

**Energy Industries of Ohio**

**Contract # S005242-F**

**Modular Coil Winding Form**

**A-3 Documentation Package**

**10/11/06**

# **This A-3 Documentation consists of:**

## **Part 1**

**Final documentation package Metal Tek Intl. – Pages 3-63**

**Latest revision 8/02/2006**

**Foundry documentation – 10/11/06 – additional info located in appendix**

## **Part 2**

**Final documentation package Major Tool - Pages 64 - 116**

**Latest revision 8/29/2006**

**Machine shop documentation**

**NOTE - MTM – new EIO TOC is on page 65. Use this as a reference for finding files in MTM portion of Doc package.**

## **Part 3**

**Metal Tek radiographic films from part 1 (shipped to PPPL)**

**Major Tool radiographic films from part 2 (shipped to PPPL)**

## **Part 4 – Appendix**

**Metal Tek CA-1347 for thin walled condition on A style MCWF added – Page 118**

# **Energy Industries of Ohio**

**Contract # S005242-F**

**Modular Coil Winding Forms**

## **A-3 Documentation Package**

**Part 1 – Metal Tek International  
Casting Data Package**

**8/02/06**

\*\*Note – Document #'s listed in the TOC (page 4) are not necessarily the same as the number hand written on the top of the document. Please use page # to find relevant document.

# A-3 Documentation Package

## List of Documents 8-02-06

Doc #	Description	Page #
1	MTR for weighted average of chemistry – 3 ladles replaced by product analysis after PM incl MTR from Wisconsin Centrifugal	5
2	MTR for A-2 Shim revised 8/16/05	6
3	Lincoln weld metal product conformance spec Lot 30188513/78308	7
4	St Louis Test Lab dated 8/16/05 mech test results at RT & CVN @ 293°k for Lincoln lot 30188513/78308	8
5	St Louis Test Lab dated 10/5/05 CVN @ -320°F for Lincoln weld lot 30188513/78308	10
6	Westmoreland mechanical test @ -320°F dated 10/18/05 Lincoln Lot 30188513/78308	11
7	Westmoreland Tensile test report @ -320°F dated 11-25-2005	12
8	St Louis Test Lab dated 11-16-05 – incl. tensile test results @ room temp & Charpy V Notch (CVN) at 77°K & 293°K	13
9	Weld map	16
10	MQS Radiographic Inspection Report dated 11/20/05	19
11	MQS Radiographic Inspection Report dated 1/5/05 * note typo on date actual date should be 1/5/06	24
12	MTK Radiographic Interpretation Report dated 1/22/06	27
13	MTK Radiographic Shooting Sketch for A coils	28
14	MTK Radiographic Interpretation Report A-3 Shim	29
15	A-3 Coil heat treat chart dated 11/2/05	30
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18	MTK signed MTS A-3 Coil	34
19	MTK signed MTS A-3 Coil shim	45
20	CA 1308 – shim chemistry out of spec	4
21	CA 1323 – CA for sulfur & phosphorus readings - final ver. 2/26/06 - <b>NOTE</b> – applies to A-3 shim only	49
22	CA 1536 for excess Manganese levels	54
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27	EIO shipping release for A-3 Coil	62
8/2/06		



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### Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
Phone: 636-479-4499 - Fax: 636-479-3399

## Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2  
Pattern Number MCWF-A3  
CAF Metal Designation CF8MNMnMod  
Material Spec CF8MNMnMOD

Cert Number 176180-1  
Pour Date 10/14/2005

Weighted average of 3 heats - Ladle 1 #31251(41%), Ladle 2 #31252(22%),Ladle 3 #31255(37%) Total Weight 33126 lbs.

Element	Min	Actual	Max
C	0.04	0.04	0.07
MN*	2.3	2.9	2.8
SI	0.0	0.3	0.7
CR	18.0	18.2	18.5
NI	13.0	13.3	13.5
MO	2.1	2.2	2.5
P	0.0	0.034	0.035
S	0.0	0.012	0.025
N	0.24	0.26	0.28

\*Over specification, see CA XXXX.

#### Comparison to WC Analysis

All analysis at CAF was performed after the preventive maintenance.

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
Ladle #1											
CAF	31251	Button #1	0.04	0.3	2.8	18.1	13.4	2.2	0.26	0.034	0.012
CAF	31251	Button #2	**	0.3	2.7	18.1	13.4	2.3	**	0.034	0.012
WC	31251	Button #2	**	0.3	2.6	17.9	13.4	2.3	**	0.035	0.016
Ladle #2											
CAF	31252	Button #1	0.04	0.4	2.9	18.2	13.3	2.2	0.26	0.034	0.012
CAF	31252	Button #2	**	0.4	2.9	18.2	13.3	2.2	**	0.030	0.011
WC	31252	Button #2	**	0.4	2.7	18.1	13.4	2.2	**	0.032	0.016
Ladle #3											
CAF	31255	Button #1	0.04	0.4	3	18.3	13.2	2.2	0.25	0.034	0.012
CAF	31255	Button #2	**	0.4	2.9	18.3	13.2	2.2	**	0.031	0.012
WC	31255	Button #2	**	0.4	2.7	18.2	13.4	2.2	**	0.034	0.016

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

Superior Quality Engineered Metal Products



## Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
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## Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2 Heat Number 29198 Pour Date 4/28/2005  
Pattern Number SE-141-073 COIL C SHIM (-3 thru-6 Parts) Cert Number S73220-2 and  
SE-141-033 COIL A SHIM (-1 thru-6 Parts) Cert Number S76220-1  
CAF Metal Designation CF8MNMnMod  
Material Spec CF8MNMN MOD  
Revised 1/30/06

Element	Min	Actual	Max
C	0.040	0.070	0.070
CR	18.000	18.100	18.500
MN	2.300	2.970	2.800
MO	2.100	2.450	2.500
N	0.240	0.255	0.280
NI	13.000	13.120	13.500
P*	0.000	0.013	0.035
S*	0.000	0.010	0.025
SI	0.000	0.700	0.700

MN & SI previously reported on CA 1308 and were accepted.

\*P & S taken from test from heat parts were poured from and analyzed by wet chemistry, ASTM E1019-03 for sulfur and Gravimetric for Phosphorous.

This report covers the eleven castings poured from heat 29198. Only parts listed above however will be shipped for this order. Each casting has a unique number stamped in the part adjacent to the pattern number to differentiate the part and subsequent reporting that will be traced to the casting.

Specification limits have been updated to latest specification.

The certificate is produced with EDP and valid without signature.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

# PRODUCT CONFORMANCE REPORT



Product	LNM 4455	Size(s) mm	1,2
Class.	EN 12072-99: G 20 16 3 Min L	Lot/Batch	3018513/78308
		Item No.	692129
Customer	EUROWELD MOORESVILLE N.C. 28117 UNITED STATES	Quantity	105,0 KG
		Customer ref.	P.O.: 05 - 46
		LSW Order No.	SD427896

Chemical analysis (%) EN10204 2.2

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N
0,01	0,5	7,3	0,015	0,001	20,3	15,4	2,9	0,1	0,19

Mechanical tests, all weld metal EN10204 2.2

Tensile testing					Impact testing		
Cond.	Temp.	Rp0.2	Rm	A5	Cond.	Temp.1	Av1
	°C	N/mm2	N/mm2	%		°C	J
AW	RT	407	623	41	AW	-196	67

Additional information EN10204 2.2

Other tests

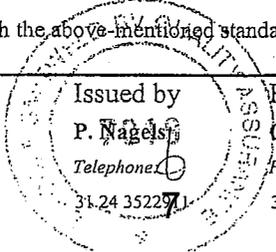
### Remarks

Impact testing (individual values): 70J - 65J - 67J.

The product identified above has been manufactured, tested and supplied in compliance with a Quality Assurance Programme that fulfils the requirements of EN 29000/ ISO 9000/BS 5750 or similar standard.

We herewith certify that the product complies with the above-mentioned standards. Certified ISO 9001:2000.

Company	Lincoln Smitweld B.V.	Registered Office	Nieuwe Dukenburgseweg 20 6534 AD NIJMEGEN	Post address	P.O. Box 253 6500 AG Nijmegen	Issued by	P. Nagels	Telephone	31 24 352271	Function	QA Administrator	Date	22/03/2005	Cert.No.	3018513/7830
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August 16, 2005  
 Lab No. 05P-2532  
 P.O. No. 21324  
 Page 1 of 2

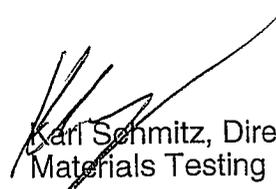
**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** LNM 4455, LINCOLN LOT 3018513/78308  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 293°K

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
LNM4455-7	104	0.085	100
LNM4455-8	106	0.093	100
LNM4455-9	99	0.084	100
<b>Average</b>	103	0.087	100

*Identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
 Materials Testing

KS/tlv



Certificate No. 0397-01  
 Certificate No. 0397-02

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 AN OFFICIAL COPY OF TEST REPORT WILL BE PROVIDED BY THIS LABORATORY ON REQUEST.  
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August 16, 2005  
 Lab No. 05P-2532  
 P.O. No. 21324  
 Page 2 of 2

**Attention: CHUCK RUUD**

**REPORT OF MECHANICAL TESTS**

**SAMPLE ID: LNM 4455, LINCOLN LOT 3018513/78308**

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)		Modules of Elasticity
						in.	%	
LNM4455	0.1932	0.0866	55.2	65200	95200	0.76	38.0	23.4

Round, reduced section tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

*Identification of tested specimens provided by the client.*

*Room Temperature Test CTR*

  
 Karl Schmitz, Director  
 Materials Testing

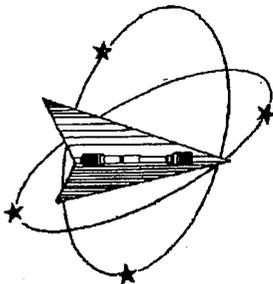
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**Westmoreland Mechanical Testing & Research, Inc.**  
 P.O. Box 388  
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 Website: [www.wmtr.com](http://www.wmtr.com)  
 WMT&R is a technical leader in the material testing industry.



Section 1 of 1

WMT&R Report No. 5-35979  
Requisition No. 4972

October 18, 2005

**CERTIFICATION**

MetalTek International  
The Carondelet Division  
8600 Commercial Blvd.  
I-55 Industrial Park  
Pevely, MO 63070-1528

Attention: Jim Galaske

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.  
The following tests were performed on this order: TENSILE

TENSILE RESULTS: ASTM E21-03a

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.0030 in./in./min., 0.0500 in./min./in.

MATERIAL: METALTEK CF8MNMNMOD

DISPOSITION: Report

Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AIUR
3018513/78308	C54936	-320	184.9	123.7	33	33	32.8	18470	12350	0.3566	0.2926	1.40	1.86	0.09987403	M9	R

AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

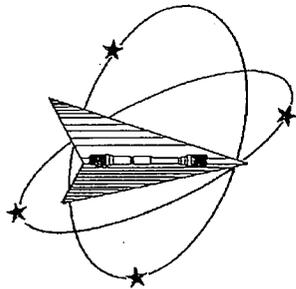
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 Roy E. Stamm  
 Technical Services Manager / Tensile Supervisor

10-18-05

October 18, 2005

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621-01 & 621-02



7

November 25, 2005

## CERTIFICATION

Section 1 of 1

WMT&R Report No. 5-38272

Requisition No. 4654

MetalTek International  
The Carondelet Division  
8600 Commercial Blvd.  
I-55 Industrial Park  
Pevely, MO 63070-1528

Attention: Jim Galaske

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: TENSILE

### TENSILE RESULTS: ASTM E21-05

Requirements: UTS ksi (Min 95\Max ---) 0.2% YS ksi (Min 72\Max ---) 4D Elong. % (Min 32\Max ---) Modulus Msi (Min 21\Max ---)

SOAK TIME: 5 Minutes

SPEED OF TESTING: 0.003 in./in./min., 0.05 in./min./in.

MATERIAL: Metaltek CF8MNMnMOD

DISPOSITION: Acceptable

Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	A\UR
A3 (Z1)	C71342	-320	167.9	99.8	54	45	23.2	16250	9658	0.3510	0.2605	1.40	2.16	0.09676184	M9	A
A3 (Z2)	C71343	-320	162.7	96.2	40	35	27.4	15730	9297	0.3508	0.2839	1.40	1.96	0.09665160	M9	A
A3 (Z3)	C71344	-320	167.3	100.6	59	47	29.4	16170	9719	0.3508	0.2563	1.40	2.22	0.09665160	M9	A

A\UR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

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 Roy E. Starr / Matt J. Wojton  
 Technical Services Manager / Tensile Supervisor

11-25-05  
 November 25, 2005

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 Pevely, MO 63070

November 16, 2005  
 Lab No. 05P-3555  
 P.O. No. 21324  
 Page 1 of 3

**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** A3 COIL- Z1, Z2, Z3  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 293°K  
**REQUIREMENTS:** 50 ft / lbs min

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-1	138	0.071	80
Z1-2	129	0.096	80
Z1-3	152	0.066	80
<b>Average</b>	140	0.078	80
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-1	212	0.072	80
Z2-2	202	0.091	90
Z2-3	176	0.076	80
<b>Average</b>	197	0.080	83
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-1	134	0.056	80
Z3-2	124	0.081	90
Z3-3	152	0.099	90
<b>Average</b>	137	0.079	87

*Identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
 Materials Testing



Certificate No. 0397-01  
 Certificate No. 0397-02

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November 16, 2005  
 Lab No. 05P-3555  
 P.O. No. 21324  
 Page 2 of 3

**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** A3 COIL- Z1, Z2, Z3  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 77°K  
**REQUIREMENTS:** 35 ft / lbs

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-4	81	0.056	70
Z1-5	92	0.036	60
Z1-6	76	0.058	70
<b>Average</b>	83	0.050	67
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-4	92	0.041	70
Z2-5	108	0.056	70
Z2-6	99	0.042	70
<b>Average</b>	100	0.046	70
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-4	80	0.048	70
Z3-5	54	0.032	40
Z3-6	102	0.046	75
<b>Average</b>	79	0.042	62

*Identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
 Materials Testing



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 Certificate No. 0397-02

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November 16, 2005  
 Lab No. 05P-3555  
 P.O. No. 21324  
 Page 3 of 3

**Attention: Chuck Ruud**

**REPORT OF MECHANICAL TESTS**

**SAMPLE ID:** A3 COIL- Z1, Z2, Z3

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Modulus of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
Z1	0.1956	0.0707	63.9	22.1	43300	83100	1.10	55.0
Z2	0.1924	0.0769	60.0	21.9	42100	81800	1.09	54.5
Z3	0.1940	0.1188	38.7	22.4	44100	83000	1.03	51.5

Round, reduced section tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

Identification of tested specimens provided by the client.

*Room temperature test Ctn*

KS/tiv

  
 Karl Schmitz, Director  
 Materials Testing



Certificate No. 0397-01  
 Certificate No. 0397-02

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## A-3 Coil Weld Map – Metal Tek

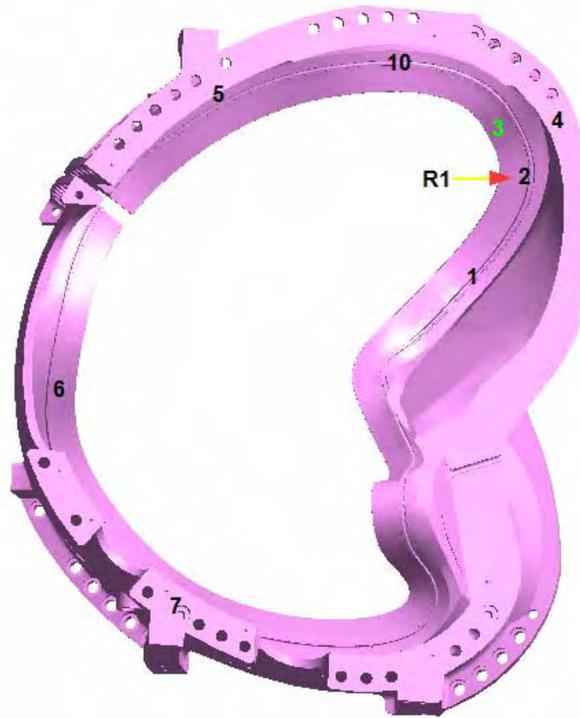
Map of all major welds exceeding 20% of wall, over 1 inch or over 10<sup>2</sup> inches

<b>Defect Number</b>	<b>Drawing View</b>	<b>Length (inches)</b>	<b>Width (inches)</b>	<b>Depth (inches)</b>
1	Left	7	2	1
2	Left	9	4	¼
3	Left	15 ½	7	1
4	Left	10	3	¾
5	Left	9	2 ½	1
6	Left	5	2	Thru
7	Left	19	5	Thru
8	Top	6	2	1
9	Top	3	2	2
10	Left	6	5	¼
11	Right	22	5	¾
12	Right	8	2	2
13	Right	8 ½	4	¾
14	Right	5	2	2
15	Right	9	9	Thru
16	Right	8	2 ½	Thru
17	Bottom	11 ½	1 ½	Thru
18	Back	11 ¾	1 ½	1 ½
19	Back	3	2	1 ¾
20	Back	13	1 ½	1 ½
21	Back	2 ½	1 ½	1 ¼
22	Back	4	2	2
23	Back	4	1 ¾	1 ½
24	Top	9 ½	1 ½	1 ½
25	Top	3	2	1 ¾
R1 (at #2)	Left	8	5	1

## A-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10<sup>2</sup> inches

A-3 Weldmap  
Left View



Note – R1 located on weld # 2

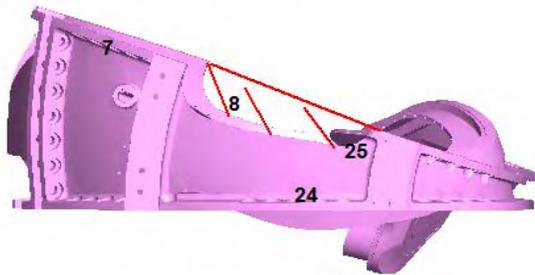
# A-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10<sup>2</sup> inches

A-3 Weldmap  
Right View



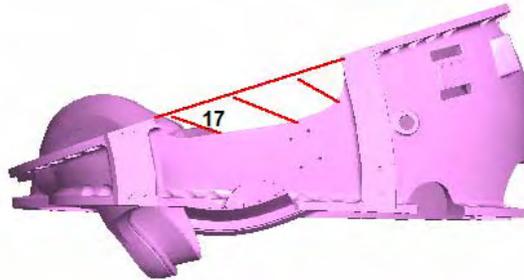
A-3 Weldmap  
Top View



# A-3 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10<sup>2</sup> inches

A-3 Weldmap  
Bottom View



Note - Weld # 8 & 17 located in cut-out areas of casting

A-3 Weldmap  
Back View



Note - Welds # 20 - 23 located in cut out area

# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		11/20/05	361-02698-1
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		22501	GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET 1 OF 5	

PART NUMBER	Serial No	View	No Apparent Indications		Dross		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Inclusion	Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Sur-face		
MCWF-A3	1-2		✓						1				
	2-3		✓						3				
E.I.O. C040851	3-4		✓						1-2				
	4-5		✓						2				
M176180	5-6		✓						2				
	6-7		✓						1-2				
Z103990	7-8		✓						1-2				
	8-9		✓						2				
	9-10		✓									✓	
	10-11				R				4				
	11-12				R				1		R	✓	
	12-13				R				5		R	✓	✓
	13-14				R				5				
	15				R				5				
	16-17		✓						3				
	17-18		✓									✓	
	18-19		✓						1				
	19-20		✓										
	20-21		✓									✓	
	21-22		✓										
	22-23		✓										
	23-24		✓						1				
	24-25		✓						2				
	25-26		✓						1-2				
	26-27		✓										

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	13043	SHT.	REV. 1
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>John Petraske</i>		
				CERTIFIED NDT LEVEL (RT)	Exp 01/08 RT II John Petraske		

# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		11/20/05	361-02698-1
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		22501	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET 2 OF 5	
ASTM E94-93	MSS-SP-54-1999		

PART NUMBER	Serial No	View	No Apparent Indications		Dross		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Inclusion	Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface		
MCWF-A3	27-28	✓							23				
	28-29	✓							2				
E.I.O. C040851	29-1	✓							2				
	30-31	✓							1				
M176180	31-32	✓										✓	
	32-33	✓											
Z103990	33-34	✓											
	34-35	✓											
	35-36			R							R		
	36-37												
	37-38	✓							1				
	38-39			R					5				
	39-40			R					4				
	41-42			R					5				
	43-44	✓							1				
	44-45	✓							1				
	45-46	✓											
	46-47	✓											
	47-48	✓											
	48-49	✓											
	50-51	✓											
	51-52	✓											
	52-53			R							R		
	54-55	✓											
	55-56	✓								2			

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	13043	SHT.	REV. 1
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>John Petraske</i>		
				CERTIFIED NDT LEVEL (RT)	RTIF E-POV08 John Petraske		

# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		11/20/05	361-02698-1
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		22501	GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET 3 OF 5	

PART NUMBER	Serial No	View	No Apparent Indications		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Dross or Slag	Porosity	Lack of Fusion Gas Cracks	Hot Tears	Under cut surface		
MCWF-A3	57-58	✓						2			
	58-59	✓							1		
E.I.O. C040851	59-60	✓									
	60-61	✓									
M176180	61-62			R					4		
	62-63			R						R	
Z103990	64-65			R						R	
	63-64	✓							1		
	64-65	✓									✓
	65-66	✓									
	66-67	✓							2		
	67-68			R	5				2	R	
	68-69	✓							2		
	69-70			R					4		
	70-71			R					4		
	71-72	✓			2						
	72-73	✓						2-3			
	73-74	✓									
	74-75	✓									✓
	75-76	✓			1						
	76-77			R					4		
	77-78	✓									
	78-79	✓							2		
	79-80	✓							2-3		
	80-81			R					4		

NO. ACCEPTED	NO. REJECTED	MQS TECH. NO.	13043	SHT.	REV. 1
COMMENTS		CUST. RSS NO.		SHT.	REV.
		REVIEWER	<i>John Petruska</i>		
		CERTIFIED NOT LEVEL (RT)	RT II Exp 01/08 John Petruska		

# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		11/20/05	361-02698-1
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		22501	GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET 4 OF 5	

