbs	1/2-13 UNC	38 ft-lbs
1/2 -20 UNF	40 ft-lbs	5/8-11 UNC....	83 ft-lbs	5/8-18 UNF...	95 ft-lbs
3/4-10 UNC.....	105 ft-lbs	3/4-16 UNF	102 ft-lbs	1-8 UNC ...	236 ft-lbs
1-14 UNF	212 ft-lbs	1 1/4 UNC	432 ft-lbs	1 1/2-6 UNC	732 ft-lbs

5 Materials and Parts for Station No. 1

The following materials and/or equipment will be used with this procedure. MSDS’s for chemicals will be located in a notebook in the winding facility.

General Description	Material	Reference Document/Product No.
Cladding	Copper	Drawing list to be added as addendum for each coil type as drawings are approved
Solvent	Chlorine-Free Degreaser	CRC Product No. 03185 [MSDS #05032]
Solvent	Acetone	MSDS# 00561

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Studs for coil clamp to casting stud	Stainless steel grade 316	3/8-16 UNC x 2.5 inches long [other lengths may be required in tight areas]
Mold release	Release agent dry lubricant	“Miller-Stephenson” -PTFE MS122DF
MC Turning Fixture	Equipment	Drawing no. SE144-008
Rolled Ring Assembly	Fixture	Drawing no. SE144-007
Casting to Ring Assy. Fixture	Fixture	Drawing no. SE144-050
Weld stud alignment fixture	Fixture	Drawing no. SE144-085
Stud Welder unit	Equipment- TRW Nelson	Model no. 101 Series 4500
Supports and hardware for MC mounting casting to turning rings	Fixture	See drawing SE144-050
Supports and hardware for TRC mounting casting to turning rings	Fixture	See drawing SE144-200
Cladding and edge insulation	Kapton-Type HN adhesive back	0.00325 inch thick
Cement- for adhering cladding	Adhesive cement	3M Product no. CA40H
Adhesive accelerator for cement	Accelerator	3M Pronto Surface Activator
Winding clamps	Equipment	Drawing SE144-080
RTV sealer for poloidal break	Sealant	RTV108
Alcohol	Ethanol	MSDS
Severn Gauge	Equipment	Permeability indicator # 6424
Thread-locker	Loctite	Loctite 2440 medium strength thread-locker

6 Fabrication Process

This fabrication procedure is to be used as guide to complete the preparation of the winding form for coil winding. Deviation from this procedure for processes that DO NOT affect the design of the coil can be made with the concurrence of the MC Field Supervisor. These deviations shall be documented in the procedure and initialed by the MC Field Supervisor prior to implementing the deviations. Deviations that may effect the design of the coil requires a Request for Deviation “RFD” approval. The RFD must be approved prior to proceeding. Procedure changes need to be incorporated into the document via “Minor Procedure Changes” or “Revisions”.

6.1 Daily Startup Activities:

- 6.1.1 Check all daily supplies needed:
- 6.1.2 Turn on the Turning Fixture power switch to verify operation.
- 6.1.3 Check stud welder for operation [Only if being used that day]
- 6.1.4 Check station for cleanliness
- 6.1.5 Check that the day’s travelers and procedures are in their document holder.
- 6.1.6 Date and initial daily Startup Log located at the back of Station Log Book.

6.2 Daily Shutdown Activities:

- 6.2.1 Turn off power to Turning Fixture.
- 6.2.2 Turn off stud welder and secure for off hours.
- 6.2.3 Clean entire workstation area.
- 6.2.4 Verify that all Traveler and data sheet information is complete.
- 6.2.5 The Lead Technician shall verify that the Station’s Log Book has been completed and signed for the day.
- 6.2.6 Cover the Modular coil casting with plastic tarp.
- 6.2.7 Date and initial daily Shutdown log located at the back of Station Log Book

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6.3 Transport of Winding Form to the Modular Coil Mfg. Facility (MCMF):

- 6.3.1 Transport a MCWF or TRC from its storage area to the MCMF using lift procedure **D-L-NCSX-983**.
- 6.3.1.1 Position the winding form on the floor supported by wooden blocks.

6.4 Verification of the Electrical Properties of the Poloidal Break

The electrical integrity of the poloidal break needs to be verified, via a megger test, prior to mounting the MCWF into the support ring. [See Figure 1- Typical Poloidal Break] [Not required for TRC]

6.4.1 Test Criteria

- Test Voltage: 250 volts - Acceptance criteria for this test: >500 k-ohms

6.4.2 The Test Director for this test is: _____

6.4.3 Safety Requirements & Conditions

The following safety and prerequisites shall be used for performing test of the Poloidal break.

- 6.4.3.1 All personnel involved with these tests shall be familiar with the hazards and work procedure to minimize accidents that may occur.
- 6.4.3.2 A **“Safety Watch”** shall be appointed by the Test Director. The Test Director shall clearly describe to the Safety Watch his/her responsibilities.

Name of Safety Watch: _____

Responsibilities have been clearly discussed with Safety Watch:

Verified: _____ **Date:** _____

Test Director

- 6.4.3.3 Responsibilities of a Safety Watch include as a minimum:
 - a) Monitoring the operations in an attempt to prevent careless or unsafe activities.
 - b) Shutting down the power in case of an accident.
 - c) Contacting ESU in case of accident
 - d) Additional responsibilities of a Safety Watch can be found in the ES&H Manual Section 2, Chapter 2.2.6.

6.4.3.4 During the test, the “Test Area” shall be roped-off and suitable “danger high voltage” signs and flashing lights displayed.

Test Area has been safed:

Verified by: _____ **Date:** _____

Test Director

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- 6.4.3.5 The test operator shall stand on an electrical safety mat during the test operation.
- 6.4.3.6 Approved rubber electrical safety gloves shall be worn by test members during grounding operations which occur once the test has been completed, and the test equipment turned off.
- 6.4.3.7 Upon completion of test and before the components are declared safe to touch, the coil being tested shall be properly discharged using a "Ground Hook". After a minimum period of 10 seconds, while the ground hook is still in place, attach a ground cable to the coil. The ground hook may be removed once the ground cable is in place.

6.4.4 Testing of Mid-Plane Insulation:

- 6.4.4.1 Electrically connect (jumper) the poloidal joint mid-plane to the modular coil for this test.
- 6.4.4.2 Measure the insulation resistance between the mid-plane plate and each bolt. The test results shall be in compliance with the requirements noted in Section 6.4.1.

Mid-Plane to Each Bolt- Megger Test Results

Test Components	Voltage Level Volts	Resistance k-Ohms	Remarks
Bolt 1 to Mid	250		
Bolt 2 to Mid	250		
Bolt 3 to Mid	250		
Bolt 4 to Mid	250		
Bolt 5 to Mid	250		
Bolt 6 to Mid	250		
Bolt 7 to Mid	250		

Casting Temperature _____ deg. C

Equipment ID Number: _____ Calibration Date: _____

Megger Results: *Acceptable:* _____ *Unacceptable:* _____

Test Director Signoff: _____ Date: _____

Quality Control Witness: _____ Date: _____

Remarks:

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6.4.5 Testing of Bolt Insulation

6.4.5.1 Electrically connect (jumper) together all of the bolts and the modular coil winding form for this test.

6.4.5.2 Measure the insulation resistance between the electrically connected (jumped) combination and the mid-plane. The test results shall be in compliance with the requirements noted in Section 6.4.1.

Mid-Plane to Bolts & Winding Form- Megger Test Results

Test Components	Voltage Level Volts	Resistance k-Ohms	Remarks
Mid-plane to Bolts & WF	250		

Equipment ID Number: _____ **Calibration Date:** _____

Megger Results: *Acceptable:* _____ *Unacceptable:* _____

Test Director Signoff: _____ **Date:** _____

<p>Remarks:</p>
--

6.4.6 If the test results were within the test criteria identified in section 6.4.1 proceed to section 6.5.

6.4.7 If the test results are unacceptable, the field supervisor shall review the test results with NCSX project management to determine corrective action. All corrective actions shall be performed under the direction of the Field Supervisor. Once completed repeat the electrical tests. All corrective actions shall be documented and added to the RUN copy.

