everson electric company

Manufacturing Process Outline/Traveler for the TF Outer Leg Assembly

Everson Electric # 52730 Work Order # _____

PPPL DWG # & Rev. E-DC1070 Rev. 0 Date: _____

Customer: **Princeton University Plasma Physics Laboratory**

PPPL Purchase Order Number: S-04043-F Date: March 17, 1998

The original completed Traveler and the Test Record Sheets will be shipped with the coils. A copy shall be given to the project engineer.

NOTE: Correct errors by line, signature, and date. **DO NOT WRITE OVER OR USE WHITE OUT!**

DISCREPANCIES: No repair of any discrepancy shall be initiated without prior written approval from the buyer.

Original Authors: Tuan Hoang	**APPROVED BY (Signature & Date)**
Date: March 17, 1998	**Project Engineer:** 10/9/98
Revised by: Chuck Hallquist	**Engineering Manager:**
Revision Date: 10/8/98	**Production Manager:**
Revision #: B	**Quality Assurance:**
	PPPL Representative: James D Chyanowski 10/12/98

Serial Number _____

Revision Table

Revision	Description	Date
Original	Original Issue	3-17-98
A	Re-write	8/13/98
B	Section 3.1-029 Change section from spidering completion to adhering the cooling tube into the conductor with Stycast resin. Section3.1-034 Change Hydro test from 600 PSI for 20 minutes and 200 PSI for sufficient time to 600 Psi for 10 minutes. Change flow from 6.8 GPM to 2.1 GPM Section 3.1-050 Remove Feeler gauge ID number Section 3.1-055 Remove one of the Megger test ID documentation, this was a duplicate documentation. Section 3.1-060 Add thermal couple placement to the baking table Section 3.1-065 Add thermal couple placement to the baking table Section 3.1-070 Re-work testing so that a second water test will only be performed if the cooling tube is damaged. Remove the requirement for the surface plate and outside micrometer. Re-word section so that the lead checking will be in relation to each other and not the curing fixture.	10/8/98

1.0 Scope

This Manufacturing Process Outline (MPO) addresses the fabrication process and Quality Assurance tests to deliver TF Outer Leg Assembly to PPPL in accordance with the following:

Drawing List: **E-DC1066 Rev. 0**
E-DC1067 Rev. 0
E-DC1068 Rev. 0
E-DC1069 Rev. 0
E-DC1070 Rev. 1
E-DC1082 Rev. 0

Specification No.: **NSTX-SPEC-13-043**

It is the intent of this MPO to fabricate TF Outer Leg Assembly in strict accordance with the drawings and specifications and meet the requirements of PPPL.

GENERAL NOTES FOR COIL FABRICATION:

- **All Everson Electric safety policies must be observed.**
- **All nonconformances shall be directed to the department supervisor.**
- **Correct errors by line, signature, and date. Do not write over or use white out !**
- **No repair of any discrepancy shall be initiated without prior written approval from PPPL.**
- **Clean, lint-free gloves will be worn at all times once the conductor has been cleaned.**
- **Coil parts that are inadvertently handled with bare hands or otherwised soiled must be cleaned with acetone.**

Serial Number _____

- **Keep parts and conductor covered at all times. Also cover winding during work stoppage.**
- **Keep metal cuttings and filings out of winding, leads and insulated conductor during metal cutting, filing, sanding and polishing operations.**
- **Never use forced air to remove particles or debris . Use a vacuum.**
- **Round all sharp edges on conductor (.03" radius typical) that contact insulation.**
- **Fill all voids in the coil with clean fiberglass roving or cloth or NEMA G-10.**

2.0 Materials and Parts

The following provides a list of the parts and materials (with EE# cross references) required to fabricate the TF Outer Leg Assembly:

TF Outer Leg Assembly:

Description	PPPL Part #	EE #
Ram 225, Mold Release		M0243
Type H kapton, .005″ Thick x 36″ Wide x 50 ft Long		M0480R
Scotchply, .020″ Thick x 2.0″ Wide Crossply		M0590B
Flux Duzall		M7399
Ciba-Geigy DZ-80-1, Primer		M7400
95%/5% Tin-Antimony Soft Solder		52659-009
TF Oulter Leg Assembly Conductor		52730-001
Coolant Tube Support Mounting Bracket		52730-002
Coolant Tube Clamp Block		52730-003
Outer Connector		52730-004
Inner Connector		52730-005
Copper ETP 110, 1x4x10.25		52730-006
Adaptor, Nibco #6030 X F 3/8		52730-007
ACR Copper Tubing, ϕ1/2 O.D. x .032″ Wall, Tinned		52730-008
Tedlar Tape		M0380
10-32 UNF-2A HHC x 1.0 lg, 316 SS		52730-010