PART NUMBER	Serial No	View	No Apparent Indications		Dross or Porosity		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Inclusion	Slag	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface		
MCWF-A3	81-82	✓						2	1-2				
	82-83	✓						1-2					
E.I.O. C040851	84-85	✓						2-3					
	85-86	✓						2-3					
M176180	86-87	✓		R				3		R			
	87-88A	✓											
Z103990	88-89	✓						2					
	89-90	✓		R	5								
	90-91	✓						1-2					
	92-93	✓		R				5					
	94-95	✓							2			✓	
	95-96	✓		R					4			✓	
	96-97	✓		R					4			✓	
	97-98	✓		R					5			✓	
	98-99	✓			2			1	2			✓	
	99-100	✓		R				5				✓	
	100-101	✓										✓	
	102-103	✓						3				✓	
	103-104	✓							3			✓	
	104-105	✓		R					4			✓	
	106-107	✓						1				✓	
	107-108	✓						2				✓	
	108-109	✓		R				2	5			✓	
	109-110	✓						2	3			✓	
	111-112	✓										✓	

NO. ACCEPTED	NO. REJECTED	MQS TECH. NO.	SHT.	REV. 1
4	1	13043		
COMMENTS		CUST. RSS NO.	SHT.	REV.
		REVIEWER		
		CERTIFIED NDT LEVEL (RT)		
		RTII Exp 1/08 John Petraske		

# TEAM COOPERHEAT-MQS, INC.

# CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		11/20/05	361-02698-1
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		22501	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET 5 OF 5	
ASTM E94-93	MSS-SP-54-1999		

PART NUMBER	Serial No	View	No Apparent Indications		Dross		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Inclusion	Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface		
MCWF-A3			112-113	R					4			✓	
			113-114	✓					3			✓	
E.I.O. C040851			115-116	✓					2			✓	
			116-117	✓								✓	
M176180			118-119	R					1	R		✓	
			119-120	✓								✓	
Z103990			121-122	✓				1	1			✓	
			122-123	✓								✓	
			123-124	✓	1			1				✓	
			124-125	R	R	ST				R		✓	
			125-126	R				4				✓	
			126-127	✓				3	1			✓	
			127-128	✓					2			✓	
			129-129	✓								✓	
			130-131	✓								✓	
			131-132	✓				3				✓	
			133	✓								✓	
			134	✓								✓	

NO. ACCEPTED	NO. REJECTED	MQS TECH. NO.	SHT.	REV. 1
0	1	13043		
COMMENTS		CUST. RSS NO.	SHT.	REV.
		REVIEWER	S. TERACE	
		CERTIFIED NOT LEVEL (RT)	II	

# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

**CUSTOMER**

NAME METAL TEK INTERNATIONAL  
 ADDRESS 8600 COMMERCIAL BLVD  
 CITY PEVELY STATE MO ZIP 63070

DATE  
01/15/2005

WORK ORDER NO.  
361-02825

P.O. NUMBER  
22896

XRAY X

GAMMA

PROCEDURE SPECIFICATION  
ASTM E94-93

ACCEPTANCE CRITERIA  
MSS-SP-54-1999

SHEET      OF     

PART NUMBER	Serial No	View	No Apparent Indications		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Dross or Slag	Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under Surface	
MCWFA-3		10-11	✓								
	(R1)	11-12	✓					2			
Z103990		12-13	✓					2			
HT# M176180		13-14	✓								✓
CO 40851		V15	✓		2						✓
		35-36	✓								
		38-39	✓								✓
		39-40	✓								
		41-42	✓								
		52-53	✓								
		61-62	✓								
		12-63	✓					1			
	62A-63A		✓								
		67-68	✓					2			
		69-70	✓					1-2			
		70-71	✓								
		76-77	✓		1						
		80-81	✓								
		86-87	✓								✓
		89-90	✓								
		92-93			R						
		95-96	✓					5			
		96-97	✓								
		99-100	✓								
		104-105	✓					3			

0. ACCEPTED COMMENTS

Φ

NO. REJECTED 1

MQS TECH. NO. 13043

SHT. REV. 1

CUST. RSS NO.

SHT. REV.

REVIEWER John Petroske  
 CERTIFIED NDT LEVEL (RT)

John Petroske RT II Exp. 01/08



# TEAM COOPERHEAT-MQS, INC.

## CERTIFIED RADIOGRAPHIC INSPECTION REPORT

FORM 6061-RT- 002 Rev.2

5512 W. State St. Milwaukee, WI 53208 Tel:(414)771-3060 Fax:(414)771-9481 (800)818-6403 www.cooperheat-mqs.com

**CUSTOMER**

NAME METAL TEK INTERNATIONAL  
 ADDRESS 8600 COMMERCIAL BLVD  
 CITY PEVELY STATE MO ZIP 63070

DATE 01/15/2005  
 WORK ORDER NO. 361-02825  
 P.O. NUMBER 22896  
 XRAY X  
 GAMMA  
 SHEET        OF       

PROCEDURE SPECIFICATION ASTM E94-93  
 ACCEPTANCE CRITERIA MSS-SP-54-1999

PART NUMBER	Serial No	View	No Apparent Indications		Dross or Porosity		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejection	Inclusion	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface			
MCWFA-3		26-27	✓										
	109-110		✓							2			
Z103990													
HT# M176180													
CO 40851													

O. ACCEPTED 1 NO. REJECTED 0

COMMENTS Reshots

MQS TECH. NO. 13043 SHT.        REV. 1  
 CUST. RSS NO.        SHT.        REV.         
 REVIEWER John Petroske  
 CERTIFIED NDT LEVEL (RT)  
 John Petroske RT II Exp. 01/08



RADIOGRAPHIC STANDARD SHOOTING SKETCH

Customer <u>Energy Ind. of Ohio</u>	Pattern Number <u>MW FA-3</u>
Material <u>CFBM/NM/N Mod</u>	Traceability Number
Film Manufacturer <u>Fuji</u>	Source Number <u>22.1 Ci 6060</u>
IQI LEVEL <u>2-2T</u> From CQP 401 <input checked="" type="checkbox"/> Other (Specify, E.G. 2-4T, 2-1T) <u>N/A</u>	

Exposures (views)	<u>9R-93</u>												
Thickness (IN.)	<u>1 1/2" 3</u>												
S/F Distance (IN.)	<u>20"</u>												
Penetrameter	<u>3040 60</u>												
Time (MIN.)	<u>15m</u>												
Focal Spot (IN.)	<u>.1</u>												
Film Size (IN.)	<u>14X17</u>												
Screen Size (Pb) Front/Back	<u>101</u>												
S.W.E./D.W.E.	<u>SWE</u>												
S.W.V/D.W.V.	<u>SWV</u>												
Film Type	<u>29 159</u>												
Acceptance Standard	<u>E746 E186</u>												
Severity Level	<u>see spec</u>												

Shooting Sketch (Use Additional Pages as Needed)

See original Technique drawing

Technique Prepared By: <u>Dave Matyja</u>	Level: <u>II</u>	Date: <u>1-22-06</u>
Technique Approved By: _____	Level: _____	Date: _____





E10 11-1-05

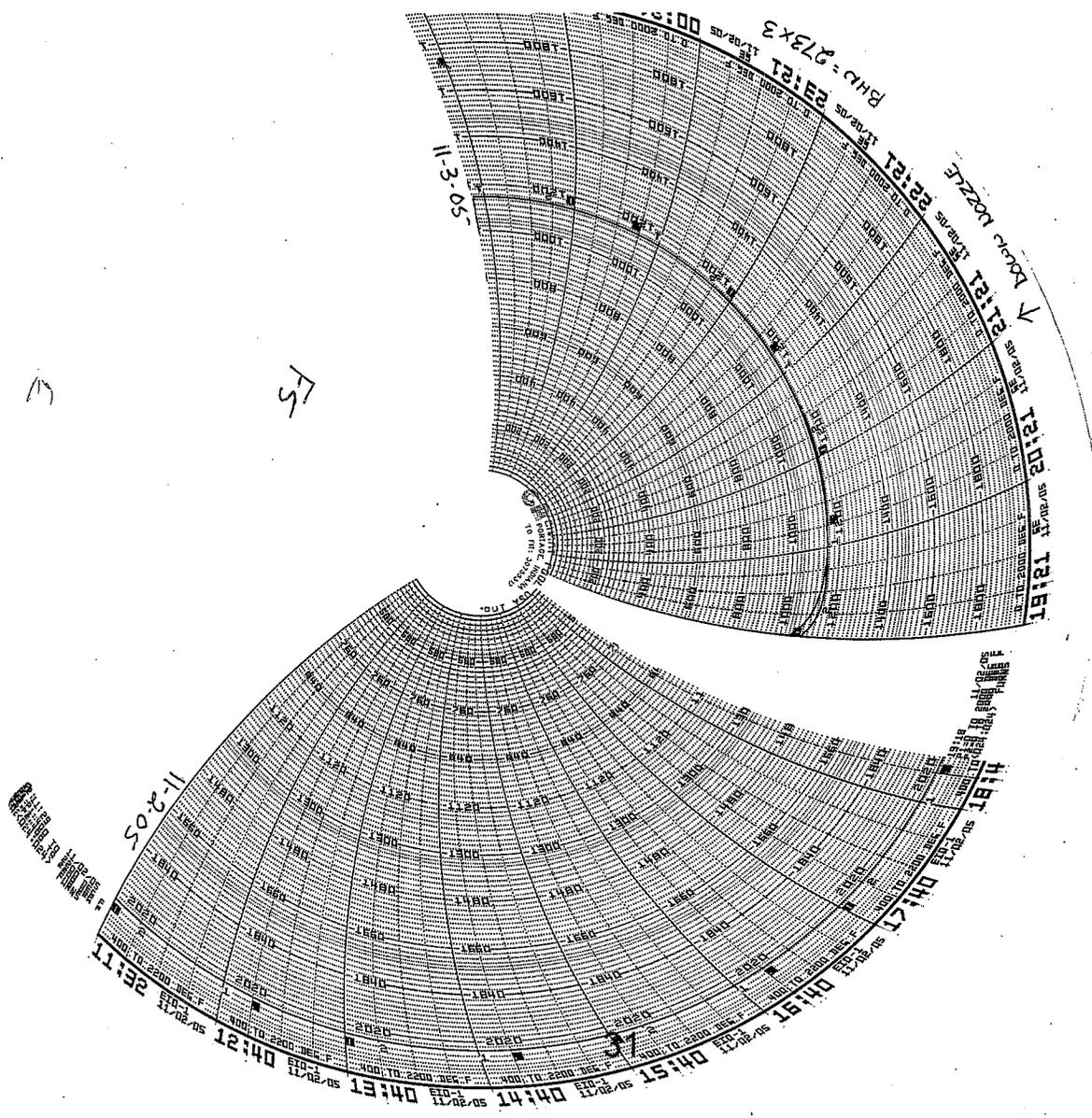
A-3 COIL

M176180-1

Page 2

3

FS

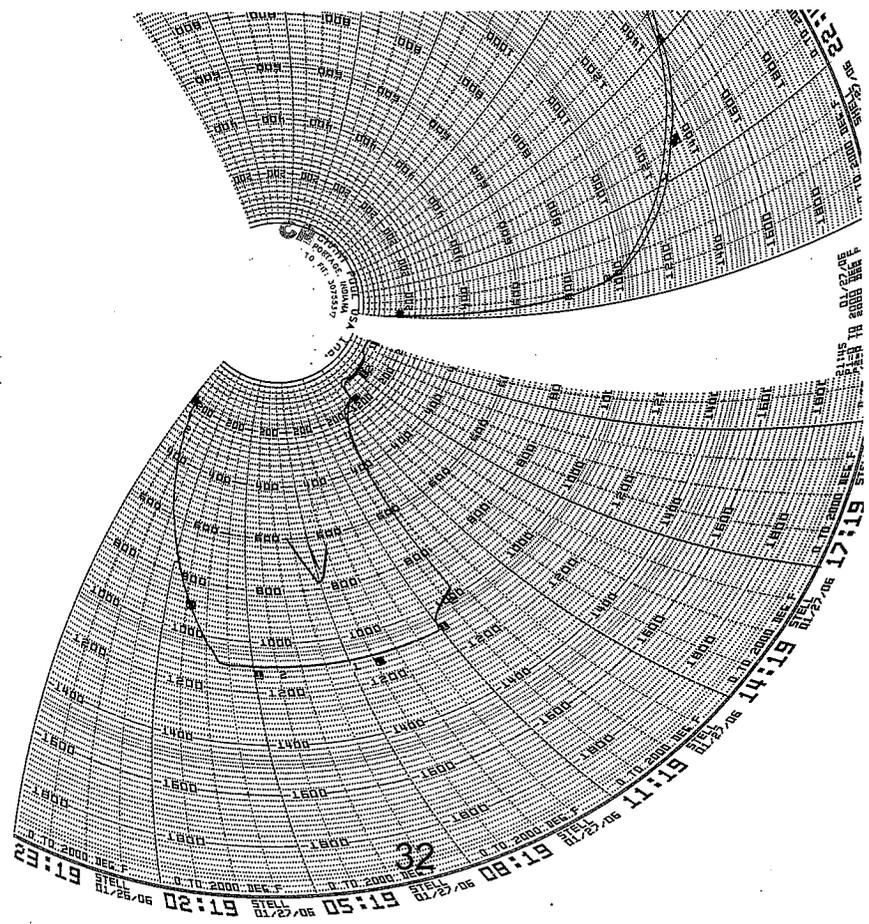


E10 1-26-06

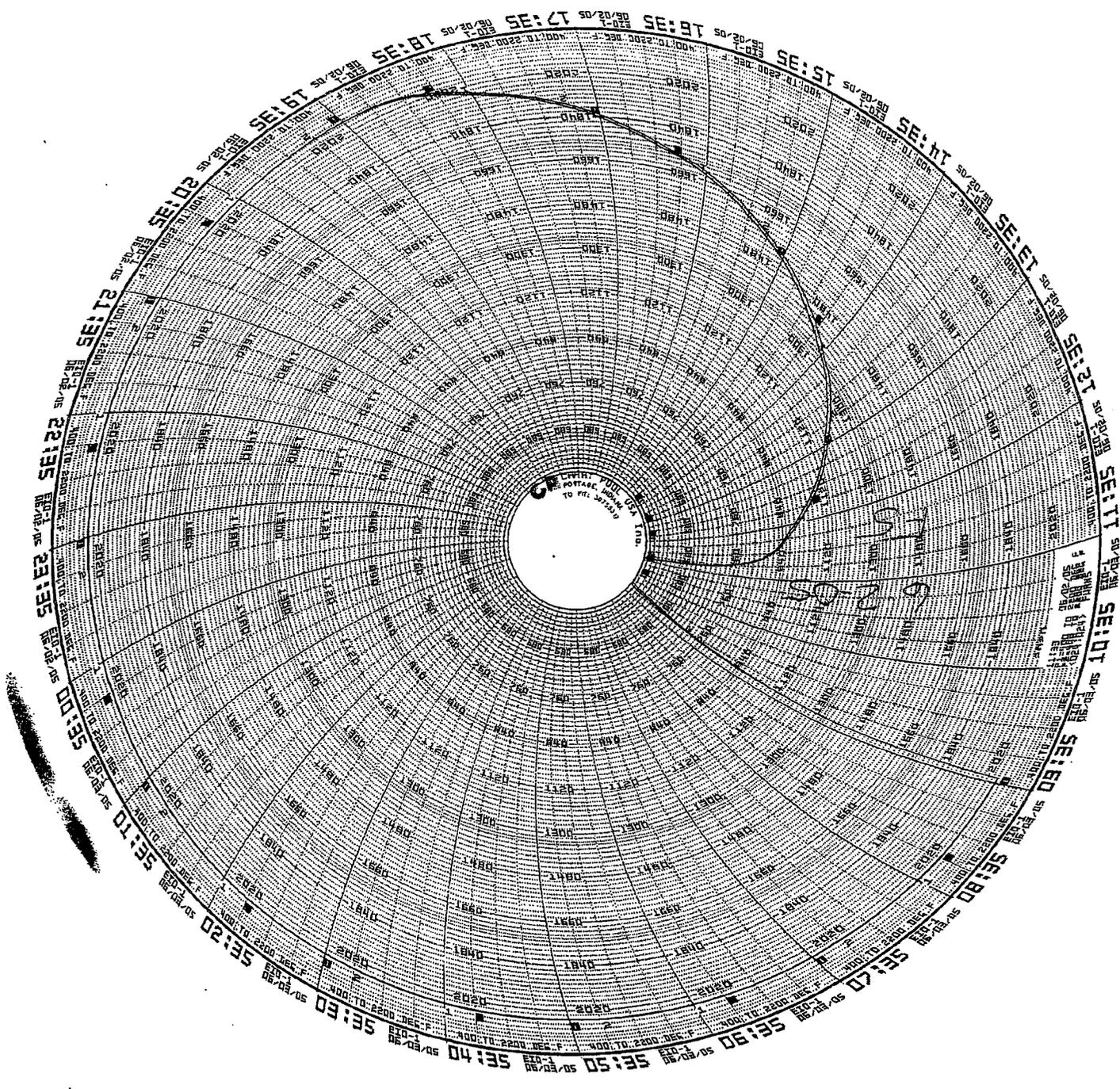
A-3

176180-1

1Pc



A+C Shims CTR



Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) A 3 Coil

1 OF 11 CO# 40851 Dated 3-9-05 Revision: Rev 9 Dated Issued:9/30/05

*Reprinted*

OPER. #	STATION	DESCRIPTION OF PROCESS	Name	Date
10	QUALITY RELEASE	REVIEW AND APPROVE MTS. RECEIVED APPROVAL FROM EIO ON xxxxx FROM _Pete D._ SIGNED QUALITY MANAGER	<i>ptr</i>	<i>9/29/05</i>
15	PATTERN NPAT SOP 0100REV2	APPLY APPROPRIATE PART NUMBER, SERIAL NUMBER, AND FOUNDRY MARK, TO THE PATTERN. CAST ON TEST BARS AND CAST ON BLOCKS (extra 3"x3"x1" specimens) REQUIRED, ID AS TO COIL NUMBER AND ZONE LOCATION.	<i>BWC</i>	<i>10/14</i>
20	COREMAKE CORE SOP 0100 REV 6 CALIBRATION PER CORE SOP 0200R4/0300R6	MAKE CORES IN SAND MIXTURES AS DESCRIBED BY METALTEK ENGINEERING AND VERIFIED IN MODELING TRIALS. METALTEK CORE SOP 0100 REV 6) CORE WASH WITH ZIRCONIUM CORE WASH. (CALIBRATION OF EQUIPMENT REQUIRED PER CORE SOP 0200,R4 / 0300,R6)  VERIFY COUNT AND INSPECT.	<i>BWC</i>	<i>10/14</i>
30	MOLD MOLD SOP 0400 REV 8 CALIBRATION PER MOLD SOP 0900 REV 5 PREPARATION PER MOLD SOP 1100R2/1200R2/1300R1 SAND TESTING PER MOLD SOP 1400R2/1500R3/1600R2	MOLD PER WORK INSTRUCTIONS IN MAPICS ROUTING AND SOPS REFERENCED. ENGINEER OF RECORD - ROGER BROMAN, CONSULT ON MOLD-RELATED CONCERNS. MOLD MATERIALS REQUIRED PER MAPICS BOM. NOTIFY ENGINEER OF ANY SUBSTITUTIONS.	<i>BWC</i>	<i>10/14</i>
40	POUR MELT SOP 0100R5 MELT SOP 0700R2 MELT SOP 0600R2	METAL MUST BE AOD REFINED OR AOD INGOT. VIRGIN METAL ADDITIONS ALLOWED. RECORD POURING TEMPERATURE: <u>NA</u> CASTING POURED AT: <u>10AM</u> DATE: <u>10/14/05</u> HEAT #'s: <u>31250 to 31255</u> ELAPSED POUR TIME <u>18 min</u> KEEL BLOCKS POURED: <u>NA</u> <u>yes</u> Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: <u>JW, DD, KS</u> Analyzed: <u>G#</u> Date: <u>10/15</u>	<i>JG</i>	<i>10/15/05</i>
50	MELT SOP 0800R2	SHAKEOUT	<i>CJA</i>	<i>10/19</i>
60	ARC RISE SOP 0100R1	REMOVE RISERS AS DIRECTED BY SUPERVISOR.	<i>mw</i> <i>mw</i>	<i>10/20</i> <i>11/1</i>

**Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) A 3 Coil**

2 OF 11 CO# 40851 Dated 3-9-05 Revision: Rev 9 Dated Issued:9/30/05

70	HEAT TREAT HEAT SOP 0103R5	SOLUTION ANNEAL. MAKE SURE TO BLOCK ALL FLANGES OF FORM AND RACETRACK TO MINIMIZE CREEP DISTORTION. Soak Temp: 2050F, Soak Time: At least 7 hours , Quench Type: Air Cool MAKE SURE TEST MATERIAL IS PLACED IN THE CORRECT ZONE.	DLS FS-1	11/1/05
80	PHYSICAL TESTING	OBTAIN TEST SPECIMENS AND SUBMIT FOR PHYSICAL TESTING. REPORT RESULTS AS PART OF STEP 530. DCMA IS TO WITNESS CHARPY TESTING AT LAB.	WH	11/2
NOTE		<b>THE ORDER OF CLEANING PROCESSES MAY BE ALTERED DUE TO CAPACITY CONSTRAINTS. HOLD POINTS AND COMPLIANCE WILL NOT BE COMPROMISED. EIO WILL BE ADVISED OF ALL CHANGES THAT MAY RESULT IN A REQUEST FOR DEVIATION FROM REQUIREMENTS.</b>		
90	GRIND GSAW SOP 0100R3	SWING GRIND TO REMOVE RISER REMAINS AND FLASH IF REQUIRED.	TS	11/7
100	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND SURFACE OF PART AS REQUIRED FOR CONTOUR.	CA	11/11
110	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	AM	11/12/05
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF X-RAY . EIO NOTIFIED ON <u>11/14/05</u> DCMA NOTIFIED ON <u>11/14/05</u>	Q ENG OR QA MGR	<i>Ch</i>
120	X-RAY AT MQS MQS PROCEDURE 20.H.010 REV 0	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. WHEN MARKING USE BLACK MARKERS. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT - LEVEL II	DWM 11/30/05
130	X-RAY CQP 401 REV 5	X-RAY INTERPRETATION. ACCEPTANCE MSS SP 54. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET. IF OK CHECK HERE _____ AND SEND TO STEP 160. REJECTED CHECK HERE _____ MARK UP DEFECTS AND SEND THE CASTING TO STEP 140.	RT - LEVEL II	DWM 11/30/05
140	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% RT INSPECTION.	CA	12/7
150	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION AS REQUIRED.	CA	12/7

**Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) A 3 Coil**

3 OF 11 CO# 40851 Dated 3-9-05 Revision: Rev 9 Dated Issued:9/30/05

160	INTERIM VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 IN NON MACHINED AREAS AND LEVEL 2 IN MACHINED AREAS. IF OK CHECK HERE _____ IF REJECTED CHECK HERE ____ . MARK AND REPAIR AT STEP 190.	VT - LEVEL II <i>KCA</i>	<i>12/8</i>
170	INTERIM 100% L.P. CQP 0300 REV 10	L.P. 100% OF COMPONENT. ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA- LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ GO TO 190. IF REJECTED CHECK HERE _____ ✓	LP - LEVEL II <i>KCA</i>	<i>12/8</i>
180	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% VISUAL AND LP INSPECTION.	<i>CA</i>	<i>12/9</i>
190	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION OR VISUAL DEFECTS AS REQUIRED.	<i>CA</i>	<i>12/9</i>
200	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ IF REJECTED SEND BACK TO STEP 190	LP - LEVEL II <i>KCA</i>	<i>12/8</i>
210	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	<i>CA</i>	<i>12/9</i>
220	WELD MAP	MAP ALL MAJOR WELDS WITH DIGITAL PHOTO/MAPS INDICATING LOCATION. SERIALIZE DEFECTS ON CASTING, USE SCALE IN PHOTOS AND DOCUMENT SIZE. THIS IS TO BE PERFORMED BY SUPERVISOR, INSPECTION LEAD MAN OR THEIR DESIGNEE, FILE WITH QA. USE YELLOW MARKER. SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING. MUST INDICATE ON MAP ALL MAJOR WELDS, DEFINED AS GREATER THAN 20% OF THE WALL OR 1 INCH WHICHEVER IS LESS OR 10 SQUARE INCHES APPROXIMATLY 3.3"X3.3".	<i>JB</i>	<i>12/9</i>
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON <u>12/1</u> DCMA NOTIFIED ON <u>12/1</u>	Q ENG OR QA MGR <i>CA</i>	
230	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ LIST ALL MATERIAL/LOTS USED: <u>78308</u> QUALITY ENG. Name: <u>CA</u> Date: <u>12/9</u>		
240	WELD SOP 0100 REV 7	WELD REPAIR DEFECTS AS MARKED. FOR WELDS <2" - WPS 10-SMAW-CF8MNMN MOD REV 1(Flat) or 25 SMAW-CF8MNMN MOD		

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CO# 40851 Dated 3-9-05 Revision: Rev 9

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		REV 0 (Vertical) FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2					
250	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.	CA				
260	L.P. WELD CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ WASH AND SEND TO STEP 280. IF REJECTED CHECK HERE <input checked="" type="checkbox"/>	LP - LEVEL II JR				
270	REPEAT	REPEAT STEPS S180 TO S250AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION. IF OK CHECK HERE _____ AND PROCEED TO STEP 280.					
280	REPEAT STEPS	SUPPLEMENTAL REPAIR STEPS	1 <sup>ST</sup>	2 <sup>ND</sup>	3 <sup>RD</sup>	4 <sup>TH</sup>	5 <sup>TH</sup>
S180	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.	CA				
S190	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION OR VISUAL DEFECTS AS REQUIRED.	CA				
S200	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING.	LP - LEVEL II JR				
S210	WELD MAP	MAP ALL MAJOR WELDS WITH DIGITAL PHOTO/MAPS INDICATING LOCATION. SERIALIZE DEFECTS ON CASTING, USE SCALE IN PHOTOS AND DOCUMENT SIZE. THIS IS TO BE PERFORMED BY SUPERVISOR, INSPECTION LEAD MAN OR THEIR DESIGNEE, FILE WITH QA. USE YELLOW MARKER. MUST INDICATE ON MAP ALL MAJOR WELDS, DEFINED AS GREATER THAN 20% OF THE WALL OR 1 INCH WHICHEVER IS LESS OR 10 SQUARE INCHES APPROXIMATLY 3.3"X3.3". SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING.	JB 12/21				
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON <u>12/16</u> DCMA NOTIFIED ON <u>12/16</u>	Q ENG OR QA MGR				
S220	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL /LOT USED : <u>78308</u> , _____ QUALITY ENG. Name: <u>Ch</u> Date: _____					
S230	WELD SOP 0100 REV 7	WELD REPAIR DEFECTS AS MARKED. FOR WELDS <2" - WPS 10-SMAW-CF8MNMN MOD REV 1(Flat) or 25 SMAW-CF8MNMN MOD REV 0 (Vertical)	291				

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		FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2					
S240	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.		CA			
S250	L.P. WELD CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ WASH AND SEND TO STEP 280. IF REJECTED CHECK HERE _____ AND RETURN TO STEP S180.	LP - LEVEL II	OK REJ	OK REJ	OK REJ	OK REJ
	REPEAT	REPEAT STEPS S180 TO S250 AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION.	QA ENG.	9/30/11/11			
280	TEST MAG PERM SOP MAG PERM 100, REV 1	TEST MAG PERMEABILITY REPAIR AREAS TEST AT LEAST EVERY 2 INCH SQUARE OF WELD. ACCEPTANCE 1.02. IF OK CHECK HERE _____ AND GO TO STEP 300. IF REJECTED CHECK HERE _____.		CA		1/12	
290	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 280. REPEAT UNTIL COMPLIANCE IS ACHIEVED.		NA			
300	X-RAY (NOTE)	IF RADIO GRAPHED AREAS ARE GREATER THAN FOUR TO FIVE INCHES THE CASTING WILL BE SENT TO MQS. SEND TO MQS CHECK HERE <input checked="" type="checkbox"/> . RADIOGRAPH AT CAF CHECK HERE _____		QA ENGINE ER		RBK 1/13/06	
310 A	MQS X-RAY DEFECTS REPAIRED BY WELDING	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. <b>ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.</b> ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.		LEVEL II		RBK 1/14/06	
310 B	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. <b>ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.</b> ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.		RT - LEVEL II		NA	
320	X-RAY CQP 401 REV 5	X-RAY INTERPRETATION. ACCEPTANCE MSS SP 54. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET. IF OK CHECK HERE _____ AND SEND TO STEP 340. REJECTED CHECK HERE <input checked="" type="checkbox"/> MARK UP DEFECTS AND SEND THE CASTING TO STEP S321.		RT - LEVEL II		RBK 1/14/06	
	REPEAT STEPS	SUPPLEMENTAL REPAIR STEPS		1 <sup>ST</sup>	2 <sup>ND</sup>	3 <sup>RD</sup>	4 <sup>TH</sup> 5 <sup>TH</sup>

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S321	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.					
S322	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING.	LP - LEVEL II JB 1/17				
S323	WELD MAP	MAP ALL MAJOR WELDS WITH DIGITAL PHOTO/MAPS INDICATING LOCATION. SERIALIZE DEFECTS ON CASTING, USE SCALE IN PHOTOS AND DOCUMENT SIZE. THIS IS TO BE PERFORMED BY SUPERVISOR, INSPECTION LEAD MAN OR THEIR DESIGNEE, FILE WITH QA. USE YELLOW MARKER. MUST INDICATE ON MAP ALL MAJOR WELDS, DEFINED AS GREATER THAN 20% OF THE WALL OR 1 INCH WHICHEVER IS LESS OR 10 SQUARE INCHES APPROXIMATELY 3.3"X3.3". SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING. SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING.	JB 1/10/06				
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON <u>1/12</u> DCMA NOTIFIED ON <u>1/12</u>	Q ENG OR QA MGR CJA				
S324	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: <u>78305</u> MATERIAL /LOT USED: <u>CAI</u> QUALITY ENG. Name: <u>CAI</u> Date: _____	1/18				
S325	WELD SOP 0100 REV 7	WELD REPAIR DEFECTS AS MARKED. FOR WELDS <2" - WPS 10-SMAW-CF8MNMN MOD REV 1 (Flat) or 25 SMAW-CF8MNMN MOD REV 0 (Vertical) FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2					
S326	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.					
S327	L.P. WELD CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ WASH AND SEND TO STEP S328. IF REJECTED CHECK HERE _____ AND RETURN TO STEP S321.	LP - LEVEL II 1/15 REJ	OK	OK	OK	OK
S 328 A	MQS X-RAY DEFECTS REPAIRED BY WELDING	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. <b>ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.</b> ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT- LEVE L II NA				

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S 328 B	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. <b>ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.</b> ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT - LEVE L II <i>DWM</i> <i>1/25</i>				
S 329	X-RAY CQP 401 REV 5	X-RAY INTERPRETATION. ACCEPTANCE MSS SP 54. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET. IF OK CHECK HERE <input checked="" type="checkbox"/> AND SEND TO STEP 340. REJECTED CHECK HERE _____ MARK UP DEFECTS AND SEND THE CASTING TO STEP S321.	RT - LEVE L II <i>DWM</i> <i>1/25</i>				
	REPEAT	REPEAT STEPS S321 TO S329 AS REQUIRED TILL CLEAR THROUGH VISUAL, PENETRANT AND RT INSPECTION.	QA ENG.				
340	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.					
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON <u>1/12</u> DCMA NOTIFIED ON <u>1/12</u>	Q ENG OR QA MGR <i>[Signature]</i>				
350	FINAL VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 IN NON MACHINED AREAS AND LEVEL 2 IN MACHINED AREAS. IF OK CHECK HERE <input checked="" type="checkbox"/> SEND TO STEP 453. IF REJECTED CHECK HERE _____ . MARK AND REPAIR. INITIAL WHEN COMPLETE. MUST BE PERFORMED BY LEVEL II in VT.	VT - LEVEL II <i>KCA</i> <i>1/19</i>				
360	FINAL L.P. CQP 0300 REV 10	FINAL L.P. 100% OF COMPONENT. ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. IF OK CHECK HERE _____ WASH AND SEND TO STEP 453. IF REJECTED CHECK HERE <input checked="" type="checkbox"/>	LP - LEVEL II <i>TC</i> <i>1/19</i>				
380	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING FINAL PENETRANT INSPECTION.	<i>CA</i> <i>1/21</i>				
385	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND EXCAVATION AS REQUIRED.	<i>CA</i> <i>1/24</i>				

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390	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903. IF OK CHECK HERE <input checked="" type="checkbox"/> IF REJECTED SEND BACK TO STEP 385. <i>grinders no only weld</i>	LP - LEVEL II KLA	1/24/04
400	WELD MAP	MAP ALL MAJOR WELDS WITH DIGITAL PHOTO/MAPS INDICATING LOCATION. SERIALIZE DEFECTS ON CASTING, USE SCALE IN PHOTOS AND DOCUMENT SIZE. THIS IS TO BE PERFORMED BY SUPERVISOR, INSPECTION LEAD MAN OR THEIR DESIGNEE, FILE WITH QA. USE YELLOW MARKER. SEND MAPS WITHIN 24 HOURS OF WELDING. MUST INDICATE ON MAP ALL MAJOR WELDS, DEFINED AS GREATER THAN 20% OF THE WALL OR 1 INCH WHICHEVER IS LESS OR 10 SQUARE INCHES APPROXIMATELY 3.3"X3.3".	NA	
420	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL/LOT USED: _____ QUALITY ENG. Name: _____ Date: _____	NA	
430	WELD SOP 0100 REV 7	WELD REPAIR DEFECTS AS MARKED. FOR WELDS <2" - WPS 10-SMAW-CF8MNMN MOD REV 1(Flat) or 25 SMAW-CF8MNMN MOD REV 0 (Vertical) FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2	NA	
440	GRIND GCHI SOP 0100 REV 2	HAND GRIND WELDS.	NA	
450	L.P. WELDS CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. IF OK CHECK HERE _____ WASH AND SEND TO STEP 453. IF REJECTED CHECK HERE _____ AND RETURN TO STEP 440.	LP - LEVEL II NA	
	REPEAT	REPEAT STEPS 350 TO 450 AS REQUIRED TILL WELDS CLEAR FINAL LIQUID PENETRANT INSPECTION. DOCUMENT REWORK ON A SUPPLEMENTAL MTS	QA ENG.	
451	TEST MAG PERM SOP MAG PERM 100, REV 1	TEST MAG PERMEABILITY REPAIR AREAS. RECORD ON WELD MAP LIST. TEST AT LEAST EVERY 2" SQUARE OF WELD. ACCEPTANCE 1.02. IF OK CHECK HERE _____ AND GO TO STEP 430. IF REJECTED CHECK HERE _____.	NA NA	
452	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 451. REPEAT UNTIL COMPLIANCE IS ACHIEVED.	NA	
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF LAYOUT. EIO NOTIFIED ON <u>1/20</u> DCMA NOTIFIED ON <u>1/20</u>  APPROVAL RECEIVED ON <u>NA</u>	Q ENG OR QA MGR <i>[Signature]</i>	

*BACK TO RT # 328*

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453	INTERIM LAYOUT SOP LAYOUT 0100	INSPECT CASTING TO VERIFY DIMENSIONS. THIS STEP MAY BE MOVED. NOTE: THE FIRST PART PRODUCED OF EACH TYPE A, B AND C WILL BE DIMENSIONED BY LAWTON PATTERN. IF DIMENSIONED BY LAWTON IT WILL BE DOCUMENTED HERE. Subsequent casting done internally per Romer Arm.	JJB	1/25
455	HEAT TREAT	STRESS RELIEF. Load casting into cold furnace. Ramp up to 1100 F at rate of 200 F per hour. Hold at temp 4 hours. Furnace cool to 500 F at 50 F per hour. Air cool. Submit furnace charts to QA.	DLS	1/26
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON <u>1/25</u> DCMA NOTIFIED ON <u>1/25</u>	Q ENG OR QA MGR	Gln
460	FINAL VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 ALL CONDITIONS. THIS STEP MAY BE UNNECESSARY IF OK AT STEP 350. IF OK CHECK HERE <input checked="" type="checkbox"/> . IF REJECTED CHECK HERE <input type="checkbox"/> . MARK AND REPAIR AT STEP 510. MUST BE PERFORMED BY LEVEL II in VT.	VT - LEVEL II	KLT 1/30
470	FINAL L.P. CQP 0300 REV 10	FINAL L.P. 100% OF COMPONENT. ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 1 FOR HIGH STRESSED AREAS, LEVEL 2 FOR ALL OTHER AREAS. SEE LP DRAWING. THIS STEP MAY BE UNNECESSARY IF OK AT STEP 360. IF OK CHECK HERE <input checked="" type="checkbox"/> WASH AND SEND TO STEP 500. IF REJECTED CHECK HERE <input type="checkbox"/> . DOCUMENT REPAIRS USING A SUPPLEMENTAL MTS.	LP - LEVEL II	TRC 1/30
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF MAG PERM STEPS. EIO NOTIFIED ON <u>1/25</u> DCMA NOTIFIED ON <u>1/25</u>	Q ENG OR QA MGR	Bln
500	FINAL MAG PERM INSPECTION SOP MAG PERM 100, REV 1	PERFORM MAG PERM TESTING WITH SEVRIN GAUGE. ACCEPTANCE 1.02. CHECK THE ENTIRE SURFACE ON A 6"BY6" GRID. REPORT RESULTS. USE A 6" SQUARE BLOCK TO INDICATE TEST LOCATIONS AND RECORD RESULTS. COMPLIANT AREAS WILL NOT BE MARKED. MARK NONCOMPLIANT AREAS WITH AN "X" FOR REPAIR. OK CHECK HERE <input type="checkbox"/> AND GO TO STEP 530. IF REJECTED CHECK HERE <input type="checkbox"/>		TRC 1/30
510	GRIND GCHI SOP 0100 REV 2	HAND GRIND WITH SUITABLE CONE OR OTHER SIMILAR GRINDER AS REQUIRED TO ENSURE REMOVAL OF MATERIAL TO ACHIEVE MAG PERM REQUIREMENT. CIRCLE AREA REMEDIATE FOR RETEST.		NT
520	RETEST MAG PERM SOP MAG PERM 100, REV 1	RETEST MAG PERMEABILITY AT FAILED TEST POINTS. MARK NONCOMPLIANT AREAS WITH AN "X" FOR REPAIR. ACCEPTANCE 1.02. IF OK CHECK HERE <input type="checkbox"/> . IF REJECTED CHECK HERE <input type="checkbox"/> RETURN TO STEP 510.		NA
530	DOC. REVIEW	REVIEW DOCUMENTS AS REQUIRED IN CAF CHECKLIST, ALL DOCUMENTS NOTED TO BE ACCESSIBLE FOR AUDITING. (SHIPPER, C OF C, M.T.R., M.T.S., INSPECTION REPORT, X-RAY READER SHEETS AND HEAT TREAT CHARTS)		Gln 1/31

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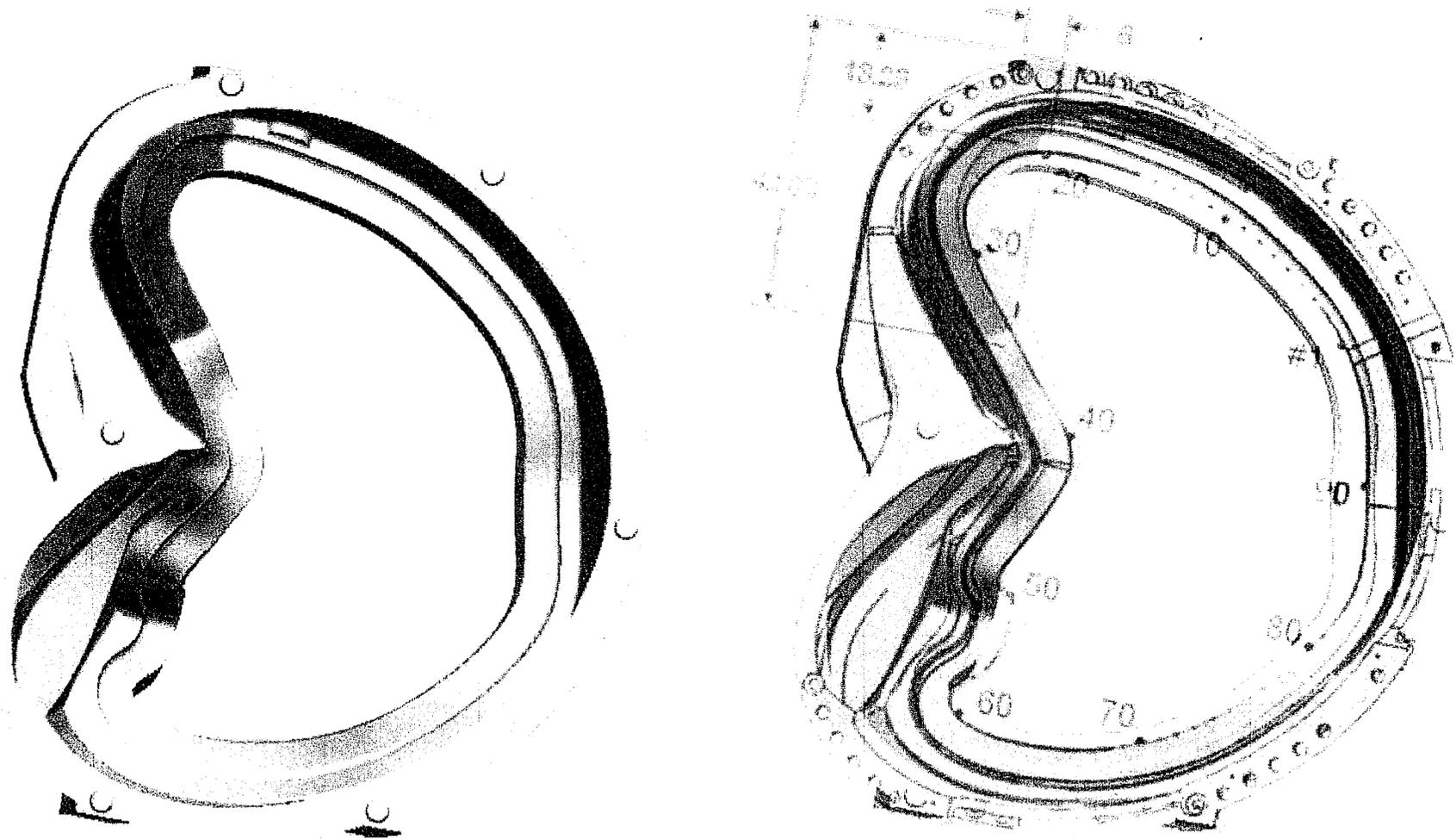
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NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON <u>1/31</u> BY <u>CA</u> . RECEIVED RELEASE FROM EIO ON <u>PD</u> .	Q ENG OR QA MGR	<u>CA</u>
540	PACK AND SHIP	PACKAGE AND SHIP TO MAJOR TOOL. MARK ON CASTING THE COIL NUMBER e.g. "A-3" ✓ <u>marked</u>	<u>CA</u>	<u>1/31</u>
1000	REVISION HISTORY	ORIGINAL 12-14-04. Approved 12-14-04. Revision level 1- Revised 1-26-05 new page 8, correct High stress areas, Revision level 2 3-16-05, delete LO step 455. Revision 3 3-28-05 Added note regarding hold point at weld step 400. Revision level 4 written for C-2 casting 4-18-05. Rev 5 added Layout SOP# and note regarding first casting layout responsibility. 5-10-05. Rev 6 added word LOT to weld material steps. 5-29-05. Rev 7 6-14-05 added "LOT" to weld step on supplement page. Rev. 8 7-29-05 added stress relief, deleted weld hold points, added vertical weld procedure, and several editorial changes. REV 9 8-28-05 – MODIFIED RT STEPS AND ADDED REQUIREMENT TO RT ALL RT DEFECTS INCLUDING SURFACE.	CARUUD	

RED AREA INDICATES HIGH STRESSED AREA



**MetalTek International – Carondelet Division**  
**Manufacturing and Test Sequence (MTS) Coil Shim A COIL S/N 3**  
**Dated 12-14-04 Revision:1 Dated Issued:10-25-05 Page 1 of 3**

OPER. #	STATION	DESCRIPTION OF PROCESS	Name	Date
10	QUALITY RELEASE	REVIEW AND APPROVE MTS. RECEIVED APPROVAL FROM EIO ON 11-1-05 FROM Pete D. SIGNED QUALITY MANAGER. <b>SHADED BOXES NEED NOT BE SIGNED.</b>	CAR	11-1-05
20	PATTERN NPAT SOP 0100REV2	APPLY APPROPRIATE PART NUMBER, SERIAL NUMBER, FOUNDRY MARK, TO THE PATTERN.		
30	MOLD	MOLD PER WORK INSTRUCTIONS IN MAPICS ROUTING AND SOPS REFERENCED. MOLD MATERIALS REQUIRED PER MAPICS BOM. NOTIFY ENGINEER OF ANY SUBSTITUTIONS. MOLD SOP 0400 REV 8 CALIBRATION PER MOLD SOP 0900 REV 5 PREPARATION PER MOLD SOP 1100R2/1200R2/1300R1 SAND TESTING PER MOLD SOP 1400R2/1500R3/1600R2		
40	POUR MELT SOP 0100R5 MELT SOP 0700R2 MELT SOP 0600R2	METAL MUST BE AOD REFINED OR AOD INGOT. VIRGIN METAL ADDITIONS ALLOWED. HEAT #: <u>29198</u> Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: <u>SR</u> Analyzed: <u>GH</u>	JG	4/28
50	MELT SOP 0800R2	SHAKEOUT		
60	ARC RISE SOP 0100R1	REMOVE RISERS AS DIRECTED BY SUPERVISOR.		
70	HEAT TREAT HEAT SOP 0103R5	SOLUTION ANNEAL. MINIMUM 4 HOURS AT 2050 F. AIR COOL.	DLS	6/2
80	GRIND GSWA SOP 0100R3 GCHI SOP 0100R2	SWING GRIND TO REMOVE RISER REMAINS AND FLASH IF REQUIRED. CHIP AND HAND GRIND SURFACE OF PART AS REQUIRED.	TJ	8/15
90	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	BB	8/20
100	VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 ALL CONDITIONS. IF OK CHECK HERE <input checked="" type="checkbox"/> IF REJECTED CHECK HERE <input type="checkbox"/> . MARK AND REPAIR AT STEP 130OR 140 IF WELDING IS REQUIRED. MAY PERFORM STEPS 110 AND 120 TOGETHER.	VT - LEVEL II CC RLA	8/24