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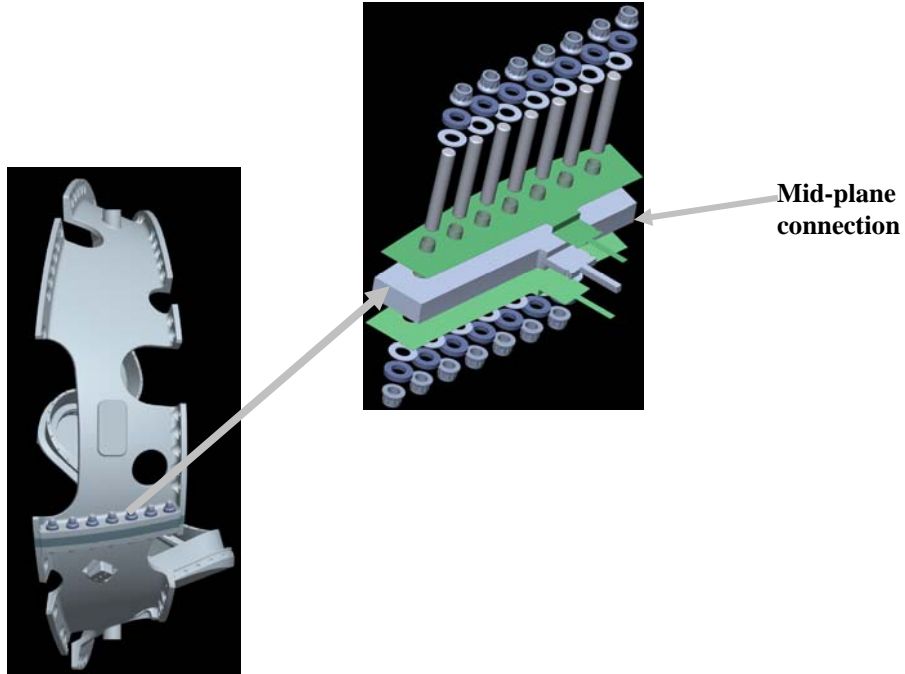


Figure 1- Typical Poloidal Break

6.5 Mount WF to Support Ring Assembly:

[Reference drawing SE-144-050]

- 6.5.1 Mount the appropriate support brackets to the casting that will allow the winding form (MCWF) to be joined with the Turning Fixture support ring. (Figure 2-Mounting support brackets to casting)

Note: Each coil type (A, B, C, TRC) have different support brackets that will join the MCWF to Turning Fixture support rings.

- 6.5.2 Position the MCWF with lower support brackets into the assembly fixture [station 1a]. (Figure 3- Position Casting in Assy. Fixture) [Note: the TRC will not be assembled in the assembly fixture]
- 6.5.3 Position a support ring into the assembly fixture around the casting, and secure the winding form and support ring together with support brackets. Note the orientation of the ring in relation to the lifting beam and pivot locations. (Figure 4- Install Support Ring)
- 6.5.4 Secure the support/lifting beam to the joined MCWF and ring support [MCWFA}. (Figure 5- Install Lifting Beam)
- 6.5.5 Verify that all hardware has been torqued [see section 4.3 for torque values] and that the MCWFA is ready for transport to the Station No. 1b Turning Fixture.

Verified:	
Lead Technician: _____	Date: _____
Field Supervisor: _____	Date: _____

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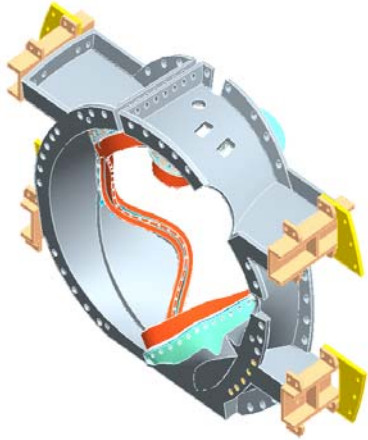


Figure 2-Mounting support brackets to casting

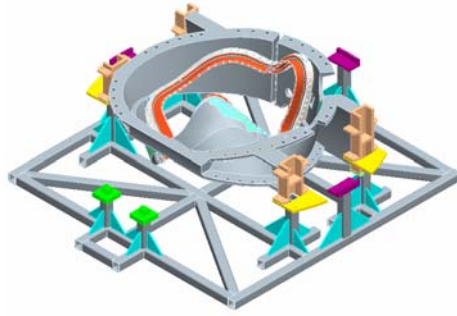


Figure 3-Position Casting in Assy. Fixture

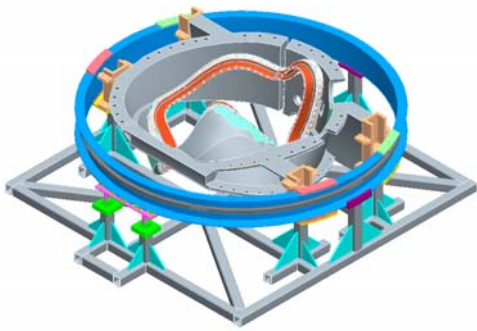


Figure 4- Install Support Ring

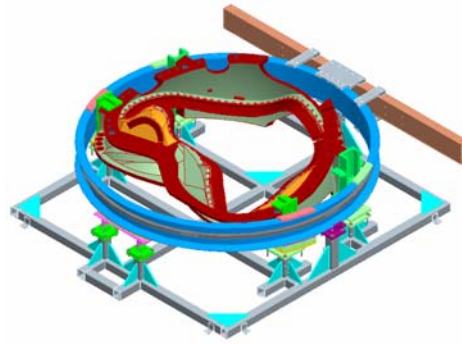


Figure 5-Install Lifting Beam

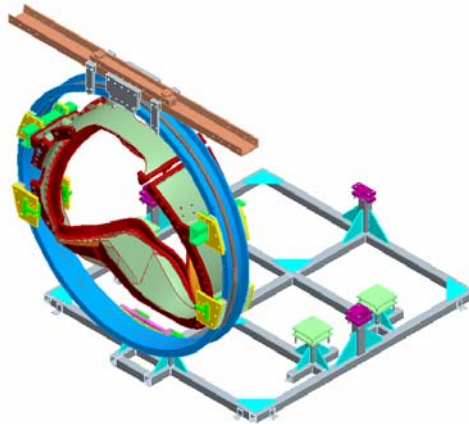


Figure 6-Rotate Casting/Ring Assembly

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6.6 Install MCWFA in Turning Fixture:

- 6.6.1 Using lift procedure **D-L-NCSX-984**, carefully raise the MCWFA until it is in the vertical position. (Figure 6-Rotate Casting/Ring Assembly) Transport and install MCWFA into the Station No. 1 turning fixture. Secure the MCWFA to the turning fixture.