Serial Number _____

10-32 UNF-2A HHC x 1.5 lg, 316 SS		52730-011
10-32 UNF-2B Hex Nut 316 SS		52730-012
#10 Spring Lock Washer		52730-013
#10 Flat Washer, 316 SS		52730-014
CTD-112P Pre-impregnated Tape, .006″ Thick x 1.0″ Wide Part Number 2258XS		52730-015

3.0 Fabrication Process

3.1 TF Outer Leg Assembly

TF Outer Leg Assembly is made up of three weldments, Type A and B. Weldment A is sandwiched between Weldment B.

3.1-005	Conductor Incoming Measurements/Inspections

Check the bare conductor to verify that length and cross sectional dimensions are within the required tolerance on the approved PPPL Dwg #E-DC1066. Furthermore, the conductor will be inspected for twist, warp and camber. Measure and record the dc resistance and temperature of each conductor. Note: Each conductor will be serialized at the end of the bar and will travel with the conductor until the coil is ready for shipment.

Conductor Serial No.	Dimensional Check Pass/Fail	Visual Inspection for Twist., Warp and Camber Pass/Fail	DC Resistance Measurement Ω	Temperature @ Time of DC Resistance Measurement ° F

Resistance meter identification number: _____ Calibration due date: _____

Notify PPPL 48 hours prior to inspection for joint PPPL/Everson inspection. _____

From this time on, the conductor will be tracked to the quadrant and assembly.

QA Signature and Date:_____
Signature and Date:_____

3.1-010	Cooling Tube Installation

Direct Material

Outer Leg Conductor	52730-001
95%/5% Tin-Antimony Soft Solder	52659-009
Flux Duzall	M7399
ACR Copper Tubing, ϕ1/2 O.D. x .032" wall, Tinned	52730-008
Acetone	M0184

Tooling

Digi Sense Temperature Sensor	ID#_____	Cal. Due Date : _____
Wilson Hardness Tester Model	ID#_____	Cal. Due Date : _____
Torch		
Dynafile or buffer		
Wet rag		
Center Punch		

Process

The conductor hardness is critical aspect to the success of the assembly. Extreme care will be exercised to ensure that the heating process used for soldering does not effect the hardness of the copper. Measure and record Rockwell hardness of each conductor (start, middle and end) Pre and Post soldering to ensure compliance.

Clean the groove in each conductor and ϕ1/2 ACR copper tubing with Acetone and disposal wipes to remove excess oil, lubricant and grease. Measure and cut each cooling tube to 300 inches (25 ft) long. Measure and scribe the center mark on the conductor. The cooling tube will be positioned at the center mark of the conductor and work toward the ends of the bar. Initial soldering operation is to start at the center of the conductor and solder approximately 120 inches to either side of the centerline. The remaining cooling tube will be soldered when the electrical flags are installed. Place the cooling tube in the conductor groove. Press the cooling tube against the groove and secure the cooling tube in position with the center punch, Care will be taken not to hit the cooling tube with the center punch. If at anytime the center punch hits the cooling tube, the cooling tube must be replaced. Do not proceed until QA has inspected this procedure and signed the table below. After the conductor and copper tubing are cleaned, apply liberal amount of flux to the groove and place the tinned copper tubing inside the groove. The tinned copper tubing should extend a minimum of 12 inches from the conductor surface. Using a torch, solder the copper tubing in place using 95%/5% Tin-Antimony solder. Excess solder will be removed with a damped rag. During the soldering operation, measure and record the temperature of the conductor at minimum three places (start, middle and end of conductor). Temperature will be measured with Digi Sense temperature sensor. Place type K thermocouple directly on conductor surface after soldering and the torch is removed. After temperature of the conductor is measured and recorded, remove excess solder with damped rag. The temperature required to solder the cooling tube to the conductor should not exceed 465° F. **Only qualified operator is permitted to perform this operation.** Qualify operator must conformed to QM2 and QM16 Qualifying Procedure.