**MetalTek International – Carondelet Division**  
**Manufacturing and Test Sequence (MTS) Coil Shim A COIL S/N 3**  
**Dated 12-14-04 Revision:1 Dated Issued:10-25-05 Page 2of 3**

120	100% L.P. CQP 0300 REV 10	L.P. 100% OF COMPONENT. ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA- LEVEL 2. IF OK CHECK HERE <u>        </u> GO TO 150. IF REJECTED CHECK HERE <u>  ✓  </u> MARK AND REPAIR AT STEP 130 OR 140 IF WELDING IS REQUIRED.	LP - LEVEL II JPS 12/28	
130	GRIND GCHI SOP 0100R2	HAND GRIND DEFECTS. CONFIRM REPAIRS VISUALL AND BY LP. ACCEPTANCE AS NOTED ABOVE. IF OK, CHECK HERE <u>  ✓  </u> AND GO TO STEP 170. IF WELDING IS NEEDED GO TO STEP 130.	TC	12/28
140 IF NEEDED		IF REPAIRS BY WELDING ARE REQUIRED DOCUMENT ON SUPPLEMENTAL MTS ON LAST PAGE.	N/A	
150	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE: SE-141-073-C SHIM. USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT - LEVEL II DWM	12/16/05
160	X-RAY CQP 401 REV 5	X-RAY INTERPRETATION. ACCEPTANCE MSS SP 54. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET. IF OK CHECK HERE <u>  ✓  </u> AND SEND TO STEP 200. REJECTED CHECK HERE <u>        </u> MARK UP DEFECTS. DOCUMENT REPAIRS ON S10 TO S70.	RT - LEVEL II DWM	12/13/05
	REPEAT	REPEAT STEPS S10 TO S70 AS REQUIRED TILL WELDS CLEAR X-RAY.	QA ENG.	NA
170	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.		
180	LAYOUT SOP 0100 ORIGINAL	INSPECT CASTING TO VERIFY DIMENSIONS. THIS MAY BE PERFORMED EARLIER IF DESIRED. SUBMIT RPORT TO QA.		1/31/06
190	FINAL VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 2 ALL CONDITIONS. IF OK CHECK HERE <u>  ✓  </u> . IF REJECTED CHECK HERE <u>        </u> . MARK AND REPAIR DOCUMENT REWORK ON A SUPPLEMENTAL MTS	VT - LEVEL II CC/RLA	1/14/05
200	FINAL L.P. CQP 0300 REV 10	FINAL L.P. 100% OF COMPONENT. ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA- LEVEL 2 ALL AREAS. IF OK CHECK HERE <u>  ✓  </u> WASH AND SEND TO NEXT STEP. IF REJECTED CHECK HERE <u>        </u> MAKE REPAIRS AND DOCUMENT ON SUPPLEMENTL MTS.	LP - LEVEL II TC	1-14-06
210	FINAL MAG PERM INSPECTION SOP MAG PERM 100, REV 1 GRIND GCHI SOP 0100 REV 2	PERFORM MAG PERM TESTING WITH SEVRIN GAUGE. ACCEPTANCE 1.02. CHECK THE ENTIRE SURFACE ON A 6"BY6" GRID. REPORT RESULTS. HAND GRIND WITH SUITABLE CONE OR OTHER SIMILAR GRINDER AS REQUIRED TO ENSURE REMOVAL OF MATERIAL. TO ACHIEVE MAG PERM REQUIREMENT.	JDR	1/31/06
220	DOC. REVIEW	REVIEW DOCUMENTS ALL DOCUMENTS NOTED TO BE ACCESSIBLE FOR AUDITING. (C OF C, M.T.R., SIGNED M.T.S., LAYOUT INSPECTION REPORT, X-RAY READER SHEETS AND HEAT TREAT CHARTS)	OKR	1/31/06

**MetalTek International – Carondelet Division**  
**Manufacturing and Test Sequence (MTS) Coil Shim A COIL S/N 3**  
**Dated 12-14-04 Revision:1 Dated Issued:10-25-05 Page 3of 3**

NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON <u>1/31</u> BY <u>Cfn</u> . RECEIVED RELEASE FROM EIO ON <u>1/31</u> .	Q ENG OR QA MGR	<u>Cfn</u>
	PACK AND SHIP	PACKAGE AND SHIP TO MAJOR TOOL.		<u>Cfn 1/31/06</u>
1000	REVISION HISTORY	ORIGINAL 12-14-04. Rev1 complete rewrite due to specification changes.	CARUUD	
SUPPLEMENTAL MTS FOR WELD REPAIRS.			FOR VT&LP/ FOR RT	
S10	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS.	<u>W/A</u>	
S20	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903. ACCEPTANCE CRITERIA- LEVEL 2.	LP - LEVEL II	LP - LEVEL II
S30	WELD MAP	MAP ALL WELDS WITH DIGITAL PHOTO/MAPS. SERIALIZE DEFECTS ON CASTING, USE SCALE IN PHOTOS AND DOCUMENT SIZE. THIS IS TO BE PERFORMED BY SUPERVISOR, INSPECTION LEAD MAN OR THEIR DESIGNEE, FILE WITH QA.. USE YELLOW MARKER. MUST SEND REPORT ON ALL AJOR WELDS, DEFINED AS OVER 20% OF WALL THICKNESS OR 1 INCH WHICHEVER IS LESS OR 10 SQUARE INCHES TO CUSTOMER. MAJOR WELDS YES _____, REPORT SENT BY _____ DATE _____ NO MAJOR WELDS CHECK HERE _____ AND GO TO STEP 170.		
S40	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL USED: _____ QUALITY ENG. Name: _____ Date: _____		
S50	WELD SOP 0100 REV 7	WELD REPAIR DEFECTS AS MARKED. FOR WELDS <2" - WPS 10-SMAW-CF8MNMN MOD REV 1 FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2		
S60	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.		
S70	L.P. WELD CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. ACCEPTANCE CRITERIA-LEVEL 2. IF OK CHECK HERE _____ WASH AND SEND TO STEP 300. IF REJECTED CHECK HERE _____ AND RETURN TO STEP 220.	LP - LEVEL II	LP - LEVEL II
	REPEAT	REPEAT STEPS S10 TO S70 AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION.	QA ENG.	QA ENG.
S80	TEST MAG PERM SOP MAG PERM 100, REV 1	TEST MAG PERMEABILITY REPAIR AREAS RECORD ON WELD MAP LIST. TEST AT LEAST 5 POINTS PER WELD. ACCEPTANCE 1.02. IF OK CHECK HERE _____ AND GO TO STEP 170. GRIND AS NEEDED TO REMEDIATE.		



4

Corrective Action 1308  
Carondelet Division - CA / PA / RGA Database  
Corrective Action Type NCR  
Date 6/13/2005  
CA Originator C. Ruud  
Pattern Number: C and A Coil Shims 11 Pieces

**Description of Defect / Non-Conformance**

Chemistry for 11 shim castings is out of specification.

**Root Cause**

Chemistry specification was not changed in system and not communicated to Lab personnel.

**Corrective Action**

Specification was corrected in system and Lab personnel trained. Mag permeability was checked on the parts and are less than 1.02u.

**Verification of Corrective Action**

Chemistries were checked on subsequent parts and are within specification.

**Preventive Action**

Create Inspection and Test Plan summarizing all requirements.

**Estimated Completion Date**

6/15/05

**Actual Completion Date**

Complete.

A handwritten signature in black ink, appearing to read "C. Ruud".

Signed: C. Ruud

CC: Roger Broman, Barry Craig, Joe Edwards, E.J. Kubick

**Nonconformance Report: CA 1323 (phosphorus levels exceeds specification limits for castings C1- C4 and A1 and C1 shim and four Type C and six A coil shims)**

**Project Disposition:**

The erroneous levels were due to calibration errors with the spectrometer. As reported in MTK's attached report, preventive maintenance has since been performed on the spectrometer. The reported chemistry will be accepted for the castings and shims noted above. The specification chemistry will not be changed at this time.

**Approvals:**

**Phil  
Heitzenroeder**

Digitally signed by Phil Heitzenroeder  
DN: CN = Phil Heitzenroeder, C = US,  
O = PPPL, OU = Mech. Eng. Division  
Reason: I agree to 'specified' portions  
of this document  
Date: 2006.02.21 11:49:56 -05'00'

---

Procurement Technical Representative

**Brad  
Nelson**

Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US,  
o=ORNL, ou=FED,  
email=nelsonbe@ornl.gov  
Date: 2006.02.21 14:16:12  
-05'00'

---

Responsible Line Manager:



Corrective Action 1323  
Carondelet Division - CA / PA / RGA Database  
Corrective Action Type NCR  
Date 7/27/2005  
CA Originator C. Ruud  
Applies to: Coil castings C-1, C-2, C-3, C-4 and A-1 and C 1 shim and four C coil and six A coil shims

**Description of Defect / Non-Conformance**

Phosphorus levels in material produced to date exceed specification limits. Both phosphorus and sulfur readings reported erroneously in certifications.

Certification reports have shown phosphorus and sulfur levels in the <.01% range. Independent laboratory data confirmed phosphorus in the .018 to .033% range and sulfur in the .005 to .022% range. Actual levels of some tests are above those in PPPL Specification NCSX-CSPEC-141-03-07 Rev 7.

Nonconformance was first suspected as a result of analysis of zoned attached test specimens volunteered by MetalTek International as response to PPPL questions on weighted average chemical analysis and quality of blending in the gating system. Nonconformance was verified on the bars used in the study and has been extended to evaluation of previously poured products.

**Root Cause**

Specification limits were set below the levels achievable through use of available raw materials. Spectrometer did not properly calibrate for phosphorus and sulfur at levels of specification due to equipment malfunction.

The chemical specification of EIO heats uses alloy CF8MNMn-Mod which incorporates a type standard calibration with a certified reference material (CRM) BS180. This enables the operator of the spectrometer to match the elemental concentrations of this alloy with corrective factors. These factors are determined by analyzing the CRM and having them compared with the calibration curves for each element. The phosphorus and sulfur content have very low measured intensities due to low concentrations. Intermittent failure of the spectrometer intensity measuring card caused higher intensity readings for phosphorus and sulfur. Subsequent checks with the CRM resulted in low corrective factors that were not detected. This in turn resulted in low reported concentrations for the EIO samples. All the major elements, which are measured on other intensity cards, have been closely monitored and matched very well with the CRM and thus were reported correctly.

**Corrective Action**

Modification to specification for phosphorus and sulfur will be requested. Limits will be set based on process capability and consistent with other stainless steel grades. Replacement of deficient card in spectrometer will be made upon delivery.

Subsequent immediate analysis of chemistry results, obtained by wet analysis, is attached and demonstrate top of specification for sulfur and over specification for phosphorus. The spectrometer manufacturer has performed an analysis to determine the cause of the malfunction and verified that the intensity card has an intermittent fault and must be replaced. The card has been ordered and scheduled for replacement on August 15, 2005.

Until the card is replaced we will be performing additional type standardizations to ensure accurate sulfur and phosphorus analysis. Additionally, for coils made until the card is replaced, an independent laboratory will perform a verification of the chemical analysis.

**Verification of Corrective Action**

Will be determined at a later date.

**Preventive Action**

In addition to spectrometer faults, we have identified that the specification ranges for sulfur and phosphorus is unattainable. Analysis and specifications for virgin charge materials predict sulfur at 0.040% maximum and phosphorus at 0.040% maximum. We have no way to remove phosphorus from the melt and do not intentionally add phosphorus. So, the confirmed coil analyses, along with analyses of virgin material heats, demonstrate sulfur in the range of 0.010% to 0.022% and phosphorus in the range of 0.018% to 0.033%. These results are consistent with our charge material analysis. We will request a deviation for phosphorus in the subject parts and also request a permanent specification change to 0.040% maximum for both phosphorus and sulfur, to allow us to provide non-discrepant material. This change will not affect, in any way, the physical properties or material performance because all coils and test material exhibited sulfur and phosphorus within the new ranges despite inaccurate reporting. Other actions: Specifications have been added to the BS 180 standard and the type standard will be measured against the criteria.

**Estimated Completion Date**

August 15, 2005

**Actual Completion Date TBD**

Signed: C. Ruud



CC: Jim Galaske, Barry Craig, Joe Edwards, E.J. Kubick

**Guide to St Louis Testing Report Dated 7-26-05**

Sample name	Sample origin
A1Z1	Cast on bar A-1 coil, zone 1
A1Z2	Cast on bar A-1 coil, zone 2
A1Z3	Cast on bar A-1 coil, zone 3
C1	Cast on bar C-1 coil
C2Z1	Cast on bar C-2 coil, zone 1
C2Z2	Cast on bar C-2 coil, zone 2
C2Z3	Cast on bar C-2 coil, zone 3
C3Z1	Cast on bar C-3 coil, zone 1
C3Z2	Cast on bar C-3 coil, zone 2
C3Z3	Cast on bar C-3 coil, zone 3
F1	Final analysis button from ladle for C-4 coil
F2	Final analysis button from ladle for C-4 coil
F3	Final analysis button from ladle for C-4 coil
P1	Preliminary analysis button from ladle for C-4 coil

Testing is underway of the heat used to pour the four C coil and six A coil shims.

*Attachment to  
CA 1323*



Chemical, Metallurgical, Mechanical, Nondestructive, Environmental Testing, Analyses and Field Service.

July 26, 2005  
Lab No. 05C-0608  
Invoice No. 59891  
P.O. No. 21324  
Page 1 of 1

**METALTEK INTERNATIONAL**  
8600 Commercial Blvd.  
Pevely, MO 63070

**Attention: Chuck Ruud**

**REPORT OF CHEMICAL ANALYSIS**

**SAMPLE ID:** A1 Z1, A1 Z2, A1 Z3, C1, C2 Z1, C2 Z2, C2 Z3,  
C3 Z1, C3 Z2, C3 Z3, F1, F2, F3, P1

**RESULTS: %**

ANALYTE	A1Z1	A1Z2	A1Z3
Sulfur	.013	.005	.010
Phosphorus	.025	.023	.018

ANALYTE	C1	C2Z1	C2Z2	C2Z3
Sulfur	.014	.022	.018	.015
Phosphorus	.018	.024	.021	.025

ANALYTE	C3Z1	C3Z2	C3Z3
Sulfur	.013	.014	.012
Phosphorus	.024	.025	.021

ANALYTE	F1	F2	F3	P1
Sulfur	.014	.015	.012	.010
Phosphorus	.029	.033	.028	.030

Sulfur Test Method: ASTM E1019-03

Phosphorous Test Method: Colormetric

Identification of tested specimen provided by the client.

Robin E. Sinn  
Laboratory Director



**Nonconformance Report: CA1536**

**Project Disposition:**

The manganese level at 0.1% over the 2.8% limit will be accepted for A-3, A-4, A-5 & C-6. However, since the physical properties of the alloy are dependent upon consistent chemistry, NCSX requests that MetalTek do its best to conform to the chemistry as presently stated in the specification. Deviations will be considered on a case by case basis.

**Approvals:**

**Wayne  
Reiersen**

Digitally signed by Wayne Reiersen  
DN: CN = Wayne Reiersen, C = US, O  
= PPPL  
Reason: I am approving this document  
Date: 2006.02.14 11:18:44 -05'00'

---

Procurement Technical Representative

**Brad Nelson**

Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US,  
o=ORNL, ou=FED,  
email=nelsonbe@ornl.gov  
Date: 2006.02.14 17:35:58 -05'00'

---

Responsible Line Manager:



Corrective Action 1536  
Carondelet Division  
Corrective Action Type NCR  
Date 1-13-06  
CA Originator C. Ruud  
Applies to: A-3, A-4, A-5 and C-6 Coil

**Description of Defect / Non-Conformance**

Manganese levels in material produced for A-3 and C-6 coil castings exceed specification limits in PPPL Specification NCSX-CSPEC-141-03-07 Rev 10. Manganese is 0.1% over the maximum of 2.8% for both parts.

**Root Cause**

Mt has aimed at the higher end of the range for manganese to assure the chemistry is correct in the casting. However the manganese did not fade as much as expected.

**Corrective Action**

Lower the aim to 2.9%.

**Verification of Corrective Action**

Chemistry analysis of coil chemistries for A-4 and 5 indicated that we are still 0.1% high. Therefore they have been added to this corrective action. Based on this result we will lower aim to 2.8%.

**Preventive Action**

The specification for manganese should be increased.

**Verification of Preventative Action**

Pending

**Estimated Completion Date**

TBD

**Actual Completion Date**

TBD

Signed: C. Ruud

A handwritten signature in black ink, appearing to be "C. Ruud", with a long horizontal line extending to the right.

CC: R. Broman, B. Craig, J. Edwards, E.J. Kubick, J. Markham, J. Galaske



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### Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
Phone: 636-479-4499 - Fax: 636-479-3399

### Final Inspection Report

Customer ENERGY INDUSTRIES OF OHIO  
Pattern: MCWF-A3 COIL

Order PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 1/31/2006

Type Description	Cert Number	Procedure	Acceptance Criteria	Actual
Liquid Penetrant	176180-1	CQP - 300 Rev 9	SEE NOTE	Acceptable
Notes Acceptance per ASTM A903. Acceptance criteria - level 1 for high stressed areas, level 2 for all other areas.				
Mag Perm	176180-1	SOP Mag Perm 100 Rev 1	<1.02	Acceptable
Radiographic	176180-1	Technique # 12726	MSS SP 54	Acceptable
Visual	176180-1	CQP - 500 REV 4	ASTM A802 LEVEL 2	Acceptable

#### Liquid Penetrant

Technician: Tom Chapman  
ASNT Level II

#### Visual

Technician: Kevin Anderson  
ASNT Level II

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

www.MetalTekInt.Com



## Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
Phone: 636-479-4499 - Fax: 636-479-3399

### Certificate of Conformance

ENERGY INDUSTRIES OF OHIO

Order Number PPPL-FP-LTS-2

Pattern MCWF-A3 COIL

ASTM CF8MNMN MOD

Date 1/31/2006

Cert Number

176180-1

A handwritten signature in black ink, appearing to read "CAR", is located in the lower right quadrant of the page.

We certify that we have complied in accordance with the drawings(s) and specifications(s) listed on the above purchase order. The articles furnished were made and/or processed from parts and/or materials in accordance with all applicable drawings(s) and specifications(s) pursuant to the afore mention purchase order.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

***Superior Quality Engineered Metal Products***

www.MetalTekInt.Com



2

### Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
Phone: 636-479-4499 - Fax: 636-479-3399

### Final Inspection Report

Customer ENERGY INDUSTRIES OF OHIO  
Pattern: SE-141-033 COIL A SHIM S/N 3

Order PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 1/31/2006

Type Description	Cert Number	Procedure	Acceptance Criteria	Actual
Liquid Penetrant	S76220-1	CQP - 300 Rev 9	ASTM A903 Level II	Acceptable
Mag Perm	S76220-1	SOP Mag Perm 100 Rev 1	<1.02	Acceptable
Radiographic	S76220-1	Technique # 12726	MSS SP 54	Acceptable
Visual	S76220-1	CQP - 500 REV 4	ASTM A802 LEVEL 2	Acceptable