Verified by: _____	Date: _____
Field Supervisor	

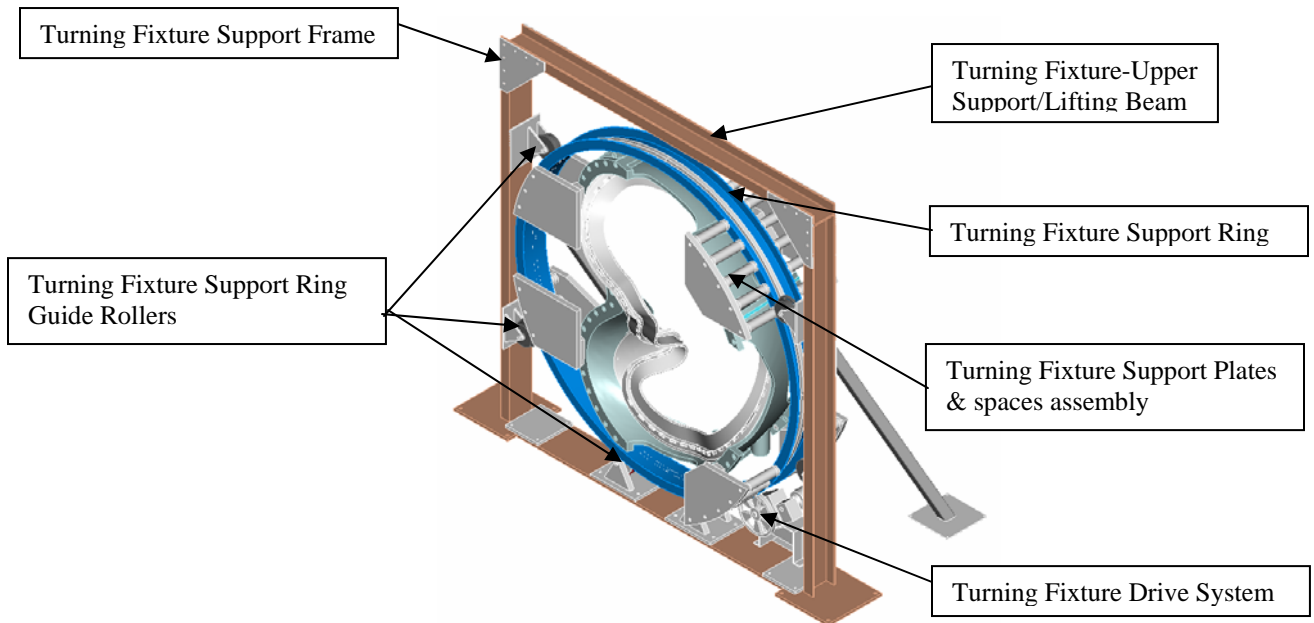


Figure 7- Turning Fixture

- 6.6.2 Compress the springs under the gear box (drive system) until they are bottomed.
- 6.6.3 Lower the MCWF and ring assembly into the turning fixture using the corner brackets for alignment. Bolt up one end loosely (use spud wrenches to align holes).
- 6.6.4 Install the upper guide rollers and align all of the guide rollers to the support ring. **NOTE: Sling the rollers and raise them into position with rope. Do not climb up ladder with roller assembly in hand.**
- 6.6.5 Decompress springs under the gear box (drive unit) until gear is fully engaged with ring gear rack. This must be verified prior to proceeding.

Verified by: _____	Date: _____
Lead Technician	

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- 6.6.6 Verify that the upper support/lift beam is in proper position and secured with appropriate hardware that is torqued to the proper value.

Verified by: _____ Date: _____ Lead Technician
--

- 6.6.7 Remove the upper support plates between the support ring and lift beam. This operation must be verified prior to operating turning fixture.

6.6.8 Figure 8- Upper Support Plates

Verified by: _____ Date: _____ Lead Technician
--

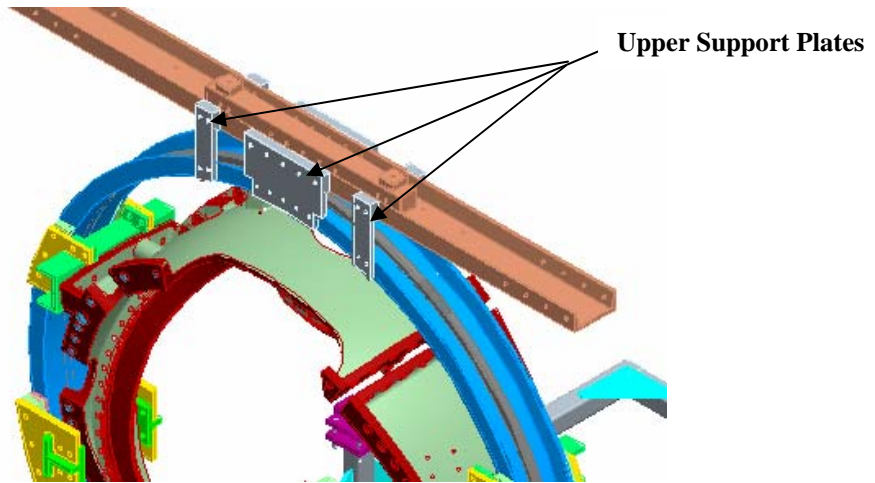


Figure 8- Upper Support Plates

- 6.6.9 To ensure proper alignment and operation of the turning fixture, rotate the MCWFA a full revolution [in both directions] using the foot-pedal control. Re-adjust the alignment rollers as required. Alignment of MCWFA to the turning fixture is complete.

Verified by: _____ Date: _____ Lead Technician
--

6.7 MC Winding Form Acceptance Inspections:

Inspections shall be made of the winding form prior to starting winding preparation activities. These inspections are based upon the requirements identified in the MC Product Specification “NCSX-CSPEC-03-08”.

6.7.1 Visual Inspection

Perform a visual inspection of the shipping crate and casting. Look for any obvious defects or damage as a result of shipment.

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Inspection Findings:

Inspection Performed by: _____ Date: _____ Findings Verified: QC Representative: _____ Date: _____
--

6.7.2 Surface Inspection:
Spot inspect the surface finish of the machined tee section using either a surface profilometer or comparator. The two “L” machined surfaces of the tee must have a RMS (root mean square) **surface finish <125 μ-inches**. Also verify that the part is free of sharp edges and burrs.

Surface Inspection Findings:

Surface Finish verified by: Field Supervisor: _____ Date: _____ QC Representative: _____ Date: _____

6.7.3 Relative Magnetic Permeability
Spot check the relative magnetic permeability of the winding form surface using a Severn gauge. The **Acceptance Criteria: < 1.02μ**.

Magnetic Permeability verified by: Field Supervisor: _____ Date: _____ QC Representative: _____ Date: _____
--

Permeability Inspection Findings:
--

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6.7.4 Dimensional Inspection for Winding Form Acceptance

- 6.7.4.1 Per section 4.2.6 of the Modular Coil Winding Form Product specification **NCSX-CSPEC-141-03-08**, a thorough measurement of the MCWF machined winding surfaces, flange surfaces, and bolt holes shall be made to verify the dimensions and tolerances of the winding form. The NCSX project may elect to perform additional measurements besides that provided by the vendor to verify the dimensional integrity of the delivered winding form.

CHECK ONE	
Accept vendor measurements, no further measurements at PPPL are required: _____ File name and location for measurement data:	
Additional measurements by PPPL are required: _____ File name and location for measurement data:	
Verified By:	
Metrology Engineer: _____	Date: _____
Dimensional Control Coordinator: _____	Date: _____
QC Representative: _____	Date: _____

6.8 Establishment of Reference Values:

- 6.8.1 The Metrology engineer shall measure the winding surfaces per procedure **D-NCSX-MCF-005** and determine whether additional monuments (fiducial points) need to be added to the winding form. If required see section 6.9 "Adding Measurement Monuments". Once it is determined that there are sufficient fiducial points, the metrology engineer shall measure and establish reference values to be used during coil manufacturing using procedure **D-NCSX-MCF-005**. A summary of all data shall be inserted into Section 9 of the Coil Field Package.

Measurements completed and reference values established. File name and location of additional reference monuments:	
Verified by:	
Metrology Engineer: _____	Date: _____
Dimensional Control Coordinator: _____	Date: _____
QC Representative: _____	Date: _____
Once approved, proceed to section 6.10	

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6.11 Identification Numbers:

- 6.11.1 Identify the ID number of each clamp location. Using a “Sharpie” felt pen write the clamp number directly onto the top of the septum next to the tapped holes. The clamp location numbers will be provided on the coil winding form drawings. See Figure 11- Mold Release and Masked Surfaces
- 6.11.2 Identify each coil side of the MCWF with either an “A” or “B”. This information will be provided from the coil drawings. Use large stick on letters that can be clearly seen.