Serial Number _____

Cond. Serial No.	Pre Rockwell Hardness			Post Rockwell Hardness			QA Visual Inspection of Cooling Tube (Rev.1)	Soldering Temperature			Operator Signature and Date		Q.C. Solder Inspection
	Top	Mid	Bot	Top	Mid	Bot	Pass/Fail	Top	Mid	Bot			

Remove excess solder with the buffer or dynafile to be flush with outside copper surface so that cross section of the conductor conforms to PPPL drawings. Flux residue and other contaminates will be removed with acetone.

PPPL Witness and Date:_____
(PPPL must be notified 48 hours prior to this operation. If no PPPL representative is present, continue to the next operation.)

Was PPPL notified? Yes____ No____
QA Signature and Date:_____
Signature and Date:_____

3.1-014	**Conductor Forming**

Direct Material
TF Conductor 52730-001

Procedure

The conductor will be formed at an "outside" vendor. The method that will be used is a roll forming method. This conductor will be driven through a three-roll former. The formed length geometry will be verified with a checking gauge.

After the three lengths have been delivered to Everson they will be inspected with a checking gauge.

After the conductor is formed, mark and scribe the ends of the coil with the conductor number.

QA verification _____ Conductor serial number : _____
QA verification _____ Conductor serial number : _____
QA verification _____ Conductor serial number : _____

QA Signature and Date:_____
Signature and Date:_____

3.1-018	Conductor Grit Blasting

Direct Material

80-100 Aluminum Oxide Grit

Tooling

Grit Blaster

Procedure

The conductor lengths will be grit blasted at the same "outside" vendor as the roll forming.

The blasting material is 80-100 mesh aluminum oxide and blasting rate is 12 seconds/inch^2. Grit blast the conductor to remove any oxidation and promote insulation bonding. A pressure of 18 – 20 PSI per nozzle at a distance of approximately 5-6 inches from the conductor.

QA Signature and Date:_____
Signature and Date:_____

3.1-023	Conductor Priming

Direct Material

DZ-80-1 Primer M7400

Tooling

Air Brush

Procedure

Apply a thin uniform layer of DZ-80-1 primer (M7400) using airbrush. Check to ensure that the conductor is completely covered with uniform layer of DZ-80-1 primer and free of conducive inclusions. Primer will be air dried before proceeding. This will be performed at the same "outside" vendor as the roll forming.

The sign off is to verify that the three lengths have been grit blasted.

QA Signature and Date:_____
Signature and Date:_____

3.1-029	Cooling tube installation [completion]

Remove the tube from the conductor channel. Clean the groove in each conductor and ϕ1/2 ACR copper tubing with Acetone and disposal wipes. Mix the stycast resin # 2850 FT with catalyst # 11 [100:4.5 PBW] [100:9.5 PBV]. Apply the resin into the conductor groove, then install the tube back into the conductor groove. Apply resin to completely cover the cooling tube from the solder end point to the tube turn out point. Wrap area with shrink mylar. Clamp the tube into place, the resin will cure in aproximatley 12 hours at room temperature.

Operator and Date:_____

3.1-030	Electrical Flag Connection

Direct Material

TF Conductor	52730-001
Outer Connector	52730-004
Inner Connector	52730-005
Silfos	M1415
95%/5% Tin-Antinomy	52679-009
Nibco #6030 X F 3/8	52730-007
Flux, Duzall	M7399

Tooling

Torch

Procedure

Cut the conductor to finish length. Use the forming fixture to verify the length prior to cutting the conductor.

Is the length Okay? Yes:_____No:_____
Operator Signature and Date:_____

Attach the inner and outer connectors as shown on PPPL's Dwg #E-DC1069. The inner and outer fittings will be brazed to the coil leads using Sil-Fos (M1415). No flux will be used with the Sil-fos material.

Q.C. Inspection of braze joint: _____
The Nibco fittings (52730-007) will be soft-solder onto the ends of the copper coolant tube using 95%/5% Tin-Antinomy soft-solder with a melting range of 453-464°F.

During the soldering operation the copper filler pieces need to be installed in the conductor extruded groove. This piece will be placed from the tube turn up point to the end of the conductor on both ends.

Q.C. Inspection of braze joint: _____

QA Signature and Date:_____
Operator Signature and Date:_____

3.1-034	Flow and Hydrostatic Tests

Direct Material

Nitrogen Bottle
Water

Tooling

Inlet Pressure gauge (2 psi resolution)	ID#_____
Exit Pressure gauge (2 psi resolution)	ID#_____
Flow Test Station	ID#_____
Weight Scale	ID#_____

Procedure

The coolant tubes into the conductors will be filled with water, pressurized to 600 psi with nitrogen and then isolated from pressure source. There will be no pressure drop, within resolution of the pressure gauge, for at least ten minutes from the time the system is isolated from the pressure source.