#### Liquid Penetrant

Technician: Tom Chapman  
ASNT Level II

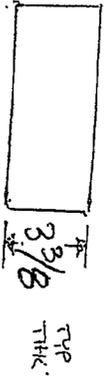
#### Visual

Technician: Kevin Anderson  
ASNT Level II

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

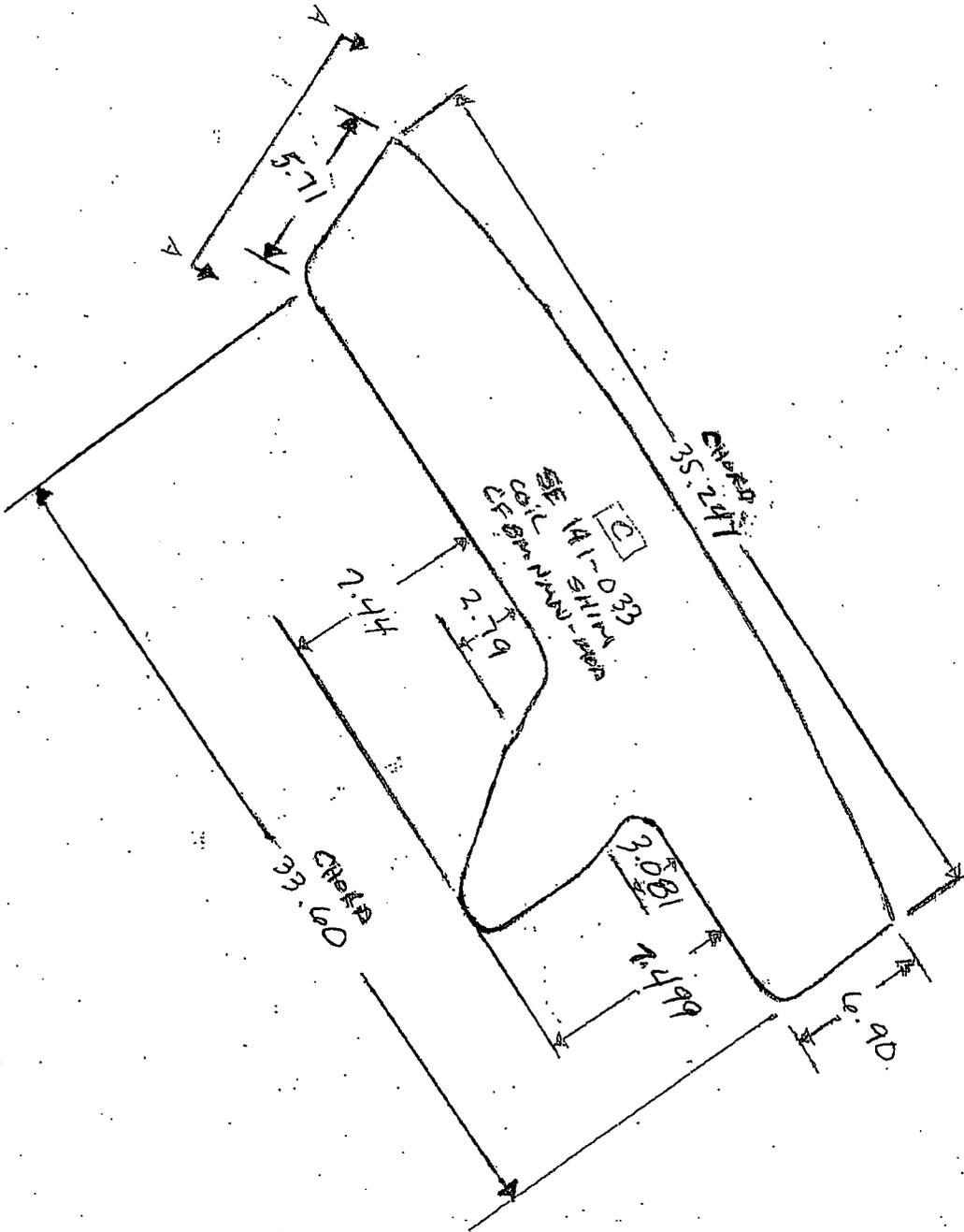
www.MetalTekInt.Com

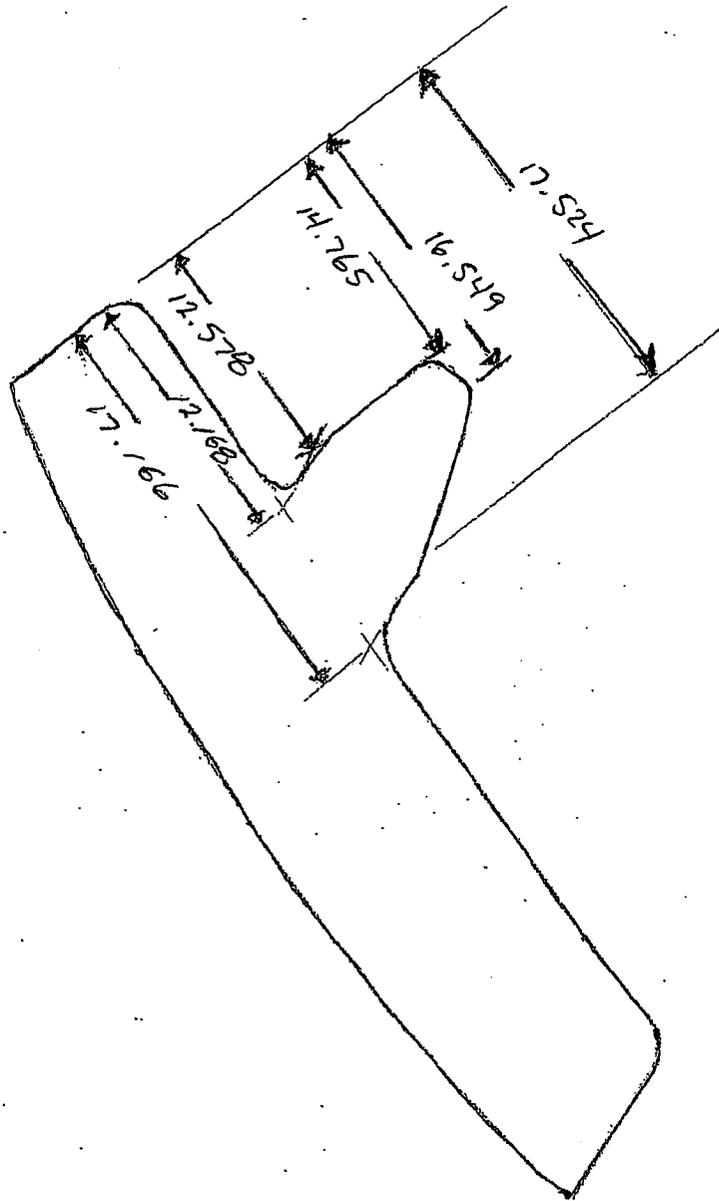


SECT A-A

HIM SE 141-033  
KETCH 1/31/06

PAGE 1 OF 2





PAGE 2 OF 2

SHIM SE 141-033  
SKETCH 1/31/04



3

## Carondelet Division

8600 Commercial Blvd. - Pevely, MO 63070 USA  
Phone: 636-479-4499 - Fax: 636-479-3399

### Certificate of Conformance

ENERGY INDUSTRIES OF OHIO

Order Number PPPL-FP-LTS-2

Pattern SE-141-033 COIL A SHIM S/N 3

Alloy CF8MNMnMOD Date 1/31/2006

Cert Number

S76220-1

A shim for A-3 coil was poured from heat number 29198. No weld repairs were necessary.

A handwritten signature in black ink, appearing to read "CAR", is located in the lower right quadrant of the page.

We certify that we have complied in accordance with the drawings(s) and specifications(s) listed on the above purchase order. The articles furnished were made and/or processed from parts and/or materials in accordance with all applicable drawings(s) and specifications(s) pursuant to the afore mention purchase order except as noted by corrective actions.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

www.MetalTekInt.Com



**EIO**  
**Energy Industries of Ohio**  
**SUPPLIER QUALITY RELEASE**

		Date: 1-31-06
--	--	---------------

I. General Information:		
Project Name:	Modular Coil Winding Form A3	
PO No:	NCSX-SOW-141-02-01	Rev.: 10
Supplier:	MetalTek	
Procurement Agent:	EIO	
Shipment:	<input checked="" type="checkbox"/> Partial <input type="checkbox"/> Final	
Supplier's Representative Print/Type Name	Supplier's Signature	Date

1. Enter:  
Project Name  
PO Number  
Supplier  
Procurement Agent
  
2. Enter a brief description of items being released, including applicable drawing number(s), dash or item number(s), drawing revision letter, specification(s), and serial number(s).
  
3. Self-Explanatory
  
4. Record any unusual circumstance, such as a conditional release.
  
5. The Supplier's representative shall sign and date.
  
7. Signature and date of the Supplier's authorized representative indicating shipping date.
  
8. In case of partial release, the supplier shall maintain copies of each sequential "Supplier Quality Release" and establish complete accountability of material release on final shipment.
  
9. Supplier shall include a copy of the completed form with each shipment.

**Energy Industries of Ohio**

**Contract # S005242-F**

**Modular Coil Winding Form**

**A-3 Documentation Package**

**Part 2**

**Major Tool & Machine**

**Revised 8/29/2006**

**\*\*Note – The table of contents that follows a supplemental EIO TOC as an aide to locating documents. Documents may be duplicated in this package; 1<sup>st</sup> as an attachment to a NC (not listed) & the 2<sup>nd</sup> time in the order noted in the MTM TOC.**

# A-3 Documentation Package

## List of Documents 8-29-06

Doc #	Description	Page #
-	MTM – Original TOC & document list	67
1	Certificate of Conformance	69
2	Completed shop travelers – 65709/3.0	70
3	NC 20124 – oversize machined hole	75
4	NC 20166 PT Rejections	76
5	NC 20201 – Final Dimensional & visual – incl. wing inspection slides	83
6	Material certification Loctite 411	90
7 & 12	Material certification G-11 round bar	91
8	IDC – Electrical Resistance Check	93
9	Material certification – weld wire – Metrode lot # W020132 Test certificate # 193695 & 194227	94
10	Westmoreland test results Metrode weld lot # W020132	96
11	Material certification – GE G11-CR flat sheet insulating material	100
12	Material certification G-11 round bar ( <b>Same as document 7</b> )	91
13	LP inspection certificate – Final inspection #17119	101
14	IDC – Poloidal break	102
15	IDC – Final dimensional	103
16	MQS – RT map & reader sheet - revised	109
17	IDC – Mag perm – Final inspection	111
18	Material certificate – South Texas Bolt - stud	112
19	Material certificate – South Texas Bolt - nuts	113
20	IDC – Mag Permeability of bearing plates - short	114
21	IDC – Mag Permeability of bearing plates - long	115
**	PPPL shipping release for A-3 – Did not appear in original MTM Doc package – Not reflected in MTM TOC which follows (page 67)	116



# ENERGY INDUSTRIES OF OH

Purchase Order Number:

S005242-F

Part Number:

SE141-114

Part Name:

MCWF A-3

MTM Work Order Number:

65709/3.0



*Major*

**Tool & Machine, Inc.**

**Customer: 8909 - ENERGY INDUSTRIES OF OHIO**  
**Customer P.O.: S005242-F**  
**Customer Part ID: SE141-114 - MCWF A-3**

Item#	Document Description / Material Description / File Name / Heat Lot
1	CERTIFICATE OF CONFORMANCE
2	COMPLETED SHOP TRAVELERS: - 65709-3 completed shop travelers.pdf
3	NC20124 - OVER SIZED BORE: - NC20124Rev1.pdf
4	NC20166 - PT REJECTIONS: - NC20166 A-3 PT Indications.pdf
5	NC20201 - FINAL DIMENSIONAL AND VISUAL: - NC20201_2_A3IDC_Photos_072806.pdf

**SE141-048 - POLOIDAL BREAK SHIM ASSEMBLY**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
6	2	30	20	Certificate of Conformance: FROM SUPPLIER / LOCTITE 411 - LOCKING COMPOUND - mc106438.TIF / CERTIFIED

**SE141-048-03 - INSULATING SLEEVE**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
7	3	10	10	Certificate of Conformance: / G11CR_1 - ROUND, BAR, 1.75 DIA - mc108545.tif / CERTIFIED

**SE141-101**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
8	1	140		Inspection Data Checklist: 2 steps

**SE141-101-1 - MOD COIL WINDING FORM ASSEMBLY TYPE-A**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
9	0	10	10	Material Certification: Trace ID: 113686 / ER316MNNF_093_GTAW - WELD WIRE,GTAW .093 DIA - mc106164.pdf / W020132 / W020132
10	0	10	10	Material Certification: Trace ID: 116252 / ER316MNNF_093_GTAW - WELD WIRE,GTAW .093 DIA - mc106579.tif / W020132 / W020132

**SE141-101-4 - INSULATING SHEET**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
11	7	10	10	Certificate of Conformance: G11CR / G11CR_3 - SHEET, FLAT - mc107081.tif / CERTIFIED

**SE141-101-5 - INSULATING SLEEVE**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
12	5	10	10	Certificate of Conformance: / G11CR_1 - ROUND, BAR, 1.75 DIA - Same as Item #7 / CERTIFIED

**SE141-114 - MODULAR COIL WINDING FORM TYPE-A**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
13	1	100		Nondestructive Liquid Penetrant Test Certification #17396
14	1	130		Inspection Data Checklist: 5 steps
15	1	132		Inspection Data Checklist: 79 steps
16	1	134		Map(s): RT MAP AND READER SHEET - mc120813.tif
17	1	136		Inspection Data Checklist: 2 steps
18	11	10	10	Material Certification: / DS141-036 - STUD - mc118607.tif / XFR/E3930
19	11	10	20	Material Certification: / DS141-060 - NUT - mc118688.tif / XFQ/5407813



*Major*

Tool & Machine, Inc.

Table of Contents  
Quality Assurance Documents For  
Workorder: 65709/3.0

Page: 2  
Date: 08/18/06  
User ID: GRIFFIT#

Customer: 8909 - ENERGY INDUSTRIES OF OHIO  
Customer P.O.: S005242-F  
Customer Part ID: SE141-114 - MCWF A-3

**SE141-141 - BEARING PLATE DETAIL TYPE "A" SHORT**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
20	13	30		Inspection Data Checklist: 1 steps

**SE141-142 - BEARING PLATE DETAIL TYPE "A" LONG**

Item#	Sub	Op	Pc	Document Description / Material Description / File Name / Heat Lot
21	14	30		Inspection Data Checklist: 1 steps

CERTIFICATE OF CONFORMANCE

Page: 1  
Date: 08/02/06  
User ID: GRIFFIT#

TO: ENERGY INDUSTRIES OF OHIO

DATE: 08/02/2006

ATTENTION: Receiving Department

Seller certifies that:

Part Number: SE141-114

Purchase Order: S005242-F

Part Name: MCWF A-3

Workorder: 65709/3.0

Part Serial Number: A3

Quantity: 1

1. These materials and/or parts were produced in conformance with all contractually applicable Government and/or Customer specifications referred in, or furnished with, the above Purchase Order.
2. The materials and/or parts furnished under the above Purchase Order were produced:
  - From materials furnished by Customer for the production of such parts.
  - From materials for which the seller has available for examination chemical and/or physical test reports or other evidence of conformance to applicable specifications.
3. All processes required in the production of these part and/or materials are listed below and were performed by a facility or personnel approved or certified by the Seller and the customer when such approval or certification is required by contract.

Certifications are on file at this plant.

Other Requirements:

MANUFACTURED PER B.P. SE141-101 REV. 3 AND P.O. REQUIREMENTS.

Signature: \_\_\_\_\_



Title: \_\_\_\_\_

*Quality Mgr.*

Date: \_\_\_\_\_

*8/2/06*



Activity	Visual Mfg Ref.	Op Status	Close Date	Emp ID
Manufacturing Planning- QA planning- Production Support	65709/3.0 -Sub:0 Op#:10	Closed	7/25/2006	840-G.Masood
PREPARE DOCUMENTATION TO PRESENT TO GOVERNMENT SOURCE INSPECTOR.	65709/3.0 -Sub:0 Op#:20	Closed	7/25/2006	840-G.Masood
REVIEW RESULTS FROM THE FOLLOWING INSEPCIONS:--PENETRANT INSPECTION (PT)--RADIOGRAPHIC INSPECTION (RT)--FINAL DIMENSIONAL INSPECTION--MAG PERMEABILITY--ELECTRICAL RESISTANCE--	65709/3.0 -Sub:0 Op#:30	Closed	7/25/2006	840-G.Masood
ORIENT PART WITH DATUM E FLANGE DOWN.----ENUSURE PART SURFACES ARE CLEAN AND FREE OF GRIT AND DEBRIS. THE PART IS NOT TO BE OILED.--THE ENTIRE PART IS TO BE WRAPPED IN PLASTIC.- PLACE FOAM ON THE 4X6 BEAMS THAT THE FLANGE WILL BE SITTING ON. LOWER THE PAR	65709/3.0 -Sub:0 Op#:40	Closed	8/10/2006	131-W.Allen
Receive customer supplied material. ----Customer material data package will not be received with the part. This record will be obtained and linked later.----Part Number: SE141-114 Rev: 5--Part Description: PRODUCTION WINDING FORM TYPE-C	65709/3.0 -Sub:1 Op#:10	Closed	2/7/2006	437-J.Hiatt
SETUP 1 - MTMFX -3101 WITH DATUM E SIDE OF PART AGAINST FIXTURE.--SETUP 2 - MTMFX-3102 WITH DATUM D SIDE OF PART AGAINST FIXTURE.----SETUP AND MACHINE THE FLANGE FACES AND FLANGE PERIPHERY TO WITHIN .100- STOCK. --FINISH MACHINE THE WING SURFACES ABOVE EA	65709/3.0 -Sub:1 Op#:18	Closed	3/31/2006	535-S.Lentz
WELD BRACES OVER THE PRE-CUT POLOIDAL BREAK IN THE -T-. SEE RON BACK FOR LOCATION OF BRACES.----MARK INSIDE EACH AREA TO BE REMOVED USING A METAL STAMP WITH THE SERIAL NUMBER FOR EACH PART AS APPLICABLE- A1- A2- A3- ETC...LOCATION OF STAMPING IS OPTIONAL.	65709/3.0 -Sub:1 Op#:19	Closed	3/31/2006	170-D.Rothenberger
SET CASTING ON RISERS WITH DATUM -E- FLANGE DOWN. TAB DATUM -E- FLANGE TO THE RISER ON EITHER SIDE OF THE BREAK TO PREVENT MOVEMENT AFTER MACHINING THE BREAK THROUGH. WELD CHANNEL BRACE ACROSS THE LARGE CUTOUT ADJACENT TO THE BREAK.--FINISH MACHINE THE PO	65709/3.0 -Sub:1 Op#:20	Closed	4/13/2006	535-S.Lentz
ROUGH MACHINE PER PROGRAM.	65709/3.0 -Sub:1 Op#:25	Closed	6/9/2006	345-D.Sauser



Activity	Visual Mfg Ref.	Op Status	Close Date	Emp ID
SET UP FIXTURE PLATE MTMFX-3101 AND MACHINE LOCATING PADS AS NECESSARY.--SET UP CASTING WITH DATUM -E- AGAINST THE FIXTURE.--- FINISH MACHINE ALL AREAS BELOW THE T SECTION.--- MACHINE T SECTION TO WITHIN .030.---- FINISH MACHINE DATUM -D- FLANGE.--	65709/3.0 -Sub:1 Op#:30	Closed	6/28/2006	345-D.Sauser
SET UP FIXTURE PLATE MTMFX-3102 AND MACHINE LOCATING PADS AS NECESSARY.--SET UP CASTING WITH DATUM -D- AGAINST THE FIXTURE.--- FINISH MACHINE ALL AREAS BELOW THE T SECTION.--- MACHINE T SECTION TO WITHIN .030.---- FINISH MACHINE DATUM -E- FLANGE.--	65709/3.0 -Sub:1 Op#:35	Closed	7/7/2006	744-P.Schumacher
THIS OPERATION CONSISTS OF 3 SETUPS.--SETUP #1: ANGLE BASE AND FIXTURE MTMFX-3101-- DATUM -E- FLANGE DOWN.--SETUP #2: ANGLE BASE AND FIXTURE MTMFX-3102-- DATUM -D- FLANGE DOWN.-SETUP #3: RISERS AND FIXTURE MTMFX-3102-- DATUM -D- FLANGE DOWN.----MACHINE P	65709/3.0 -Sub:1 Op#:50	Closed	7/17/2006	445-J.Purkhiser
SETUP PART WITH DATUM E SIDE UP.--ALL GRINDING WHEELS AND DISKS MUST BE VIRGIN MATERIAL NOT PREVIOUSLY USED ON ANY OTHER MATERIAL TO AVOID MATERIAL CONTAMINATION.----- BLEND ACCESSIBLE AREAS OF THE T SECTION.--- DEBURR WING AREAS TO REMOVE ANY SHARPNESS F	65709/3.0 -Sub:1 Op#:88	Closed	7/19/2006	219-T.Laird
CAREFULLY REMOVE SHIM FROM PART. PRINT ROUTER FOR SUBID 15- OPERATION 10 AND MOVE TO THE PROCESSED WORK CENTER.	65709/3.0 -Sub:1 Op#:89	Closed	7/19/2006	746-G.Davidson
DEBURR--ALL GRINDING WHEELS AND DISKS MUST BE VIRGIN MATERIAL NOT PREVIOUSLY USED ON ANY OTHER MATERIAL TO AVOID MATERIAL CONTAMINATION.----- TAP 96 3/8-16 HOLES USING TAP GUIDE. --- FINISH BLENDING T SECTION.--- HAND GRIND .06- - .09- CHAMFER ON ALL SPLI	65709/3.0 -Sub:1 Op#:90	Closed	7/19/2006	219-T.Laird
INSTALL BREAK SHIM AND TEMPORARY ALUMINUM SHIM PLATES. USE TAPERED PINS TO ALIGN HOLES AND INSTALL THE FOUR SLAVE BOLTS. USE ANTI-SIEZE ON THE BOLTS TO PREVENT GAULDING. TORQUE THE ASSEMBLY TO PREVENT MOVEMENT. THIS IS ONLY TEMPORARY AND ALIGNMENT IS NOT	65709/3.0 -Sub:1 Op#:92	Closed	7/20/2006	219-T.Laird



Activity	Visual Mfg Ref.	Op Status	Close Date	Emp ID
PROTECT PART FROM METAL CONTAMINATION DUE TO CONTACT WITH IRON- SPECIFICALLY WHEN RIGGING PART FOR MOVEMENT.-- MOVE PART INTO WASH BOOTH. --THOROUGHLY CLEAN AND DRY ALL SURFACES AND HOLES PER SECTION 9 OF PS583. --PARTS TO BE WASHED USING HEATED- DE-MINERA	65709/3.0 -Sub:1 Op#:95	Closed	7/20/2006	219-T.Laird
PT 100% OF ALL MACHINED AND GROUND SURFACES. EXCLUDE THE PROCESSING OF ANY AS-CAST SURFACE.--SEE PS582 FOR PROCESSING INSTRUCTIONS. ----TAKE PHOTOS OF ALL REJECTIONS AND NUMBER THEM. IF THERE ARE SEVERAL INDICATIONS CLOSE TOGETHER- NUMBER THE GROUP AND RE	65709/3.0 -Sub:1 Op#:100	Closed	7/20/2006	667-J.Bannister
SET PART ON RISERS WITH DATUM -D- FLANGE DOWN. PLACE A RISER ON EITHER SIDE OF THE POLOIDAL BREAK TO ENABLE CLAMPING TO ENSURE THAT THE DATUMS ARE COPLANER. LAY A STRAIGHT EDGE ACROSS THE DATUM -D- FLANGE TO VERIFY ALIGNMENT. ENSURE RADIAL ALIGNMENT BY LA	65709/3.0 -Sub:1 Op#:130	Closed	7/20/2006	825-B.Jarrett
-CMM INSPECT DATUM E SIDE OF CASTING. ---PERFORM ALL HARD GAGING OF THE DATUM E SIDE. ---CONDUCT PERMEABILITY CHECK OF DATUM E SIDE PER OPERATION 136.---CONSULT ENGINEERING ON ANY OUT OF TOLERANCE CONDITIONS PRIOR TO FLIPPING THE PART AND STARTING INSPECT	65709/3.0 -Sub:1 Op#:132	Closed	7/27/2006	339-E.Root
THE -T- AREAS DEFINED AS -HIGH STRESS- ARE TO BE RT 100%. SEE PS581 FOR PROCESS INSTRUCTIONS.----HAND SKETCH A LAYOUT OF ALL FILM LOCATIONS ON ATTACHED RT MAP. ----ALL FILM IS TO BE DOUBLED UP IN ORDER TO SUPPLY THE CUSTOMER WITH A COMPLETE SET OF FILM.--	65709/3.0 -Sub:1 Op#:134	Closed	7/26/2006	010-R.Contractor
PERFORM A MAG PERMEABILITY CHECK OF THE MACHINED SURFACES USING A SEVERN PERMEABILITY INDICATOR GAGE. PERMEABILITY SHOULD BE NO GREATER THAN 1.02μ.----CHECK THE PERMEABILITY IN 3 PLACES ON EACH SIDE OF THE T SECTION AT LOCATIONS ADJACENT TO EVERY 5TH HOLE	65709/3.0 -Sub:1 Op#:136	Closed	7/26/2006	495-D.Coffman
THE RESISTANCE OF THE MID-PLANE ELECTRICAL INSULATION SHALL BE GREATER THAN 500 KOHMS WHEN TESTED AT 100 VDC.---- TEST 1:--THE INSULATION RESISTANCE BETWEEN THE MID-PLANE POLOIDAL BREAK SHIM AND WINDING FORM SHALL BE MEASURED. DURING THIS TEST- THE BOLTS S	65709/3.0 -Sub:1 Op#:140	Closed	7/25/2006	503-B.Houk