6.12 Seal Poloidal Break

- 6.12.1 Wipe the outside surface of the poloidal break seams using clean lint free wipe with Chlor-free degreaser and ethanol. Do not saturate the cloth.
- 6.12.2 Seal the poloidal break seams using RTV 108 sealant. Apply sealant over all seams that will be inside of the Bag mold. Smooth the RTV with putty knife. This seal is required for successful VPI operations.

Poloidal Break has been sealed:	
Verified by: _____	Date: _____
Lead Technician	

6.13 Installation of Winding Clamp Studs and Stud Adapters

Install the stainless steel studs for the winding clamps on each side of the castings. All welding shall be performed by weld certified individuals and requirements of ES&HD 5008, Section 9 Chapter 15 for safe welding must be followed.

- 6.13.1 Notify the ESU and obtain a flame permit daily prior to starting welding operation.
- 6.13.2 On some castings, due to the geometry of the winding form, it may be necessary to add stud adapters directly to the casting prior to the installation of studs. These adapters shall be Tig welded directly to the casting. See Figure 9- Typical Stud Adapters
- 6.13.3 Stud Adapters are required for this casting: YES: _____ NO: _____
[Lead Technician verify:]

Weld Date: _____	Obtain Flame Permit: _____
Weld Operator: _____	Fire Watch: _____

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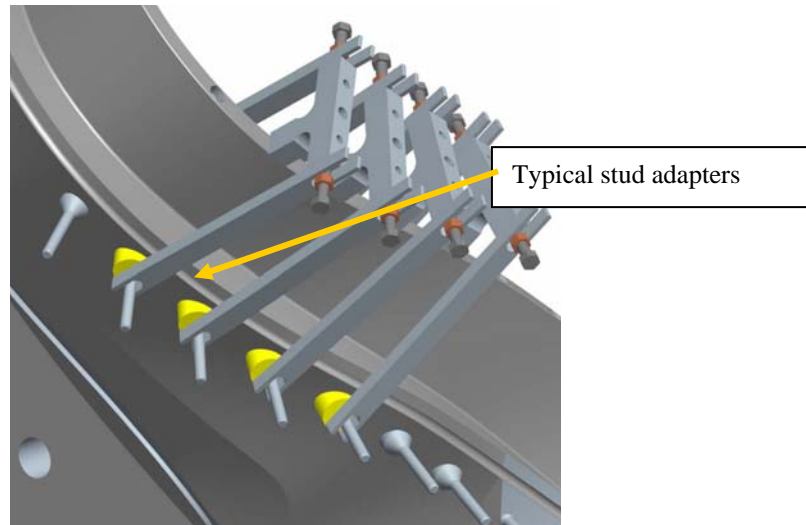


Figure 9- Typical Stud Adapters

6.13.4 Stud adapters have been installed. These need to be QC inspected prior to installing the studs.

Inspection and acceptance of welded stud adapters complete Q.C. Weld Inspector: _____ Date: _____
--

6.13.5 Position the stud alignment fixture onto the casting using the tapped hole in the septum to secure the fixture in place. Check the orientation of the fixture to the casting prior to welding.

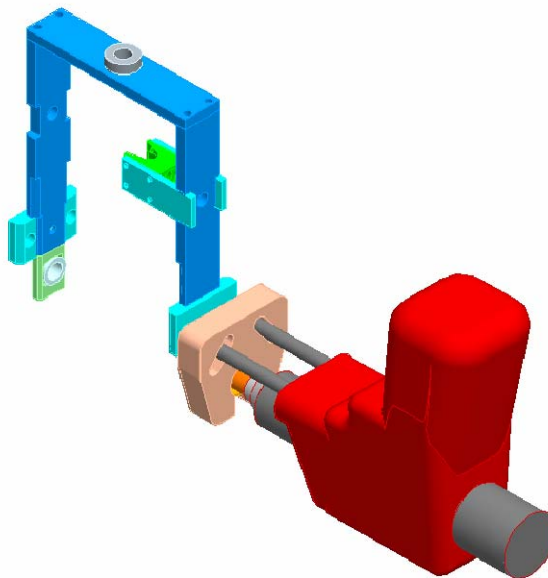


Figure 10- Stud Weld Fixture

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- 6.13.6 Using the stud welder, weld grade 316 stainless steel studs on each side of the winding. Studs shall be positioned per appropriate coil drawings. In some inaccessible locations it may be necessary to use shorter studs and they may need to be TIG welded into position.

[The stud weld operator shall fill out and submit to the Coil Facility Manager a “Filler Request Form” which is required to maintain their certification. The Coil Facility Manager is responsible for submitting the forms to the weld engineer and training group]

Stud Welder Settings:
Stud Weld Model: “TRW Nelson” Series 4500 Model 101
Time: approximately 3.5 seconds
Current: 5.75 amps

Verified by Lead Technician

Stud Weld Date: _____ **Obtain Flame Permit:** _____

Stud Weld Operators: _____ Fire Watch: _____

Stud Weld Date: _____ **Obtain Flame Permit:** _____

Stud Weld Operators: _____ Fire Watch: _____

Stud Weld Date: _____ **Obtain Flame Permit:** _____

Stud Weld Operators: _____ Fire Watch: _____

Stud Weld Date: _____ **Obtain Flame Permit:** _____

Stud Weld Operators: _____ Fire Watch: _____

Stud Weld Date: _____ **Obtain Flame Permit:** _____

Stud Weld Operators: _____ Fire Watch: _____

- 6.13.7 After welding, remove the alignment fixture and clean the weld. Remove all excess weld material.
- 6.13.8 Repeat process for each clamp position, until all studs have been installed.
- 6.13.9 Permeability Check: Each stud and weld shall be checked with a Severn permeability indicator to verify that the relative magnetic permeability is below the acceptance criteria. If the permeability exceeds the acceptance criteria the stud must be removed and replaced and/or the Field Supervisor must approve the variation via a non-conformance report (NCR).

Acceptance Criteria: 1.02μ.

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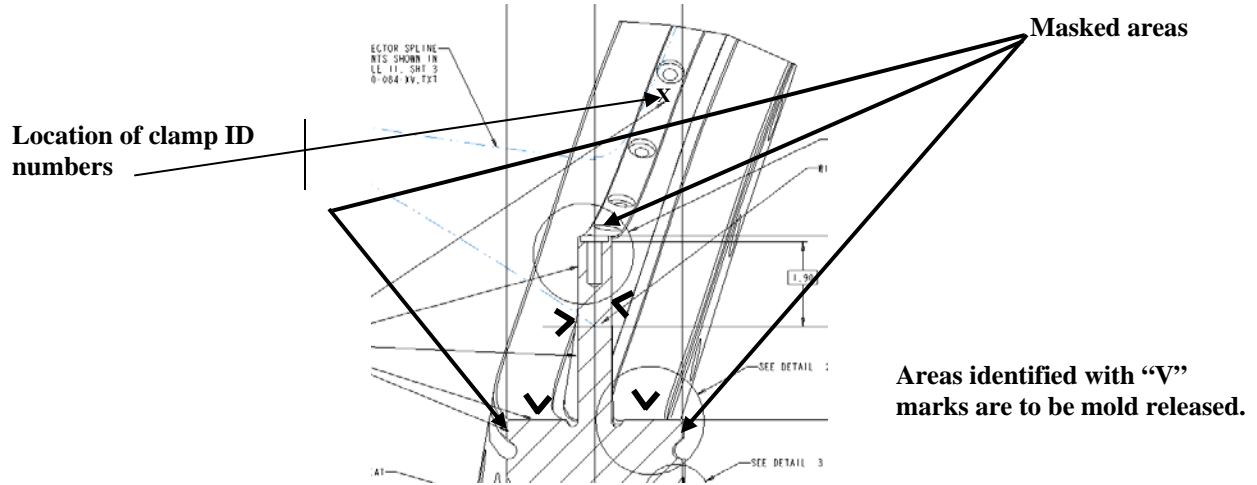