Cond. Serial No.	Record Start Pressure @600 psi	Record Final Pressure @600psi	Time Duration	Operator Signature and Date

Hydro test unit identification number: _____ Gage Calibration due date: _____

(PPPL must be notified 48 hours prior to this operation. If no PPPL representative is present, continue to the next operation.)

QA Signature and Date:_____

2. Flow Test

Measure the water flow at a pressure differential (ΔP) of 10.0 ± 2 psig. Using flexible hose and clamps, connect the supply and return to the flow test system. To ensure that all the air is out of the cooling circuit, turn on the water and purge for 1 minute. After purging of the cooling circuit is completed, measure the flow by collecting the water for 15 seconds and weighting the water that is collected during the 15 seconds. From the table posted near the flow station, obtain the flow reading using the weight of the water and the time. Record the flow and water temperature in the table below. The temperature of the water used for the test shall remain between 62-78 °F for each water passage test. Water shall be completely drained from each coil, and the coolant circuit dried by blowing dry nitrogen through the cooling circuit.

Each coolant tube shall be sealed with plastic caps.

Conductor Serial No.	ΔP 10.0 ± 2 psi psi	Flow [Ref. 2.1 gpm]	Water Temperature ° F	Operator Signature and Date

QA Signature and Date:_____

3.1-035	**Conductor Cleaning**

Direct Material

Acetone

Anti-static Plastic

Serial Number _____

Disposal Wipe

Tooling

Vacuum Cleaner

Procedure

Clean the conductor to remove all residue remaining from the grit blasting and forming operations. After the conductor is vacuum cleaned, wipe the conductor with Acetone and cover the conductor with anti-static material. **From this time on, clean, lint-free gloves will be worn at all times while handling the conductor and insulation materials.**

QA Signature and Date:_____
Signature and Date:_____

3.1-040	Conductor Priming

Direct Material

DZ-80-1 Primer M7400

Tooling

Air Brush

Procedure

Apply a thin uniform layer of DZ-80-1 primer (M7400) using brush. Check to ensure that the conductor is completely covered with uniform layer of DZ-80-1 primer. Primer will be air dried before proceeding.

QA Signature and Date:_____
Signature and Date:_____

3.1-045	Turn to Turn Insulation

Direct Material

CTD-112P Pre-impregnated Tape, .006″ x 1.00 52730-015

Tooling

Wipe the conductor with denatured alcohol prior to taping operation.

Apply three layers half-lapped of CTD-112P pre-impregnated tape (52730-015) to obtain insulation thickness of .036 inch. Turn to turn insulation will be tailor to fit neatly around water and electrical terminals.

PPPL Witness and Date:_____
(PPPL must be notified 48 hours prior to this operation. If no PPPL representative is present, continue to the next operation.)

Was PPPL notified? Yes____ No____

QA Signature and Date:_____
Signature and Date:_____

3.1-050	TF Outer Leg Assembly

Direct Material

Ram 225	M0243
Tedlar	M0380
Kapton	M0480R

Tooling

TF Outer Leg Assembly Mold	52730-400

.003″ Feeler Gauge

Assemble the weldments A and B per PPPL's DWG #E-DC1070. After the weldments are assembled, apply one layer half-lapped of Tedlar (M0380) and one half-lapped layer of shrinkable mylar. Using tooling fixture(EE# 52730-400) assemble the insulated TF conductors in accordance with PPPL's DWG #E-DC1070 Rev. 0 to form the TF Outer Leg Assembly, **install the Kapton sheet during assembly**. The ground insulation will be added at a later time. Surface treat the internal surfaces of the pressing plate and pressing with Ram 225 (M0243). When assembling the conductors, all voids between turns will be filled with B-stage tape. Once the conductors are aligned and snug against the outer pressing plate, place the entire assembly into the pressing mold. Clamp the pressing plate and pressing mold with clamping brackets. The clamping bracket will be spring loaded to maintain a constant load during the curing process. Applied 80 ft-lb torque to each 3/4 inch bolt. Using .003″ feeler gauge check the gap between the pressing plate and the pressing mold along the length of the mold. Maximum allowable gap is .002″ along the length.