Activity	Visual Mfg Ref.	Op Status	Close Date	Emp ID
PERFORM FINAL COSMETICS AS REQUIRED.--THOROUGHLY CLEAN CASTING WITH ISOPROPYL ALCOHOL. VERIFY THAT ALL HOLES ARE CLEAN AND FREE OF CHIPS.	65709/3.0 -Sub:1 Op#:150	Closed	7/27/2006	578-S.Martinez
SAW MATERIAL TO LENGTH PER MATERIAL CARD.	65709/3.0 -Sub:10 Op#:10	Closed	3/15/2006	266-R.Keith
MACHINE SLAVE HARDWARE BUSHINGS TO THE FOLLOWING:----1.620 O.D.+0/-.002--1.376 I.D. +.004/-.000--LENGTH 1.350 +/- .010----THESE BUSHINGS ARE FOR SLAVE HARDWARE SHIM MOUNTING. DELIVERY THESE PARTS TO RON BACK WHEN COMPLETE. THEY ARE TEMPORARY BUSHINGS THAT	65709/3.0 -Sub:10 Op#:20	Closed	3/29/2006	236-M.Jennings
MACHINE THICKNESS OF SHIM TO 2.125 +/- .001.--REMOVE AN EVEN AMOUNT OF STOCK FROM EACH FACE OF THE SHIM. THERE IS APPROXIMATELY 1/16- PER SIDE OF STOCK ON THE PART.--MACHINE 3/8-16 LIFTING HOLES IN BOTH ENDS OF SHIM.	65709/3.0 -Sub:15 Op#:10	Closed	7/19/2006	234-E.Booher
HAND GRIND .06- .09- CHAMFER ON PERIMETER OF SHIM AND BOTH ENDS OF HOLES.--HAVE TOOL ROOM VERIFY THE SIZE OF THE HOLES IN ORDER TO SIZE THE BUSHINGS.	65709/3.0 -Sub:15 Op#:20	Closed		
RECEIVE CUSTOMER SUPPLIED CASTING	65709/3.0 -Sub:2 Op#:10	Closed	2/7/2006	437-J.Hiatt
MACHINE THE SHIM COMPLETE CNC PROGRAMS.--SHIM THICKNESS WILL FINISH AT 2.25- LEAVING 1/16- PER SIDE FOR A LATER MACHINING OPERATION.--MACHINE -T- SECTION OF SHIM LEAVING .25- STOCK.--INSIDE PROFILE OF SHIM (OTHER THAN T SECTION) WILL BE FINISHED.--TOP AND	65709/3.0 -Sub:2 Op#:20	Closed	3/30/2006	234-E.Booher
PRE FIT EACH BUSHING TO MAKE SURE THEY SLIP INTO THE POLOIDAL BREAK FLANGE HOLES.--APPLY LOCTITE 411 TO THE OD OF EACH BUSHING AND INSTALL FLUSH TO ONE SIDE OF THE BREAK SHIM. GRIND THE OPPOSITE SIDE OF THE BUSHINGS FLUSH TO THE SHIM.	65709/3.0 -Sub:2 Op#:30	Closed		
SAW OFF 16- AND MOVE TO NEXT WORK CENTER.	65709/3.0 -Sub:3 Op#:10	Closed	6/1/2005	227-D.Bockover
MACHINE OD OF BUSHING .001- .002- SMALLER THAN SIZE OF THE HOLES IN POLOIDAL BREAK SHIM. IF HOLE SIZES VARY- MARK THE SHIM AND BUSHINGS 1 THRU 7.--MACHINE THE ID OF THE BUSHING TO 1.380 +/- .001--MACHINE THE LENGTH TO 2.19-. BUSHINGS WILL BE GROUND FLUS	65709/3.0 -Sub:3 Op#:20	Closed	7/20/2006	821-J.Leggins
RECEIVE MATERIAL--NOTIFY CFT AND FORWARD MATERIAL STORES.	65709/3.0 -Sub:4 Op#:10	Closed	6/1/2005	131-W.Allen



Activity	Visual Mfg Ref.	Op Status	Close Date	Emp ID
SAW OFF 30- LENGTH AND MOVE TO NEXT WORK CENTER.	65709/3.0 -Sub:5 Op#:10	Closed	6/1/2005	227-D.Bockover
MACHINE PER THE DRAWING FOR A .001- - .002- SLIP FIT WITH THE MATING DETAIL. --MEASURE THE HOLE SIZES IN THE TWO CASTING FLANGES AND SIZE THE BUSHINGS ACCORDINGLY. IF THE HOLE SIZES VARY- MARK EACH BUSHING 1 THRU 14 AND MAP OUT THE CORRESPONDING HOLE LOCA	65709/3.0 -Sub:5 Op#:20	Closed	7/19/2006	821-J.Leggins
SAW 13- LENGTH AND MOVE TO NEXT WORK CENTER.	65709/3.0 -Sub:6 Op#:10	Closed	6/1/2005	227-D.Bockover
RECEIVE MATERIAL	65709/3.0 -Sub:7 Op#:10	Closed	4/5/2005	131-W.Allen
MACHINE THE PROFILE LEAVING STOCK PER PROGRAM.	65709/3.0 -Sub:7 Op#:20	Closed	6/1/2006	332-J.Bagwill
SAW PER MATERIAL CARD	65709/3.0 -Sub:8 Op#:10	Closed	2/6/2006	266-R.Keith
SAW PER MATERIAL CARD	65709/3.0 -Sub:9 Op#:10	Closed	2/6/2006	266-R.Keith
RECEIVE HARDWARE- SCAN CERTIFICATIONS AND COMPLETE IDC.-- MOVE TO STORES--	65709/3.0 -Sub:11 Op#:10	Closed	5/26/2006	503-B.Houk
PLACE THE FOLLOWING IN STORES:--7 PCS - DS141-036 STUD--14 PCS - DS141-060 NUT	65709/3.0 -Sub:11 Op#:20	Closed	5/26/2006	419-J.Smith
NO CERTIFICATIONS REQUIRED.--VERIFY QUANTITY AND FORWARD PARTS TO NEXT WORK CENTER.	65709/3.0 -Sub:13 Op#:10	Closed	5/12/2006	437-J.Hiatt
MACHINE COMPLETE PER PRINT	65709/3.0 -Sub:13 Op#:20	Closed	6/21/2006	506-R.Liston
PERFORM A MAGNETIC PERMEABILITY CHECK USING A SEVERN PERMEABILITY INDICATOR GAGE. PERMEABILITY SHOULD BE NO GREATER THAN 1.02μ.--Part Number: SE141-141--Part Description: BEARING PLATE TYPE -A- SHORT	65709/3.0 -Sub:13 Op#:30	Closed	6/21/2006	533-B.Clevenger
NO CERTIFICATIONS REQUIRED.--VERIFY QUANTITY AND FORWARD PARTS TO NEXT WORK CENTER.	65709/3.0 -Sub:14 Op#:10	Closed	5/12/2006	437-J.Hiatt
MACHINE COMPLETE PER PRINT	65709/3.0 -Sub:14 Op#:20	Closed	7/13/2006	506-R.Liston
PERFORM A MAGNETIC PERMEABILITY CHECK USING A SEVERN PERMEABILITY INDICATOR GAGE. PERMEABILITY SHOULD BE NO GREATER THAN 1.02μ.--Part Number: SE141-142--Part Description: BEARING PLATE TYPE -A- LONG	65709/3.0 -Sub:14 Op#:30	Closed	7/19/2006	503-B.Houk
TURN OD OF MATERIAL TO 2.0495- +.000 / -.002.--LENGTH TO BE 1.325- +/- .010.--BREAK SHARP EDGES .010 -.020.--	65709/3.0 -Sub:16 Op#:20	Closed	7/25/2006	821-J.Leggins
FLIP PART AND CAREFULLY PLACE ON RISERS WITH THE DATUM E END UP.--GRIND RELIEF PER DIRECTION FROM ENGINEERING.--FLIP PART SO THAT DATUM E FLANGE IS DOWN.	65709/3.0 -Sub:17 Op#:10	Closed	7/28/2006	705-B.Hill

**Customer: ENERGY INDUSTRIES OF OHIO**

Contact: NANCY HORTON  
E-Mail: NKHFlowen@aol.com

Telephone: 216-496-2314  
Fax: 216-328-2001

Part: SE141-114 / MODULAR COIL WINDING FORM TYPE  
Drawing ID: SE141-114 Revision: 7

Customer P.O.: S005242-F/Ln:3  
Serial No./Qty: A3

Reported By: MIKE GRIFFITH  
E-Mail: mGriffith@MajorTool.com

Telephone: 317-636-6433  
Fax: 317-634-9420

Problem: Sheet 5, Zone C7; 1.885 +/- .003" (hole 17).  
Hole diameter measures 2.0515" (.1635" over the high limit of tolerance).

Rev. 1 - 2.057" changed to 2.0515 due to measurement error.

**Proposed Disposition:**

MTM proposes to accept the hole as is and increase the OD of the insulating bushing to compensate for the oversize condition.

Recommended bushing size to be 2.0495" +.000/-.002"

Number of additional pages: None

Customer Disposition:     Use As Is     Rework     Repair     Scrap     Replace

Rework the bushing to 2.0495" +.000/-.002"

**Approvals:**

**Larry Dudek**

Digitally signed by Larry Dudek  
DN: cn=Larry Dudek, c=US  
Date: 2006.07.26 10:30:08  
-04'00'

Procurement Technical Representative

**Brad Nelson**

Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US, o=ORNL,  
ou=FED, email=nelsonbe@ornl.gov  
Date: 2006.07.26 14:08:18 -04'00'

Responsible Line Manager:

**Mike  
Griffith**

Digitally signed by Mike Griffith  
DN: cn=Mike Griffith, c=US, o=Major  
Tool and Machine, ou=CFT - White,  
email=mgriffith@majortool.com  
Reason: I agree to the terms defined by  
the placement of my signature on this  
document  
Date: 2006.08.18 15:14:52 -04'00'

Major Tool Implemented By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Major Tool & Machine, Inc.  
1458 East 19th Street  
Indianapolis, IN 46218-4289

MTM N/C: 20166

Page: 1  
Date: 07/24/06  
User ID: GRIFFITH

---

**Customer: ENERGY INDUSTRIES OF OHIO**

Contact: NANCY HORTON  
E-Mail: NKHFlowen@aol.com

Telephone: 216-496-2314  
Fax: 216-328-2001

**Part: SE141-114 / MODULAR COIL WINDING FORM TYPE**  
Drawing ID: SE141-114                      Revision: 7

Customer P.O.: S005242-F/Ln:3  
Serial No./Qty: A3

Reported By: MIKE GRIFFITH  
E-Mail: mGriffith@MajorTool.com

Telephone: 317-636-6433  
Fax: 317-634-9420

Problem: PART IS REJECTED PER REQUIREMENTS OF ASTM A903/A903M LEVEL 1.  
FIVE INDICATIONS WERE FOUND AT TIME OF INSPECTION.

---

**Proposed Disposition:**

PROPOSE TO ACCEPT INDICATIONS AS IS.

---

Number of additional pages: 5 page PT summary

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Customer Disposition:     Use As Is     Rework     Repair     Scrap     Replace

Major Tool Implemented By: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

n:\vntmapps\Mtnonc14.qrp

Major Tool and Machine, Inc. 1458 East 19th Street, Indianapolis, IN 46218-4289 Tel: 317-636-6433 Fax: 317-634-9420

**Nonconformance Report: NC20166 A-3 PT Indications**

**Project Disposition: Accept As Is**

**Approvals:**

**Larry Dudek**

Digitally signed by Larry Dudek  
DN: cn=Larry Dudek, c=US  
Date: 2006.07.25 09:31:05 -04'00'

---

Procurement Technical Representative

**Brad Nelson**

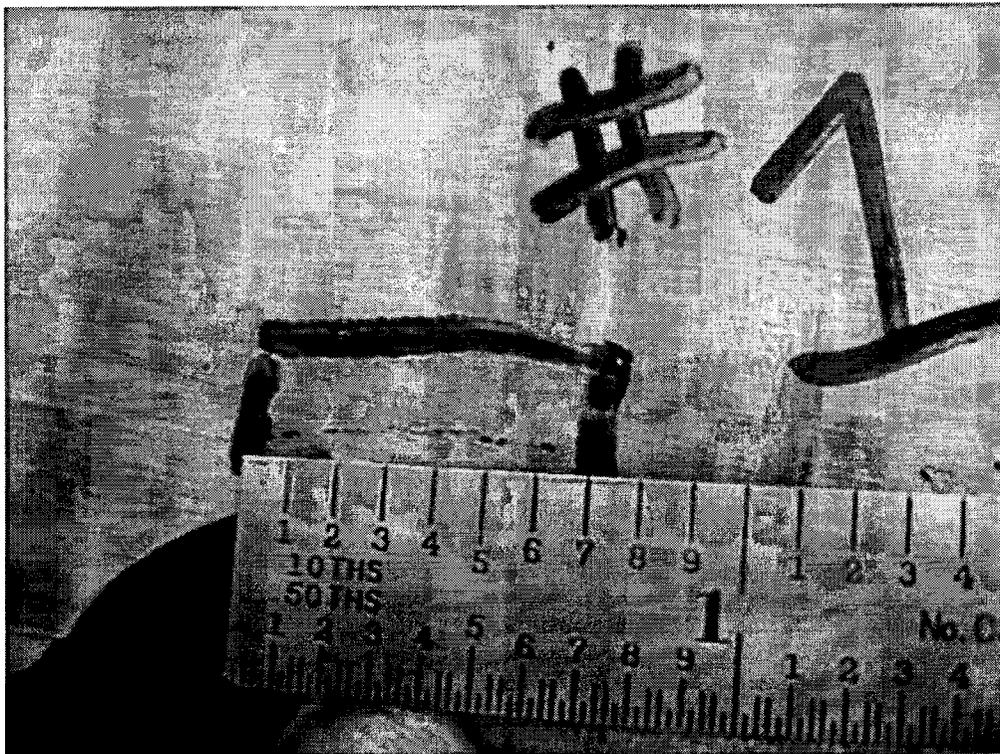
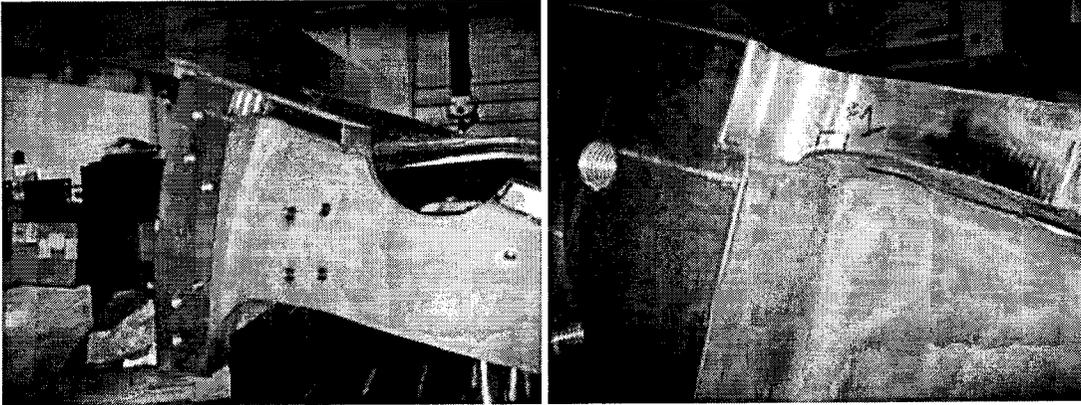
Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US, o=ORNL,  
ou=FED, email=nelsonbe@ornl.gov  
Date: 2006.07.27 09:27:10 -04'00'

---

Responsible Line Manager:

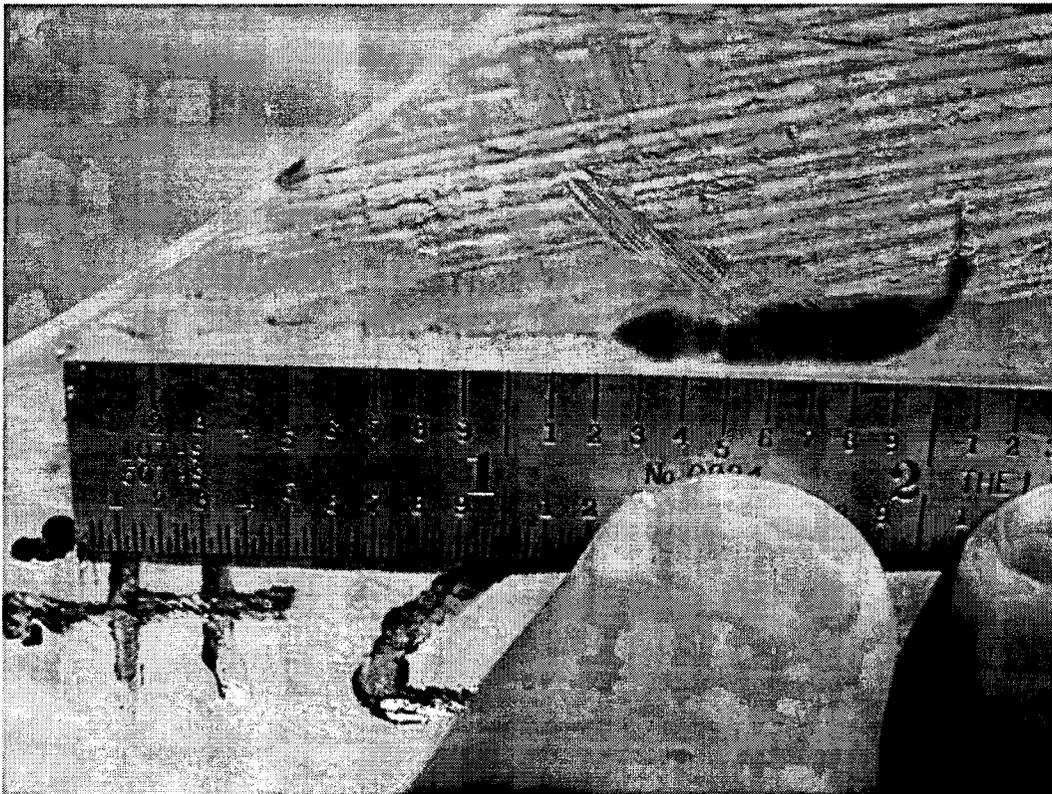
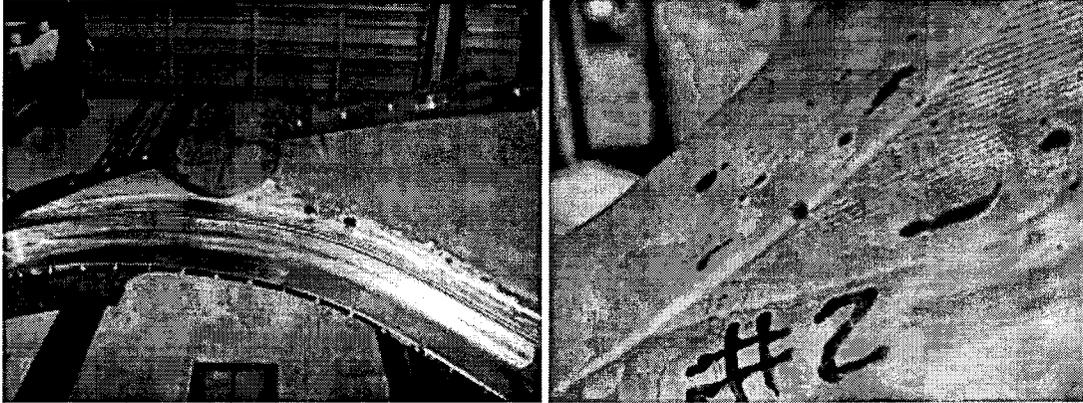
# PT Inspection Results of A3 – NC20166

1. .600" linear indication on OD of datum –E- flange located adjacent to E-flange hole 19.



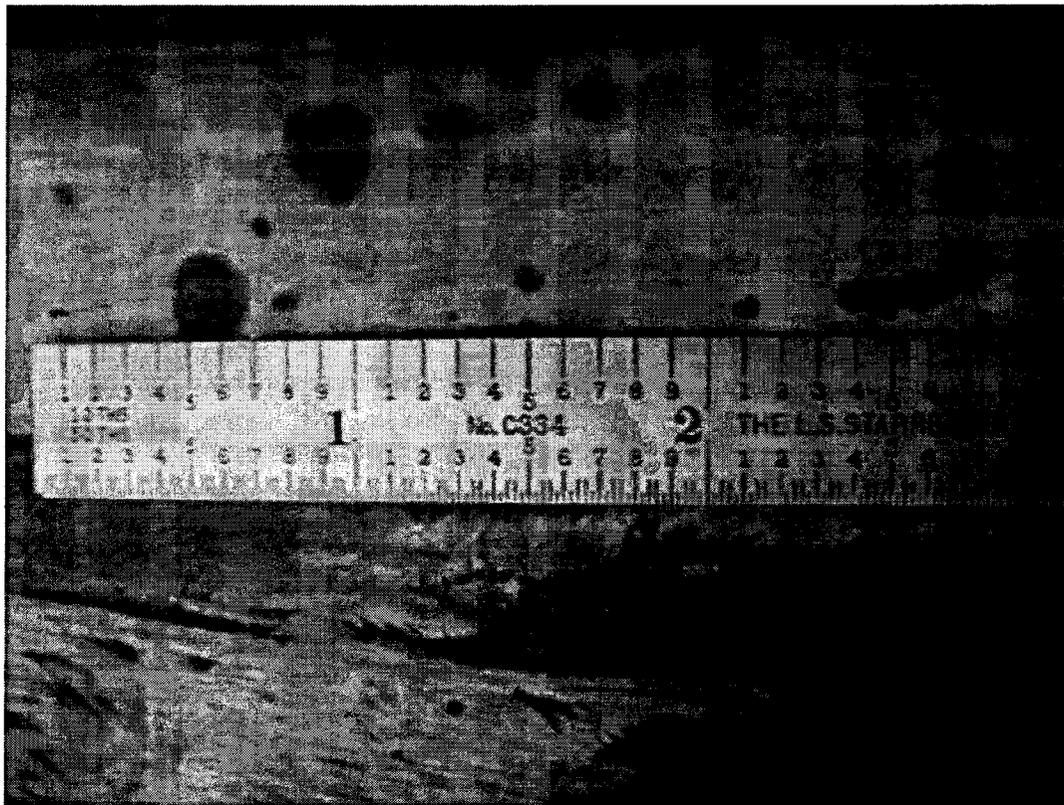
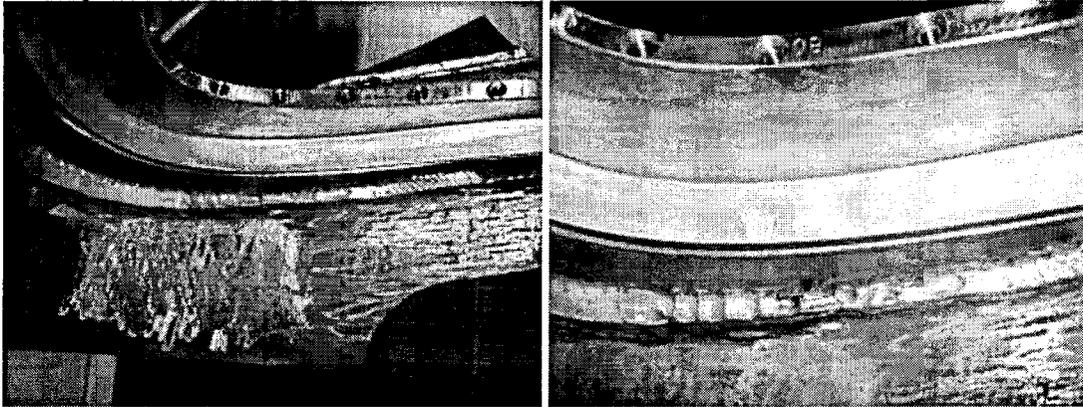
## PT Inspection Results of A3 – NC20166

- Cluster of linear indications on E side of casting below VPI groove near T hole 86. The indications are on the inner casting wall and wrap around onto the surface of the 6" radial cutout. The longest indication is along the inner wall and is approximately 2".