Figure 11- Mold Release and Masked Surfaces

6.15 Kapton Edging:

Prior to mold releasing, install (1) layer of 0.00325 inch thick adhesive back Kapton tape onto the edges of the tee casting where the cladding bends around corners. [Figure 12-Kapton Edge Installation]

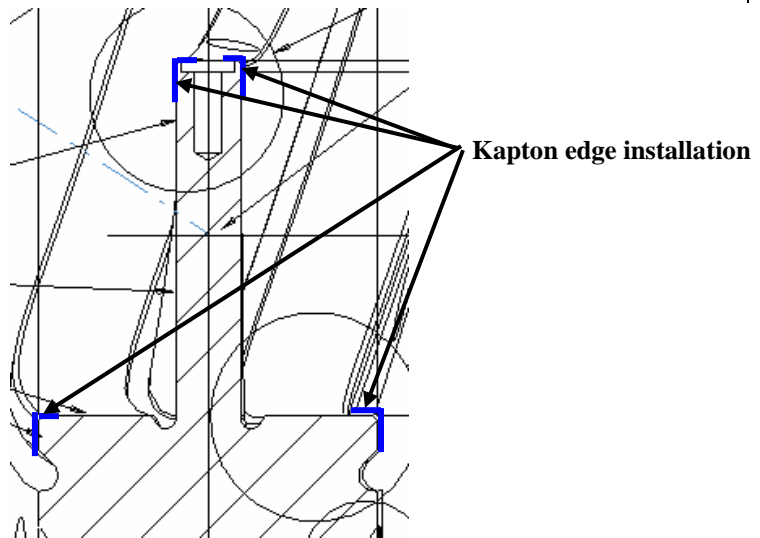


Figure 12-Kapton Edge Installation

6.16 The installation of the Kapton edging tape has been completed:

Verified:	
Lead Technician: _____	Date: _____
Field Supervisor: _____	Date: _____

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6.17 Mold Release:

Mask the surfaces identified in Figure 9 with masking tape. Apply (3) coats of mold release (“Miller-Stephenson”-PTFE MS122DF) to the winding surfaces. Allow each coat to dry to the touch prior to applying the next coat. Figure 11- Mold Release and Masked Surfaces identifies the surfaces to be coated and masked.

Lead Technician verify: _____ Date: _____

6.18 Winding clamps

Mount the top tee section of the winding clamps to the MCWF as shown in Figure 13- Winding Clamps. The clamps are located approximately every 3 inches along the entire length of the MCWF. Secure the winding clamp tee to the top of the septum using the appropriate hardware. Use the (2) side bars to assist in the positioning of the top section, but do not leave in place.

Installation of winding clamp tees is complete: Lead Technician verify: _____ Date: _____
--

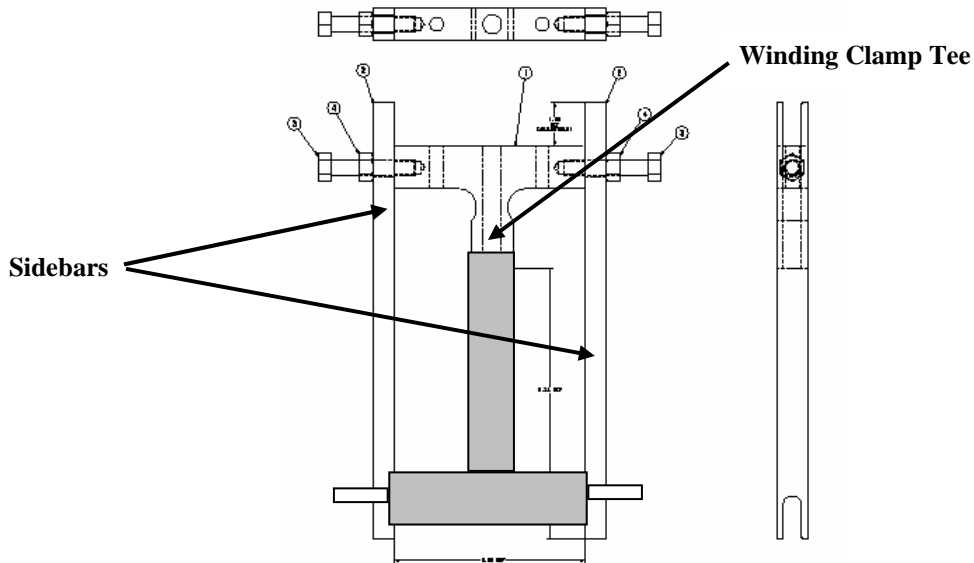


Figure 13- Winding Clamps

6.19 Fitup of Lead Blocks and Installation of Terminal Assembly

6.19.1 Prior to installing the cladding, it is necessary to fitup the Lead Block Fillers and mount the Lead Terminal Assembly to the Modular coil casting. [All part numbers are on reference drawing number SE142C-050] The terminal assembly is required to set the position of the cable connectors. If the assembly components are not available, a temporary stereolithography model of the terminal assembly will be used.

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- 6.19.1.1 Install the positioning bushings and lower leads blocks (sides A and B) and lightly tighten hardware. [**Figure 14-Position Lower Lead Blocks**] Note: The figure may change due to change in machining details.

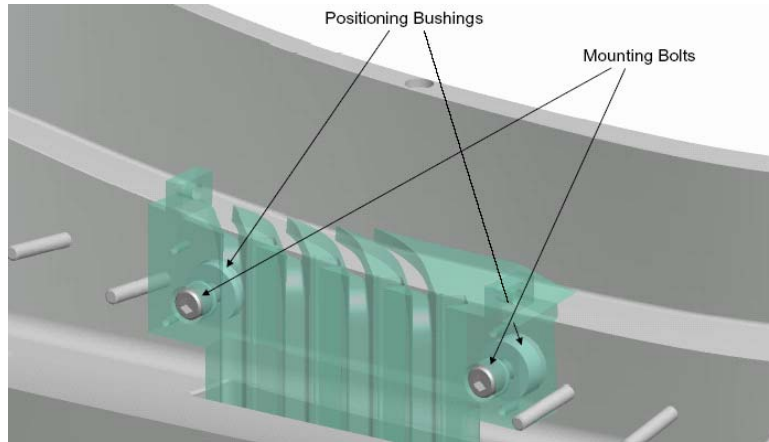


Figure 14-Position Lower Lead Blocks

- 6.19.1.2 Install the upper lead blocks (sides A and B); tighten mounting hardware and install the top plate bushing. [**Figure 15- Upper Lead Blocks and Bushing**]

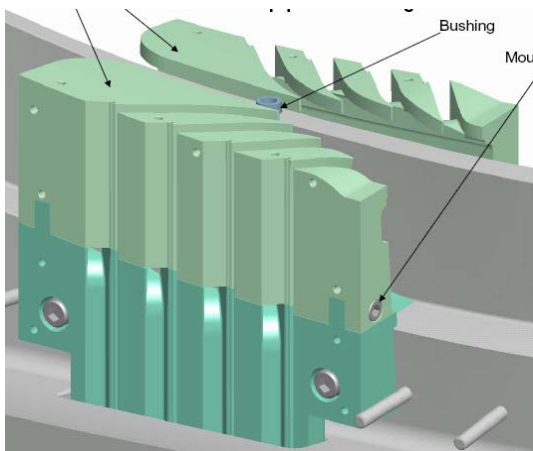


Figure 15- Upper Lead Blocks and Bushing

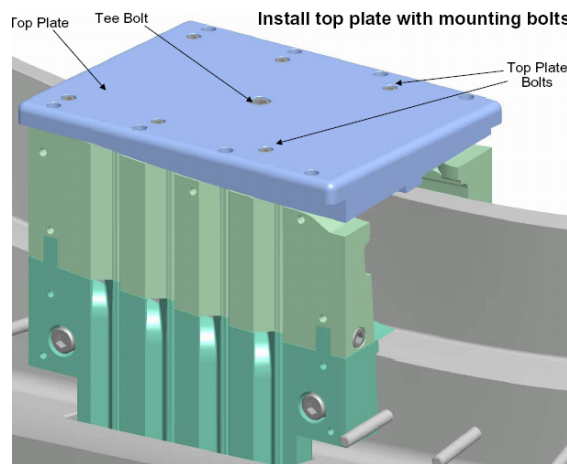


Figure 16- Install Top Plate

- 6.19.1.3 Install the Top Plate and secure in place with hardware. [**Figure 16- Install Top Plate**]
- 6.19.1.4 Accurately mark the position of the sides and bottom edges of the lower lead blocks. Either mark the casting, or attach temporary positioning blocks to the casting. [**Figure 17- Install Lead Positioning Blocks**]
- 6.19.1.5 Remove the Top Plate and Upper Lead Blocks (sides A and B). The Lower Lead Blocks remain temporarily in position until the Lead Termination Assembly has been installed.