PPPL Witness and Date:_____
(PPPL must be notified 48 hours prior to this operation. If no PPPL representative is present, continue to the next operation.)

Was PPPL notified? Yes____ No____

QA Signature and Date:_____
Signature and Date:_____

Serial Number _____

3.1-055	Pre-Cure Test

Procedure

Megger the insulation resistance between each conductor within the Outer Leg Assembly at 500 volts for a minimum of 2 minutes between each individual turn and the remainder of the turns, which will be shorted and ground. Minimum resistance is 1000 MΩ. Stamp the assembly serial number on the end of the center conductor.

Megger Test:

Conductor Serial No.	Test Voltage 500 V	Insulation Resistance Minimum 1000 MΩ

Testing unit identification number: _____ Calibration due date: _____

PPPL Hold Point and Date: _____
(PPPL must be notified 48 hours prior to this operation. PPPL approval is required prior going to the next operation).

Was PPPL Notified? Yes____ No_____

QA Signature and Date: _____
Signature and Date: _____

3.1-060	Outer TF Leg Turn Insulation Cure

Tooling

Oven (Field Coil Department)
Channel Recorder ID #_____

Procedure

After the assembly is assembled, the assembly will be transported to an oven. Attach thermocouple as shown in the table 1 to monitor the temperature of the curing cycle. The thermocouples will be connected to the chart recorder and record the entire cure cycle of the TF Assembly. The assembly will be heated to a temperature of 177° C for 8. Once the cooling tube temperature reaches between 93.3°-121.1° C (200°-250° F), open the oven and tighten the all the bolts until the mold is steel to steel. A .003″ feeler gauge will be used to check the gaping. The curing cycle will begin once the assembly and mold have uniformly stabilized at 177° C.

Table 1
Thermocouples connection:
2 thermocouples to monitor air temperature, one at each end of the oven.
2 thermocouples to monitor mold temperature, one at each end of the mold.
1 thermocouple to monitor conductor temperature.
1 thermocouple to monitor cooling tube. Thermocouple should be positioned at center of the cooling tube in the middle conductor.

Note: Do not turn on the oven until QA has looked at the setup.
QA Signature and Date:______________________

Do not remove the assembly mold assembly until QA has verified that the curing cycle has been satisfied.
QA Signature and Date:______________________

QA is to randomly witness and initial next to the row witness point is being performed.

Document Thermal Couple placement For each position							
Time @15 Min Int for Rampup @ 30 Min Int at Temp.		TherC. #1	TherC. #2	TherC. #3	TherC. #4	TherC. #5	TherC. #6
Temp (F)	Initial & Date						

Serial Number __________

Temperature at 177° C for 8 hours Start Time:_____Finish Time:_____

QA Signature and Date:_____
Signature and Date:_____

3.1-065	Ground Insulation and Final Cure

Direct Material

Scotchply, .020″ thick x 2.0″ Wide	M0590B
Tedlar, .002″ Thick x 2.0	M0380

Procedure

Remove the outer TF leg assembly from tooling fixture. Prepare the outside surface for ground insulation. The outside surface will be roughed with sand paper to promote bonding. Apply three layer half-lapped of 2″ wide x .020″ thick crossply Scotch tape (M0590B), total of .120″ thick, as shown on PPPL DWG #E-DC 1070 Applicable Rev. All layers of ground insulation will be applied in the same direction. After the Scotchply, apply one layer half-lapped of 2 mil Tedlar.

After the ground wrap, Tedlar and shrinkable Mylar are applied, the assembly will be transported to an oven. The assembly will be heated to a temperature of 160° C for 2 hours. Once the cooling tube temperature reaches between 65.5°-93.3° C (150°-200° F), open the oven and tighten the all the bolts until the mold is steel to steel. A .003″ feeler gauge will be used to check the gaping. The curing cycle will begin once the assembly and mold have uniformly stabilized.

Table 1

Thermocouples connection:

2 thermocouples to monitor air temperature, one at each end of the oven.

2 thermocouples to monitor mold temperature, one at each end of the mold.

1 thermocouple to monitor conductor temperature.

1 thermocouple to monitor cooling tube. Thermocouple should be positioned at center of the cooling tube.

Note: Do not turn on the oven until QA has looked at the setup.
QA Signature and Date:_____

Do not remove the assembly mold assembly until QA has verified that the curing cycle has been satisfied.
QA Signature and Date:_____

QA is to randomly witness and initial next to the row witness point is being performed.