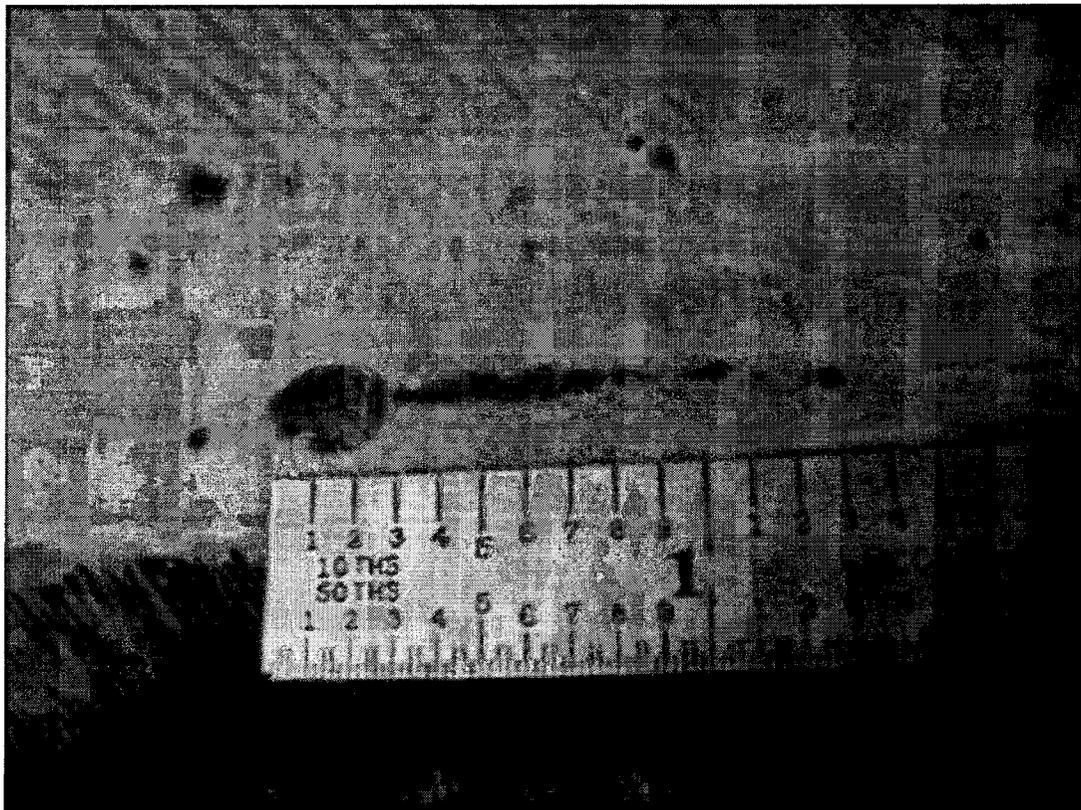
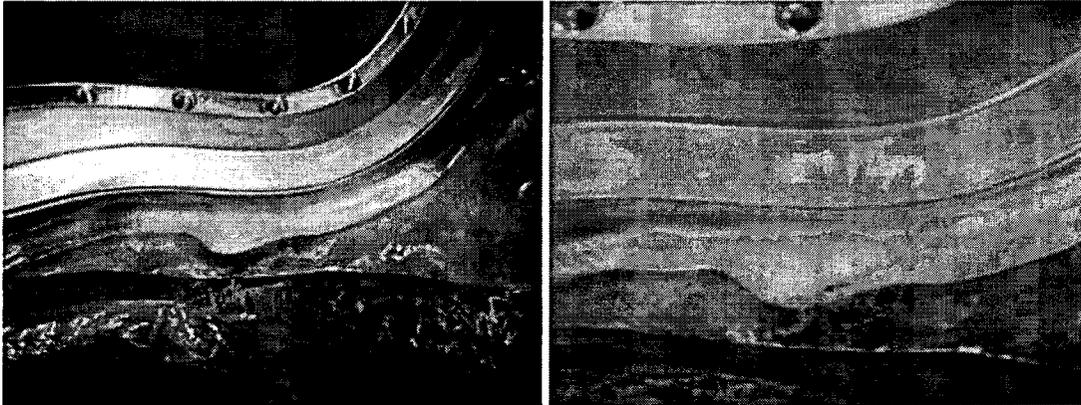
## PT Inspection Results of A3 – NC20166

- Cluster of linear indications on the datum –D- side beneath the VPI groove near T hole 80. The indication from 1.1" to 2.7" on the scale appears to be continuous for a total length of 1.6".



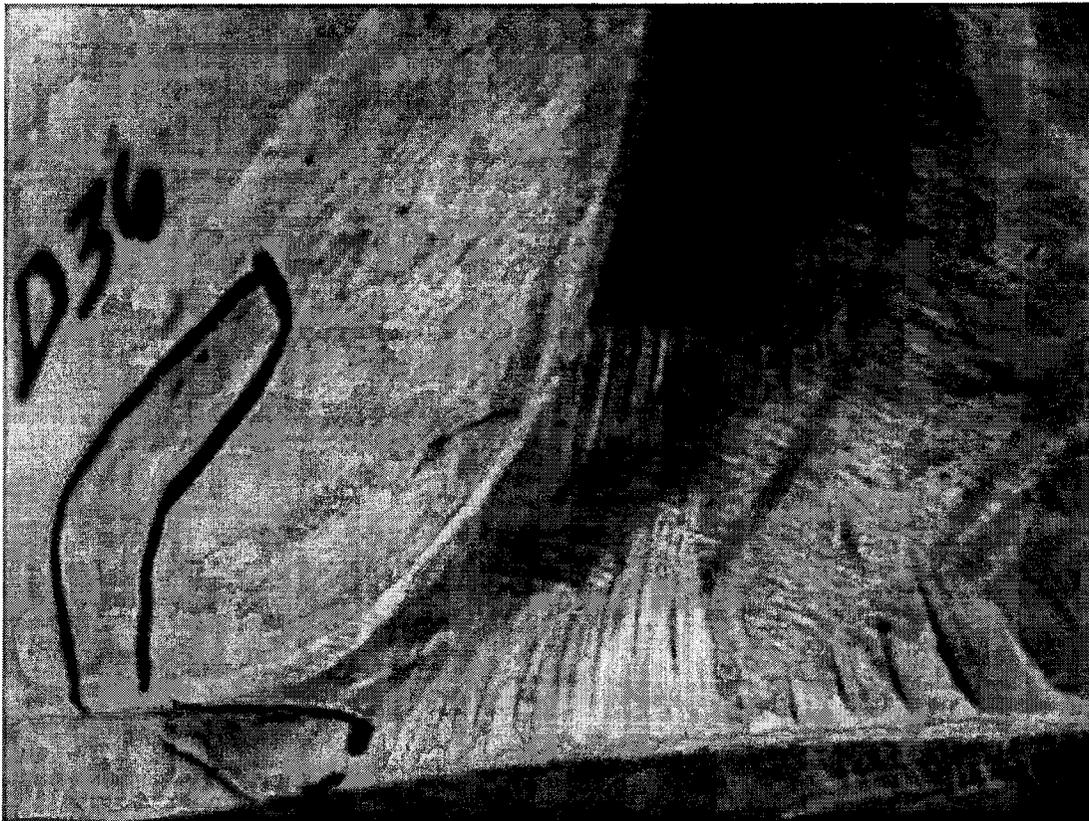
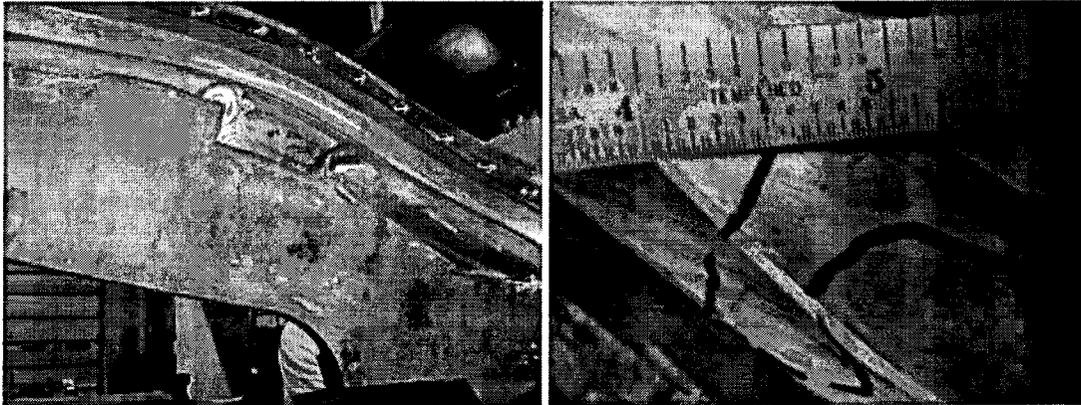
# PT Inspection Results of A3 – NC20166

- 4. Linear indication approximately 1.3" located on datum D side of casting below the VPI groove near T hole 66.



## PT Inspection Results of A3 – NC20166

5. Cluster of linear indications on and around the machined pad on the D side inner wall located near T hole 36. The longest indication appears to be continuous and is over 2”.



**Customer: ENERGY INDUSTRIES OF OHIO**

Contact: NANCY HORTON  
E-Mail: NKHFlowen@aol.com

Telephone: 216-496-2314  
Fax: 216-328-2001

**Part: SE141-114 / MODULAR COIL WINDING FORM TYPE**

Drawing ID: SE141-114                      Revision: 7

Customer P.O.: S005242-F/Ln:3  
Serial No./Qty: A3

Reported By: MIKE GRIFFITH  
E-Mail: mGriffith@MajorTool.com

Telephone: 317-636-6433  
Fax: 317-634-9420

- Problem: Inspection Test #: 130 rejected: OUTER AS CAST SURFACES: {g|,5|A|B|C}: -.056 TO .457
- Inspection Test #: 150 rejected: 4 X .03 X 45: : .010 TO .040
- Inspection Test #: 190 rejected: M TO M1: {g|,02|R|T|S}: -.020 TO .017
- Inspection Test #: 230 rejected: N TO N1: {g|,02|R|T|S}: -.024 TO .015
- Inspection Test #: 240 rejected: 2 X .06/.09 X 45: : 030 TO .068
- Inspection Test #: 270 rejected: .375-16 HOLES: {#|,06|R|T|S}: .0052 TO .072
- Inspection Test #: 280 rejected: DATUM E FLANGE: {f|,01}: .011
- Inspection Test #: 330 rejected: 8X Ø1-8 UNC: {#|,010|A|B|C}: .001 TO .025
- Inspection Test #: 350 rejected: 8X Ø1-8 UNC: {d|,010|A|B|C}: .007 TO .048
- Inspection Test #: 470 rejected: : d1.885 ~.003: 1.8855 ,1.8858, 1 HOLE 2.0515"
- Inspection Test #: 780 rejected: INNER AS CAST SURFACES: {g|,5|A|B|C}: -.444 TO .053

Also 3 additional items on NC attachment.

**Proposed Disposition:**

Based on previous submittal history, MTM proposes to accept deviations as is.

Number of additional pages: IDC attachment and NC attachment

Customer Disposition:    Use As Is     Rework     Repair     Scrap     Replace

The rejections listed above and the attached IDC list and photos were reviewed during a telecom on 7/27 attended by D. Williamson, T. Brown, F. Malinowski, P. Heitzenroeder, and H. Neilson, M. Griffith, and N. Horton. All were accepted as is with the exception of the "as cast" surface indicated in the attached Excel file and Tom Brown's PPT slides which summarize his review of this area. He determined that the cast surface in the concave surface area exceed tolerances by approximately 3/4". EIO/MTM agreed that this surface will be ground to the specified dimension.

Phil  
Heitzenroeder

Digitally signed by Phil Heitzenroeder  
DN: cn=Phil Heitzenroeder, c=US, o=PPPL, ou=Mech. Eng. Division  
Date: 2006.07.28 10:10:19 -04'00'

Brad  
Nelson

Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US, o=ORNL, ou=FED, email=nelsonbe@ornl.gov  
Date: 2006.07.28 18:22:35 -04'00'

Mike  
Griffith

Digitally signed by Mike Griffith  
DN: cn=Mike Griffith, c=US, o=Major Tool and Machine, ou=CFT - White, email=mgriffith@majortool.com  
Reason: I agree to the terms defined by the placement of my signature on this document  
Date: 2006.08.18 15:16:56 -04'00'

Major Tool Implemented By: \_\_\_\_\_

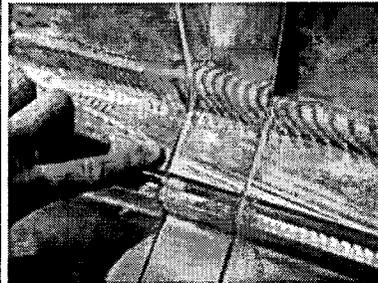
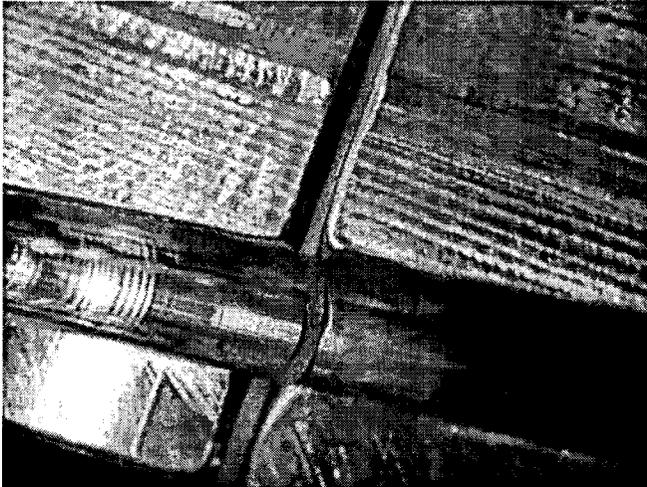
Title: \_\_\_\_\_

Date: \_\_\_\_\_

n:\mtmapps\Mtmonc14.qrp

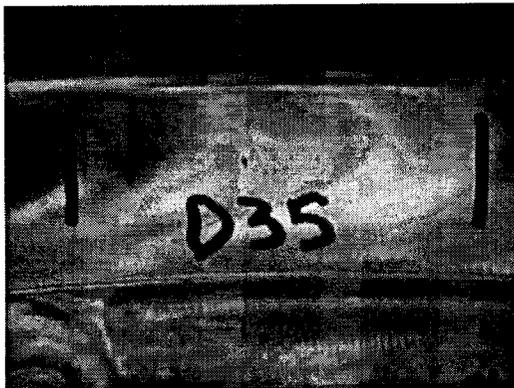
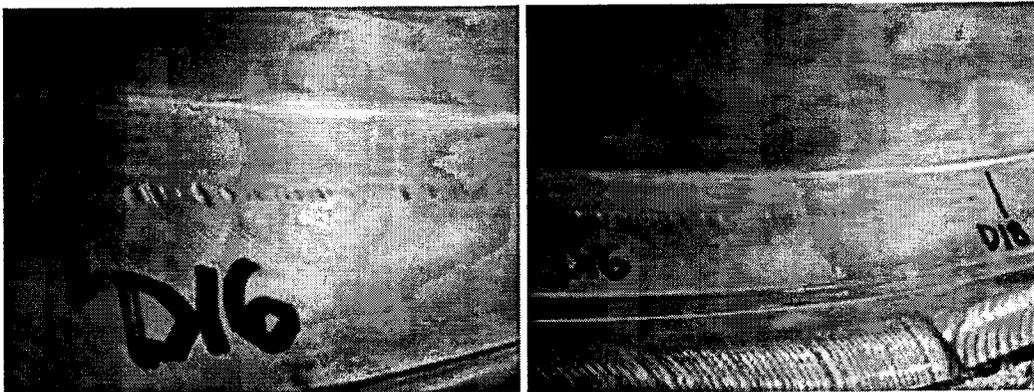
SE141-114 A3  
NC20201 attachment

1. The pictures below show examples of the G11 insulating material below the surface of the finished part. The top two are on the E side of the casting below the VPI groove. The bottom two pictures were taken at the perimeter of the datum D flange. The maximum amount the G11 is below the surface is .060”.

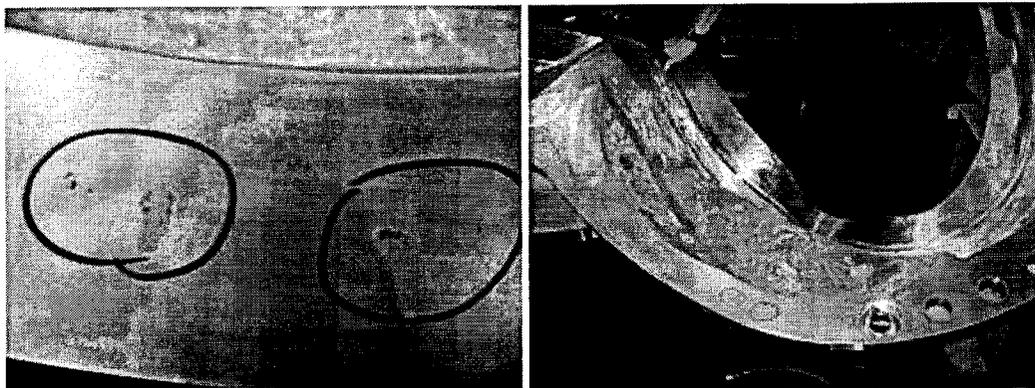


SE141-114 A3  
NC20201 attachment

2. The pictures below are of tooling marks on the short leg of the T section (datum D side). The numbers represent the corresponding T hole locations. The maximum depth of these marks is approximately .005”.



3. There were two areas of casting porosity on the D flange that were not rejectable during the PT process but are worth noting due to their visibility.



Mike Griffith

Page 2 of 2

7/27/2006



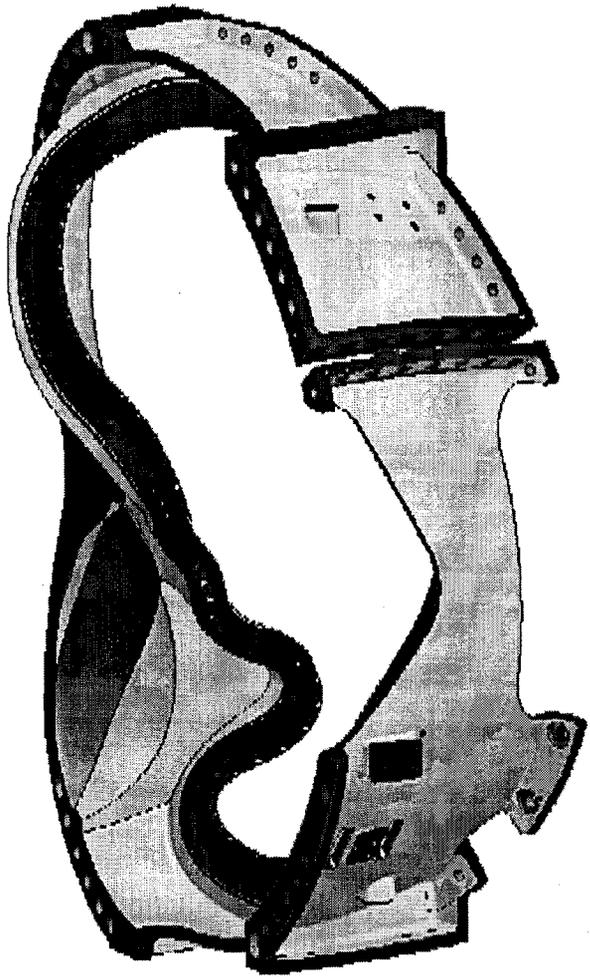
*Major*  
Tool & Machine, Inc.