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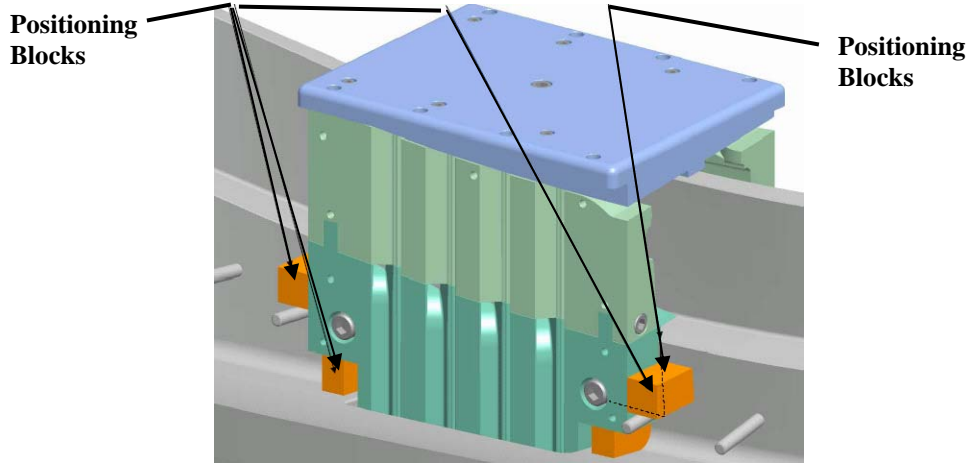


Figure 17- Install Lead Positioning Blocks

6.19.1.6 The fitup of the lead blocks is complete and installation of the Lead Termination Assembly is ready to begin.

Verified:	
Lead Technician: _____	Date: _____
Field Supervisor: _____	Date: _____

6.19.1.7 Using the G-11CR mounting base for positioning, TIG weld (2) 3/8-16 studs to the casting. **[Figure 18- Electrical Insulator and Adjustment Studs**

6.19.2 Each of the welded studs shall be inspected by a QC weld inspector (100% inspection). Welded studs rejected by QC will be removed, surface cleaned and replaced with a new stud. Attach all QC inspection reports to procedure.

Weld Date: _____	Obtain Flame Permit: _____
Weld Operator: _____	Fire Watch: _____

Inspection and acceptance of welded studs complete	
Q.C. Weld Inspector: _____	Date: _____

Summary of Results: [Add additional QC reports to back of procedure]

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- 6.19.2.1 Install the electrical insulator sheet and height adjustment nuts onto the studs just welded. [Figure 18- Electrical Insulator and Adjustment Studs]

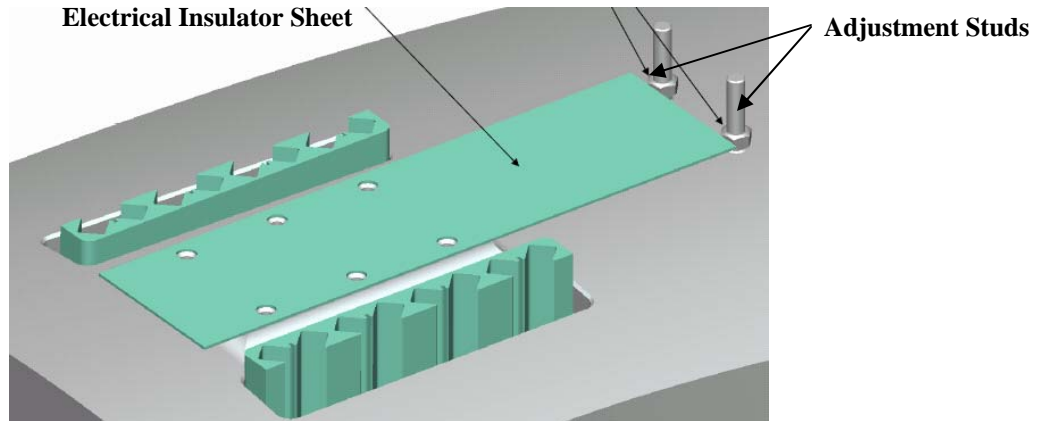


Figure 18- Electrical Insulator and Adjustment Studs

- 6.19.2.2 Install the G-11CR base plate and secure in place with 0.375 mounting hardware and Loctite 2440. [Figure 19-Installation of Lead Terminal Base]

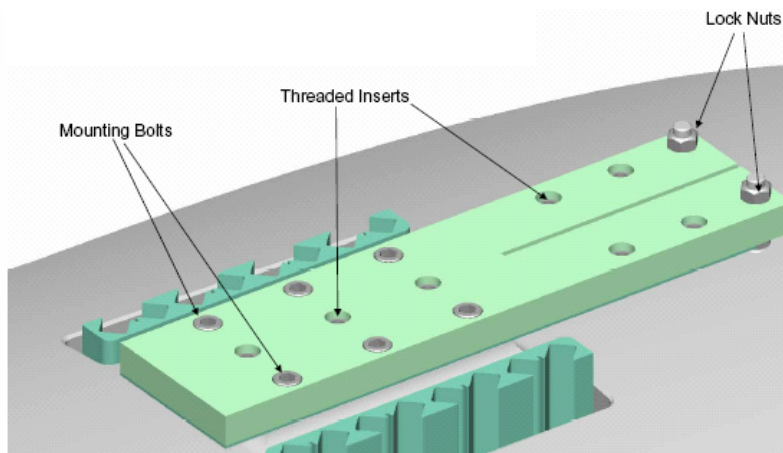
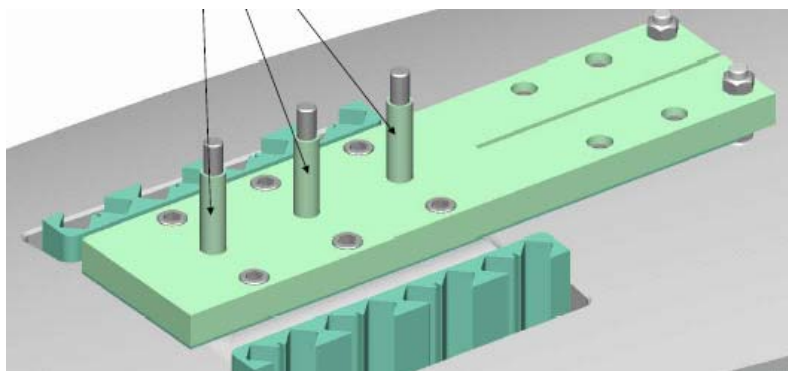


Figure 19-Installation of Lead Terminal Base

- 6.19.2.3 Install the (3) studs and insulating sleeves into the G-11CR base plate using Loctite 2440 on the threads per manufacturer's instructions. **Figure 20-Install Studs and Insulating Sleeves**