Document Thermal Couple placement For each position							
Time @15 Min Int for Rampup @ 30 Min Int at Temp.		TherC. #1	TherC. #2	TherC. #3	TherC. #4	TherC. #5	TherC. #6
Temp (F)	Initial & Date						

Serial Number _____

Temperature at 160° C for 2 hours Start Time:_____Finish Time:_____

QA Signature and Date:_____
Signature and Date:_____

3.1-070	**Final Inspection and Testing**

1. Hydrostatic and Flow Test: The Hydro and flow tests are performed before baking. A visual inspection will be performed on the cooling tubes. If any damaged or suspect area are identified that particular tube will be re-tested. Reference section 3.1-034 for testing instructions.

The cooling tubes are acceptable as is. Yes: _____ No: _____

QA Signature and Date:_____

Retesting data if applicable:

Flow _____ GPM

Pass Hydro test: 600 PSI for 20 minutes.

Operator and Date [if applicable]: _____

3. Megger Test

Tooling

Megger ID#_____ Cal. Due Date : _____

Procedure

Wrap the coil with aluminum. Megger the insulation between conductors within the assembly, and to ground by applying 3 KV between each individual turn and the remainder of the turns, which will be shorted and grounded. Insulation resistance will be greater than 1000 MΩ.

Conductor Serial No.	Testing Voltage 3 KV	Minimum Insulation Resistance 1000 MΩ	Operator Signature and Date

PPPL hold point and approval : _____

QA Signature and Date:_____

4. Hipot Test

Tooling

Hipot Test ID#_____ Calibration due date:_____

Procedure

The insulation between the coil assembly and ground will be verified by applying 3 KV DC Hipot between all turns, shorted together, and ground. Voltage will be ramped up in 10 seconds, held for 60 seconds, and ramp down in 10 seconds. Leakage current will be recorded during ramping up and down, and once every 10 seconds during the 60 second interval. Leakage current will not exceed 10μ Amps.

Test Cycle	Hipot Voltage max. @ 3 KV	Current Leakage μ Amps	Operator Signature and Date
Ramping Up			
10 Seconds @ 3 KV			
20 Seconds @ 3 KV			
30 Seconds @ 3 KV			
40 Seconds @ 3 KV			
50 Seconds @ 3 KV			
60 Seconds @ 3 KV			
Ramping Down			

PPPL hold point and approval : _____

QA Signature and Date:_____

Serial Number _____

5. Dimensional Test

Tooling

12" Caliper ID#_____ Cal. Due date:_____
48" Caliper ID#_____ Cal. Due date:_____

Procedure

Measure and record the dimensions that are on Dwg #E-DC1070 [Applicable revision]. Check the location of the electrical flags in relation to each other.

Is the assembly Okay? Yes: No:
QA Signature and Date:_____
Signature and Date:_____

Inspected By:			Date:
Item	Nominal Dimension	Measured Dimension	Out-Tol.
1	3.312		
2	6.456		
3			
4			

Prepare end item documentation as called out in the Quality Plan.

Verify that each Coil is properly identified with a Temporary tag which is attached to the leads. The tag should be clearly marked with the Drawing Number, Revision Letter, PPPL P.O. #, Everson's Name. This information should be the same as the information on the cover page of this MPO/Traveler.
Note: Stamping or painting of coil is NOT allowed.
Review Entire MPO/Traveler for completeness & assure that all test results were within specification.
Assure that all Discrepancies or NonConformancies have been Approved and included in the Traveler.

PPPL Hold Point and Date:_____
(PPPL must be notified 48 hours prior to this operation. PPPL approval is required prior going to the next operation).
Was PPPL Notified? Yes____ No____
Q.A. or Lead Engineer Review Signature and Date:_____

3.1-075	Packaging

Obtain "Product Quality Certification and Shipping Release" form to be provided by PPPL's Quality Assurance Representative prior shipping the TF Outer Leg Assembly.

Is the "Shipping Release" Form received and approved by PPPL: Yes: _____No:____
If yes, attach a copy to the end of this MPO/Traveler.

The TF Assembly will be packed in shipping fixture. Extra protective material will be used between the coil and the plates so that no damage is caused to the assembly. Ensure that the protruding leads are protected and padded. The Shipping Container will be clearly marked with the Drawing Number, Revision, PPPL P.O. # and Everson Electric's Name.

Packed by
Signature and Date:_____

Verified by:

Supervisor, Project Engineer or Q.A. Signature and Date:_____

Serial Number _____