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Figure 20-Install Studs and Insulating Sleeves

- 6.19.2.4 Begin installing the copper jumpers and insulating plates. Begin with jumper #1 then an insulating plate. Continue to alternate between jumpers and insulators until Jumper #4 has been installed. Then secure in place with Belleville washers, flat washer and nut. Use Loctite 2440 on threads per manufacturer's instructions. [Figure 21-Jumper #1 and Insulating Plate Installed and Figure 22-Final Jumper#4 Installed and Secured]

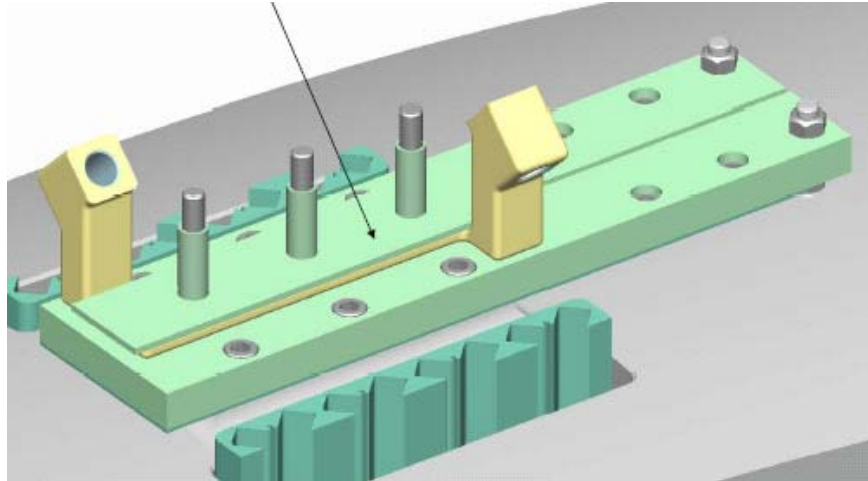


Figure 21-Jumper #1 and Insulating Plate Installed

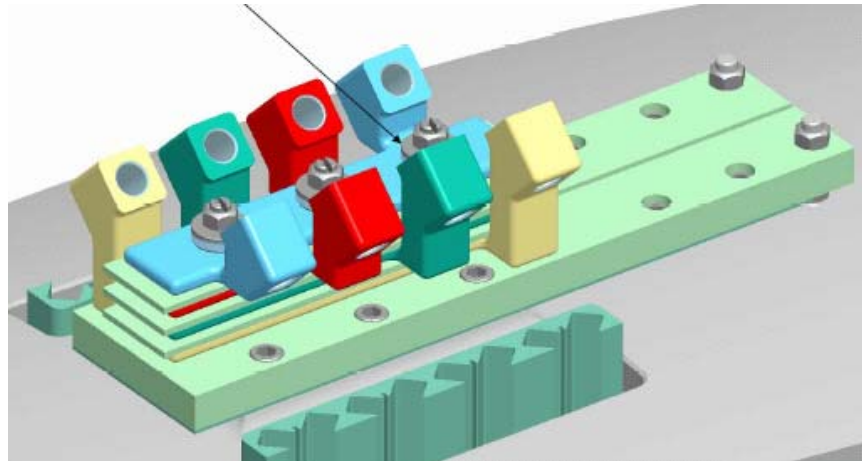


Figure 22-Final Jumper#4 Installed and Secured

- 6.19.2.5 Install and epoxy in-place the insulating divider plate in the groove provided in the G-11 base. Mount the terminal lugs to the G-11 base plate and secure in position with appropriate hardware. **Figure 23- Install Terminal Lugs**

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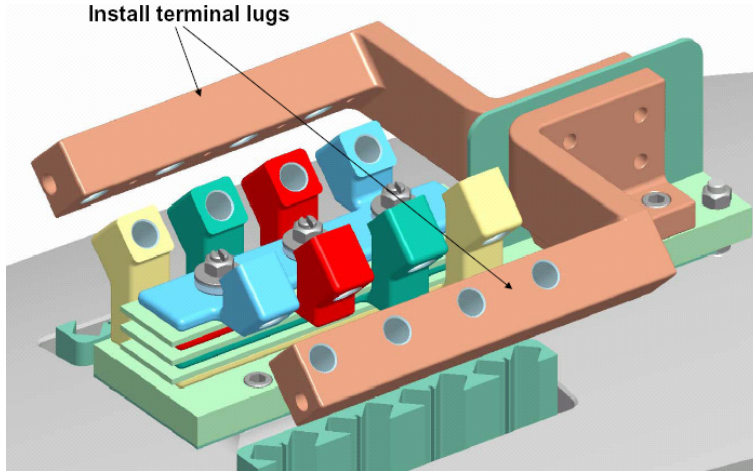


Figure 23- Install Terminal Lugs

6.19.2.6 Remove the Lower G-11CR lead blocks- Sides “A” and “B”.

6.19.2.7 Installation of the Lead Terminal Assembly is complete.

<p>Verified:</p> <p>Lead Technician: _____ Date: _____</p> <p>Field Supervisor: _____ Date: _____</p>
--

6.20 Inner wall copper cladding

6.20.1 Cladding Preparation:

6.20.1.1 Select the inner wall copper cladding being used for the coil type being manufactured. [Parts shall be deburred prior to use] Clean the copper plates with ethanol and clean lint free wipes. **EXTREME CARE** must be taken during handling of the cladding because of the potential for sharp edges. It is recommended that Kevlar gloves be used if possible during this installation.

6.20.1.2 Apply (1) layer of adhesive backed Kapton tape (0.00325 in. thick) to the backside of the cladding that is facing the winding surfaces.

6.20.2 Cladding Installation:

6.20.2.1 Fitup each section of copper cladding to the inner wall using the cladding mapping drawings. Customizing of each section of copper cladding will be required. Some pre-forming can be performed, but final fitup will be performed with cladding piece in position. Install cladding on both sides “A” and “B”. **(Figure 24- Installation of Cladding)**

6.20.2.2 Once the cladding has been fit, remove and re-clean if necessary. Check that there are no sharp edges or burrs.

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- 6.20.2.3 Secure the insulated cladding to the winding form winding surfaces using 3M adhesive cement #CA40H. Apply a minimal quantity [drop] to the back of the cladding per **Figure 24- Installation of Cladding**. A small quantity may also be applied to the backside of the vertical cladding if required to hold pieces in place. **Care should be taken to avoid any buildup of cement under cladding.**
- 6.20.2.4 Prior to placing the cladding in its final position, apply [spray] 3M Accelerator “Pronto Surface Activator” to small area of MCWF where the adhesive on the cladding will mate with the winding form.
- 6.20.2.5 Place the cladding into position and hold in place for 5 seconds. Then continue with remaining cladding pieces.

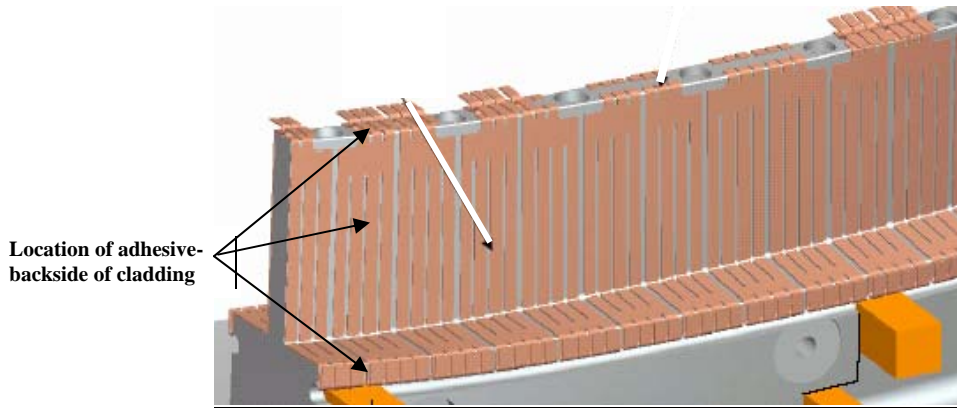


Figure 24- Installation of Cladding

- 6.20.2.6 During the installation of the cladding, continue to verify that the cladding is electrically isolated from the winding form using a multi-meter. Once all of the cladding has been installed, verify that each section of cladding is electrically isolated from its adjacent piece.

Equipment Name & ID Number: _____ **Calibration Date:** _____

Installation of the Inner Copper Cladding is complete (sides “A” and “B”) and integrity of dielectric break is verified:

Lead Technician: _____ **Date:** _____

Field Supervisor: _____ **Date:** _____

Quality Control: _____ **Date:** _____

7 Station No. 1 MCWF Preparation Completion:

7.1 Document Verification:

Verify that all pertinent data on the procedure and data sheets have been completed.

7.2 Field Package:

Ensure that all data sheets, photographs, QC inspection sheets, etc are included in the Field Package.

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7.3 Approval:

Prior to releasing a modular coil from one station to the next it is required that the all-responsible individuals sign the release indicating that all processes at that station have been satisfactorily completed. The release will include signatures from the Station Lead Technician, Field Supervisor and the QC representative.

<p>All winding form preparation activities have been satisfactorily completed.</p> <p>Lead Technician: _____ Date: _____</p> <p>Field Supervisor: _____ Date: _____</p> <p>QC shall verify completion of documentation:</p> <p>Quality Control Representative: _____ Date: _____</p>
--

The winding form is ready for transfer to the next station:

DELETED START-UP AND SHUTDOWN LOGS

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Table 1- Type "C" Coil Drawings [Required for this procedure]

Drawing Numbers	Drawing Description
Top level assembly and layouts	
se140-103.drw	MODULAR COIL ASSEMBLY TYPE-C
se142c-019.drw	TYPE-C WINDING PACK DIMENSIONS
se142c-016.drw	TYPE-C ELECTRICAL SCHEMATIC
se142c-015.drw	TYPE-C COOLING SCHEMATIC
SE141-103	Winding form assembly,
ds141-036.drw	STUD, 1.375-6UNC-2A X 9 LG
ds141-038.drw	INSULATING WASHER
ds141-060.drw	NUT, 12PT HEX 1.375-6UNC-2B
ds141-079.drw	FLAT WASHER
se141-078.drw	POL BREAK SHIM ASSEMBLY TYPE-C
se141-103.drw	MOD COIL WINDING FORM ASSEMBLY TYPE-C
se141-116.drw	PRODUCTION WINDING FORM TYPE-C
se141-123.drw	MCWF TYPE-C STUD WELDMENT
SE142C-018	Side-A winding pack assembly,
se142c-018.drw	TYPE-C SIDE-A WINDING PACK ASSEMBLY
se142c-134.drw	TYPE-C SIDE-A LOWER LEAD BLOCK COMBINED
se142c-136.drw	TYPE-C SIDE-A UPPER LEAD BLOCK COMBINED
se142c-382-101_105.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-106_110.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-111_115.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-116_120.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-121_125.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-126_130.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-131_135.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-136_140.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-141_145.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-146_150.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-151_155.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-156_160.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-161_165.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-166_170.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-171_175.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-176_180.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-181_185.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-186_190.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-191_195.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-196_200.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-201_205.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-206_210.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-211_215.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-216_220.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-221_225.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-226_230.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-231_235.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-236_240.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-241_245.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-246_250.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-251_255.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN

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se142c-382-256_260.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-261_265.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-266_270.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-271_275.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-276_280.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-281_285.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-286_290.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-382-291_295.drw	TYPE-C SIDE-A UPPER CLADDING FLAT PATTERN
se142c-384-101_105.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-106_110.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-111_115.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-116_120.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-121_125.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-126_130.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-131_135.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-136_140.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-141_145.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-146_150.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-151_155.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-156_160.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
se142c-384-161_165.drw	TYPE-C SIDE-A LOWER CLADDING FLAT PATTERN
SE142C-017	Side-B winding pack assembly,
se142c-017.drw	TYPE-C SIDE-B WINDING PACK ASSEMBLY
se142c-135.drw	TYPE-C SIDE-B LOWER LEAD BLOCK COMBINED
se142c-137.drw	TYPE-C SIDE-B UPPER LEAD BLOCK COMBINED
se142c-482-101_105.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-106_110.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-111_115.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-116_120.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-121_125.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-126_130.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-131_135.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-136_140.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-141_145.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-146_150.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-151_155.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-156_160.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-161_165.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-166_170.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-171_175.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-176_180.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-181_185.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-186_190.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-191_195.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-196_200.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-201_205.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-206_210.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-211_215.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-216_220.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-221_225.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-226_230.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-231_235.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-236_240.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-241_245.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN

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se142c-482-246_250.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-251_255.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-256_260.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-261_265.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-266_270.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-271_275.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-276_280.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-281_285.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-286_290.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-482-291_295.drw	TYPE-C SIDE-B UPPER CLADDING FLAT PATTERN
se142c-484-101_105.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-106_110.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-111_115.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-116_120.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-121_125.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-126_130.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-131_135.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-136_140.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-141_145.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-146_150.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-151_155.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-156_160.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-161_165.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-166_170.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-171_175.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-176_180.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-181_185.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-186_190.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-191_195.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-196_200.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-201_205.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-206_210.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-211_215.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-216_220.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-221_225.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-226_230.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-231_235.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-236_240.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-241_245.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-246_250.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-251_255.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-256_260.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-261_265.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
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se142c-484-281_285.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-286_290.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
se142c-484-291_295.drw	TYPE-C SIDE-B LOWER CLADDING FLAT PATTERN
SE142C-050	Leads terminal assembly,
se142c-047.drw	TYPE-C JUMPERS BASE BLOCK
se142c-049.drw	TYPE-C JUMPERS INSULATOR
se142c-050.drw	TYPE-C LEADS TERMINAL ASSEMBLY
se142c-051.drw	TYPE-C TERMINAL JUMPER #1

**Modular Coil Fabrication- Casting Preparation Activities
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se142c-052.drw	TYPE-C TERMINAL JUMPER #2
se142c-053.drw	TYPE-C TERMINAL JUMPER #3
se142c-054.drw	TYPE-C TERMINAL JUMPER #4
se142c-055.drw	TYPE-C SHORT TERMINAL LUG
se142c-056.drw	TYPE-C LONG TERMINAL LUG
se142c-057.drw	TYPE-C TERMINAL LUG CONNECTOR
se142c-058.drw	TYPE-C TERMINAL LUG CONNECTOR
se142c-059.drw	TYPE-C CABLE CONNECTOR
se142c-062.drw	WASHER .53 ID 1.25 OD X .06 THK
se142c-063.drw	FLAT WASHER
se142c-064.drw	1/2-13unc SCREW
se142c-065.drw	.53 ID .875 OD .06 THK FLAT WASHER
se142c-068.drw	INSULATING WASHER
se142c-069.drw	INSULATING SLEEVE
SE142C-233	Lead blocks enclosure,
se142c-226.drw	LEAD BLOCKS WEDGE, SIDE-B
se142c-227.drw	LEAD BLOCKS WEDGE, SIDE-A
se142c-183.drw	LEAD BLOCKS CHILL PLATE, SIDE-A
se142c-241.drw	LEAD BLOCKS CHILL PLATE, SIDE-B
se142c-201.drw	LEAD BLOCKS SUPP COOLING TUBE, SIDE-A
se142c-202.drw	LEAD BLOCKS SUPP COOLING TUBE, SIDE-A
se142c-220.drw	LEAD BLOCKS SIDE PLATE, SIDE-A
se142c-221.drw	LEAD BLOCKS SIDE PLATE, SIDE-B
se142c-184.drw	LEAD BLOCKS TOP PLATE