# MC A3 Wing Inspection

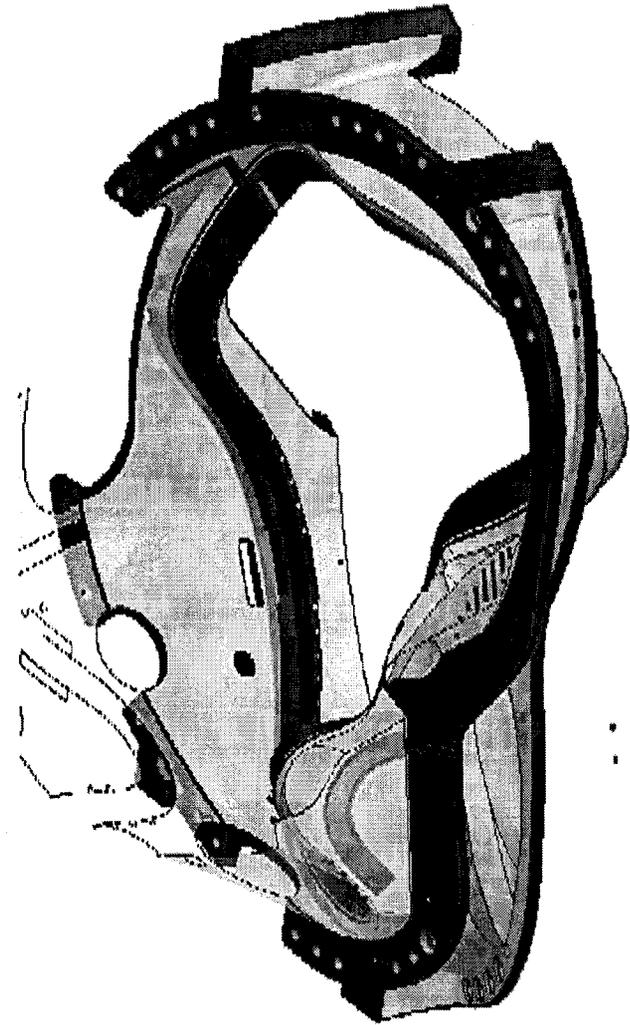
Mtm\_mc\_a3\_check.asm

T. Brown  
7/27/06

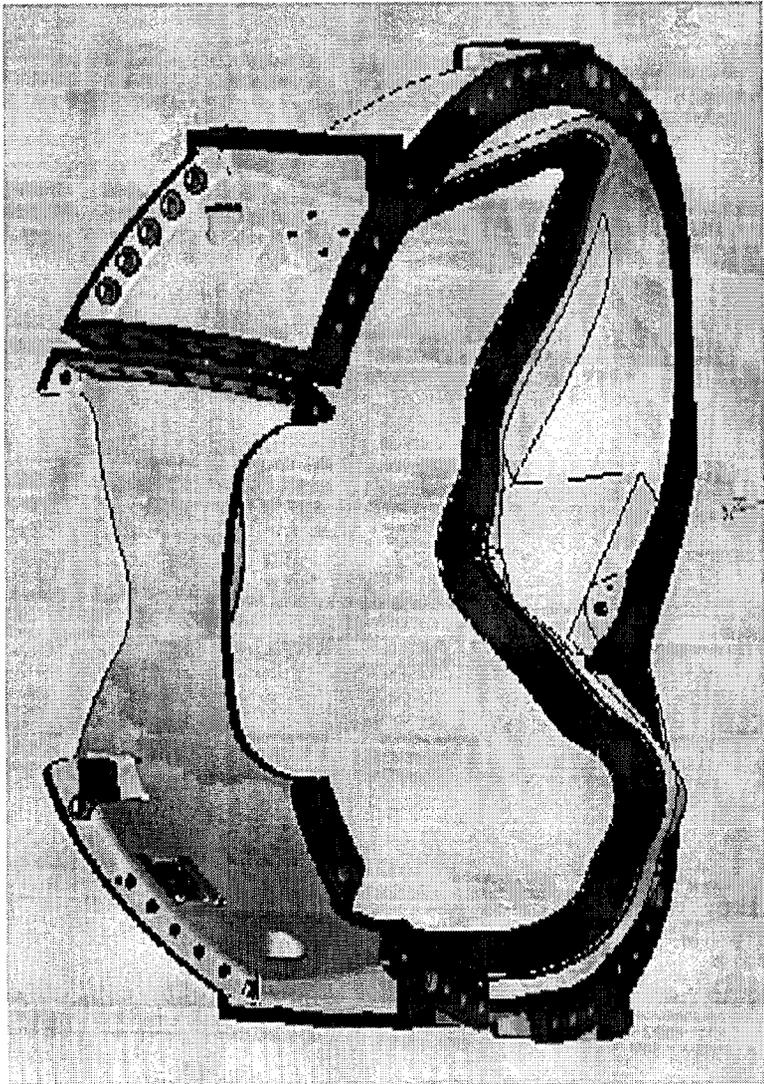
1



A to A Side



A to B Side

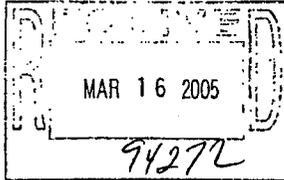


A to B Side





MAJOR TOOL & MACHINE INC 1458 E 19TH ST INDIANAPOLIS IN 46218		<b>YOUR PURCHASE ORDER NUMBER</b> P05-01332 Today's Date:		MCMaster-CARR 600 COUNTY LINE ROAD ELMHURST IL 60126-2081 IF THERE ARE ANY QUESTIONS ABOUT THIS SHIPMENT CONTACT OUR SALES DEPARTMENT (630)833-0300		PAGE 1 MCM NUMBER 6241663-03	
Warehouse Location	McMaster Carr Part Number	Fill Quantity	Item Description	Your Line	Your Order	This Shipment	
EXTRA PACKING LIST	74765 A86	1 EA	LOCTITE PRISM SUPER GLUE TOUGHENED,NUMBER 411,1-POUND BOTTLE,CLEAR 1	9	1 EA	1	
	74765 A86	1 EA	LOCTITE PRISM SUPER GLUE TOUGHENED,NUMBER 411,1-POUND BOTTLE,CLEAR 1	10	1 EA	1	
	74765 A86	1 EA	LOCTITE PRISM SUPER GLUE TOUGHENED,NUMBER 411,1-POUND BOTTLE,CLEAR 1	11	1 EA	1	
	74765 A86	1 EA	LOCTITE PRISM SUPER GLUE TOUGHENED,NUMBER 411,1-POUND BOTTLE,CLEAR 1	12	1 EA	1	



*3/16/05*  
*B.J.*

REFER TO: 6241663-03  
 MAJOR TOOL & MACHINE INC

*3/16/05*

TAG  
 CCP

PACER	NUMBER OF CARTONS	FILLER

LNS: 4

CYCLE

WEIGHT 4

MCM NO. 6241663-03 04

**PURCHASE ORDER**  
 P05-01332

FROM:  
 MCMaster-CARR  
 600 COUNTY LINE ROAD  
 ELMHURST IL 60126-2081 USA

SHIP TO:

MAJOR TOOL & MACHINE INC  
 1458 E 19TH ST  
 INDIANAPOLIS IN 46218

CCP

**CERTIFICATION OF COMPLIANCE**

This is to certify that, according to our records, the above item(s) furnished on your purchase order was supplied in accordance with the description and as illustrated in our catalog.

Sincerely,

Brian Hedstrom  
 Quality Manager

x



Shipping List 072435

Customer No 101193  
Sales Order Shipper

Sold to : STANDARD GRINDING & MFG CO  
3721 W. CHASE AVENUE  
SKOKIE, IL 60076  
United States

Ship to : STANDARD GRINDING & MFG CO  
3721 W. CHASE AVENUE  
SKOKIE, IL 60076  
United States

Ship Date	Customer PO	Sales Order	# of Boxes	Weight	Ship VIA	Bill of Lading	FOB
05/17/2005	80624	065171-00	1	0	YELLOW	072435	DE
Item	Part / Description / Details				Order Quantity	Ship Qty	
000001	39G1CNT73125NMWLF U/M SHT SO Item 4				1.00000		
	G-11 CR 48" x untrimmed X 36" x untrimmed Thickness: 3.125" +/- .110"  PLEASE NOTE THAT THERE IS NO NEMA STANDARD FOR G-11 CR SHEET  SPAULDING C OF C TO G-11 CR SHEET NO TESTING REQUIRED AT TIME OF ORDER  <i>Sheet length 3.55076</i>					1.00000	

**CERTIFICATE of CONFORMANCE**

WE HEREBY CERTIFY THAT THE MATERIAL SUPPLIED ON THIS ORDER WAS MADE IN ACCORDANCE WITH THE STANDARDS AND PROCESSES ESTABLISHED BY SPAULDING COMPOSITES COMPANY FOR THE REQUIREMENTS OF MATERIAL DESCRIBED ABOVE.

LOT # \_\_\_\_\_ DOML  
 Authorized By: Mark L. Caudillo Date: 05/17/2005

Customer Copy

Page # 1

Form: SCSHIP Rev: 8/99

000/2002

ATLAS FIBRE CO.

9447 674 1723

05/26/05 13:00



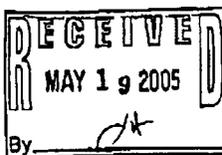
Shipping List 072434

Customer No 101193  
Sales Order Shipper

Sold to : STANDARD GRINDING & MFG CO  
3721 W. CHASE AVENUE  
SKOKIE, IL 60076  
United States

Ship to : STANDARD GRINDING & MFG CO  
3721 W. CHASE AVENUE  
SKOKIE, IL 60076  
United States

Ship Date	Customer PO	Sales Order	# of Boxes	Weight	Ship VIA	Bill of Lading	FOB
05/17/2005	60624	065169-00	1	716	YELLOW	072434	DE
Item	Part / Description / Details				Order Quantity	Ship Qty	
000001	39G1CNT71850NMWLF U/M SHY SO Item 5 G-11-CR 48" *UNTRIMMED X 36" *UNTRIMMED THK: 1.050" +/- .070"  PLEASE NOTE THAT THERE IS NO NEMA STANDARD FOR G-11 CR SHEET  SPAULDING C OF C TO G-11 CR SHEET NO TESTING REQUIRED AT TIME OF ORDER				1.00000	1.00000	



5/31/05  
NTM 05

**CERTIFICATE of CONFORMANCE**

WE HEREBY CERTIFY THAT THE MATERIAL SUPPLIED ON THIS ORDER WAS MADE IN ACCORDANCE WITH THE STANDARDS AND PROCESSES ESTABLISHED BY SPAULDING COMPOSITES COMPANY FOR THE REQUIREMENTS OF MATERIAL DESCRIBED ABOVE.

LOT # \_\_\_\_\_ DOM. \_\_\_\_\_  
Authorized By: Mark Li Candillo Date 05/17/2005

Customer Copy

Page # 1

Form: SCSHIP Rev: 8/99

000/C000

ATLAS FIBRE CO.

847 674 1723

05/26/05 13:00

**INSPECTION DATA CHECKLIST**

Quality Assurance Documentation for Part ID: SE141-101 - Item: 8

Workorder: 65709/3-0 Sub:1 Op:140

Part: SE141-101 - MODULAR COIL WINDING FORM TYPE-A - PRODUCTION MODULAR COIL WINDING FORM TYPE-A

Drawing ID: SE141-101 Rev: 3			INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY			
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT	
*		<u>TEST 1</u> RESISTANCE TO BE >500 kohms CHECK RESISTANCE BETWEEN THE MID-PLANE POLOIDAL BREAK SHIM AND THE WINDING FORM.	MULTIMETER	QA		J-1358	2.2 G OHMS	503-B.H			A
(10)								07-27-06			
*		<u>TEST 2</u> RESISTANCE TO BE >500 kohms CHECK RESISTANCE BETWEEN THE JUMPERED BOLTS AND JUMPERED MID-PLANE CASTING AND WINDING FORM.	MULTIMETER	QA		J-1358	655 M OHMS	503-B.H			A
(20)								07-27-06			

METRODE PRODUCTS LIMITED  
HANWORTH LANE, CHERTSEY

SURREY, UK, KT16 9LL

Tel: +44 (0) 1832 586721

Fax: +44 (0) 1832 585188

Email: info@metrode.com

Website: www.metrode.com

# CERTIFIED MATERIAL TEST REPORT

THIS PRODUCT HAS BEEN MANUFACTURED  
AND SUPPLIED THROUGH A SYSTEM  
APPROVED TO ISO 9001 & 2 OR EQUIVALENT



**TEST CERTIFICATE NUMBER**

183695

INVOICE TO
EUROWELD LTD
255 ROLLING HILLS ROAD
MOORESVILLE
NC 28117
USA

DESPATCHED TO
EUROWELD LTD
255 ROLLING HILLS ROAD
MOORESVILLE
NC 28117
USA

CUSTOMER ORDER NUMBER	N.05-34
DELIVERY NOTE DOCUMENT NUMBER	DN0105859
QUANTITY (KG)	15.0000
OUR ORDER REFERENCE	SO1787730 / 1
DATE	02/03/05

METRODE WELDING CONSUMABLE	ER316MNNF TIG 2.4mm
FORM	TIG WIRE
BATCH NUMBER	WO20132
SPECIFICATION	BS EN 12072:2000 W 20 16 3 Mn L

Chemical Analysis (Weight %)										Type: BS EN 10204: 3.1.B / ASME SFA-5.01: Sch. H	
C	Mn	Si	S	P	Cr	Ni	Mo	N	Cu		
0.015	7.43	0.42	0.008	0.014	19.9	15.4	2.62	0.14	0.20		


Mechanical Tests						Type: BS EN 10204: 2.2 / ASME SFA-5.01: Sch. G		
Tensile Tests						Impact Energies		
Condition	Test Temperature	R <sub>p0.2</sub> (MPa)	R <sub>m</sub> (MPa)	A4 (%)	Z (%)	Temperature (°C)	Impact Energy (J)	Lateral Expansion (mm)
AS-WELDED	ROOM	>400	>600	40	-	-196	70	-
Metrode Products Limited certifies that the above material conforms to the indicated specifications.		ASME SFA-5.01; Lot classification: S4			3/3/05 93911 Linc 1 B.1			
This document is produced electronically and is valid without signature.		Notes: 1. All includes incidental Co unless otherwise specified. 2. All (Co) includes incidental Fe unless otherwise specified. 3. Force is given as FN (Parts Number) and measured on all-weld gas using instrument calibrated against NBS-related secondary standards (See AWS A4 2-97) unless otherwise specified.						
IMPORTANT: Any liability arising from other reference on this certificate, or use of our products, is strictly limited and governed by our conditions of business.		Barrie Kyte - Q.A. Manager						

MTH 09  
3/3/05

METRODE PRODUCTS LTD  
 HANWORTH LANE  
 CHERTSEY SURREY  
 ENGLAND KT16 9LL  
 Tel +44 (0)1932 566721  
 Fax. +44 (0)1932 565168  
 Email info@metrode.com  
 Internet http://www.metrode.com



**TEST CERTIFICATE**  
 THIS PRODUCT HAS BEEN MANUFACTURED  
 AND SUPPLIED THROUGH A SYSTEM APPROVED  
 TO ISO 9001 & 2 OR EQUIVALENT



TEST CERTIFICATE NUMBER 194277

INVOICE TO
EUROWELD LTD 255 ROLLING HILLS ROAD MOORESVILLE NC 28117 USA

DESPATCHED TO
EUROWELD LTD 255 ROLLING HILLS ROAD MOORESVILLE NC 28117 USA

BATCH No.	W020102
OUR ORDER REF.	S01788013 / 1
DATE	09/03/05
PRODUCT	ER316MNNF TIG 2.4MM
FORM	TIG WIRE
SPECIFICATION	BS EN 12072:2000 W 20 16 3 Mn L

IMPORTANT: Any liability arising from either reliance on this certificate, or use of our products, is strictly limited and governed by our conditions of business.

CUSTOMER ORDER No.
N. 05-39

DELIVERY NOTE DOCUMENT No.
DN0106163

QUANTITY (Kg)
17.5000

CHEMICAL ANALYSIS (WEIGHT %)				CERTIFIED MATERIAL TEST REPORT: BS EN 10204: 3.1.B						
C	Mn	Si	S	P	Cr	Ni	Mo	N	Cu	
0.015	7.43	0.42	0.006	0.014	19.9	15.4	2.62	0.14	0.20	

TYPICAL ALL-WELD METAL MECH. PROPERTIES, AS WELDED:-  
 TS: >600 N/mm<sup>2</sup>; 0.2%PS: >400 N/mm<sup>2</sup>; EL. ON 4D: 40 %;  
 CVN @ -196 DEG.C: 70 J.

3/23/05  
 44534  
 Live / B-2

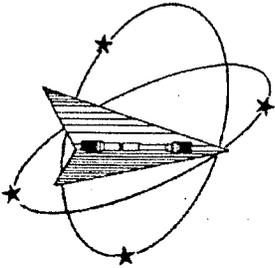
Metrode Products Ltd. certifies that the above material conforms to the indicated specifications

B. KYIET  
 Q A MANAGER

NOTES \*Ni includes incidental Co unless otherwise specified  
 \*Nb (Cb) includes incidental Ta unless otherwise specified  
 Ferrite is given as FN (Ferrite Number) and measured on all-weld pad using instrument calibrated against NBS related secondary standards (See AWS A4 2-97) unless otherwise specified

All Test certificates issued by METRODE will contain this embossed seal  
 Any recipient of a copy of METRODE Test Certificate without the seal should ensure from the supplier that it is a true and accurate reproduction of the original

mct106579.tif (1652x2103x2.tif)



*Westmoreland Mechanical Testing & Research, Inc.*  
 P.O. Box 388  
 Westmoreland Drive  
 Youngstown, Pa. 15696-0388 U.S.A.  
 Telephone: 724-537-3131 Fax: 724-537-3151  
 Website: [www.wmtr.com](http://www.wmtr.com)  
 WMT&R is a technical leader in the material testing industry.



621-01 & 621-02

April 22, 2005

**CERTIFICATION**

Page IM1 of 1

Major Tool & Machine Inc.  
 1458 East 19th Street  
 Indianapolis, IN 46218

Corrected Date  
 May 4, 2005

WMT&R Report No. 5-25008  
 P.O. No. P05-01764  
 PQR No. 434  
 Welder Jason Bever #465

Attention: Josh Mayne

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.  
 The following tests were performed on this order: IMPACT and TENSILE

**IMPACT RESULTS: ASME Section IX and AWS B2.1, ASTM E23-02**

**No Requirements**

**MATERIAL: Metaltek CF8MNMN MOD**

**SAMPLE TYPE: Charpy V-Notch**

**DISPOSITION: Report**

Specimen ID	TestLog Number	Sample Size	Temp. °F/°C	Energy ft-lbs	Energy joules	Mils Lat Exp	A/U/R
Weld-1	B65835	Standard	68\20	173	234.6	84	Report
Weld-2	B65836	Standard	68\20	160	216.9	68	Report
Weld-3	B65837	Standard	68\20	157	212.9	81	Report

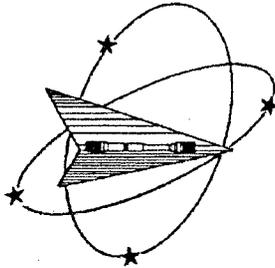
A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

  
 Richard G. Parks  
 Project Manager/Industrial Technology Engineer

5/4/05  
 May 4, 2005

KNOWINGLY OR WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES THIS CERTIFICATE OR REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF WMT&R, INC

*Testing Specialists for Aerospace, Automotive, and Material Testing Fields*  
 Locations in Youngstown, PA U.S. 96 ~ Tel. (724) 537-3131 and  
 Banbury U.K. ~ Tel. +44 (0) 1295 261211



**Westmoreland Mechanical Testing & Research, Inc.**

P.O. Box 388

Westmoreland Drive

Youngstown, Pa. 15696-0388 U.S.A.

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WMT&R is a technical leader in the material testing industry.



621-01 & 621-02



Section 1 of 2

WMT&R Report No. 5-25008

P.O. No. P05-01764

PQR No. 434

Welder Jason Bever #465

April 20, 2005

**CERTIFICATION**

Major Tool & Machine Inc.  
1458 East 19th Street  
Indianapolis, IN 46218

Attention: Josh Mayne

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 9, dated 4/1/2000.

The following tests were performed on this order: IMPACT and TENSILE

**TENSILE RESULTS: ASME Section IX and AWS B2.1, ASTM E21-03a**

**SOAK TIME: 5 Minutes**

**SPEED OF TESTING: 0.0050 in./in./min., 0.0500 in./min./in.**

**MATERIAL: Metrode ER316Mnnf**

**DISPOSITION: Report**

Specimen ID	TestLog Number	Temp. °F/°C	UTS KSI/MPA	0.2% YS KSI/MPA	Elong %	RA %	Modulus MSI/GPA	Ult. Load LBS/NEWTONS	0.2% YLD. LBS/NEWTONS
T1	B65833	-320/-196	191.8/1320	148.7/1030	27	39	28.7/198	2630/11699	2039/9071

A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

**DISPOSITION: Report**

Specimen ID	TestLog Number	Orig. Width (in./mm)	Final Width (in./mm)	Orig. Thick (in./mm)	Final Thick (in./mm)	Orig. Dia. (in./mm)	4D Orig GL (in./mm)	4D Final GL (in./mm)	Orig. Area (Sq. in./Sq. mm)	Failure Location/Type	Machine Number	A/U/R
T1	B65833	0.1802/4.57708	0.1437/3.650	0.0761/1.933	0.0582/1.478	0.2511/6.378	0.70/17.78	0.89/22.61	0.04183816/26.992307	WELD/DUCTILE	M9	R

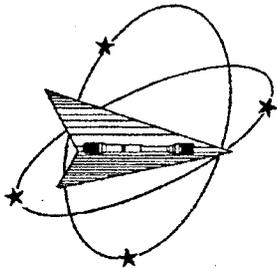
A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

KNOWINGLY OR WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES. THIS CERTIFICATE OR REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF WMT&R, INC.

Roy E. Starr/Matt Wojton  
\_\_\_\_ Technical Services Manager/\_\_\_\_ Tensile Supervisor

April 20, 2005

Testing Specialists for Aerospace, Automotive, and Material Testing Fields  
Locations in Youngstown, PA U.S. 917 ~ Tel. (724) 537-3131 and  
Banbury U.K. ~ Tel. +44 (0) 1295 261211



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WMT&R is a technical leader in the material testing industry.



621-01 & 621-02



April 20, 2005

**CERTIFICATION**

Major Tool & Machine Inc.

Section 2 of 2

WMT&R Report No. 5-25008

P.O. No. P05-01764

**TENSILE RESULTS: ASME Section IX and AWS B2.1, ASTM E21-03a**

**SOAK TIME: 5 Minutes**

**SPEED OF TESTING: 0.0050 in./in./min., 0.0500 in./min./in.**

**MATERIAL: Metrode ER316Mnnf**

**DISPOSITION: Report**

Specimen ID	TestLog Number	Temp. °F/°C	UTS KSI/MPA	0.2% YS KSI/MPA	Elong %	RA %	Modulus MSI/GPA	Ult. Load LBS/NEWTONS	0.2% YLD. LBS/NEWTONS
T2	B65834	-320/-196	204.7/1410	156.5/1080	29	34	29.9/206	5095/22664	3894/17323

A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

**DISPOSITION: Report**

Specimen ID	TestLog Number	Orig. Dia. (in./mm)	Final Dia. (in./mm)	4D Orig GL (in./mm)	4D Final GL (in./mm)	Orig. Area (Sq. In./Sq. mm)	Failure Location/Type	Machine Number	A/U/R
T2	B65834	0.1780/4.521	0.1444/3.668	0.70/17.78	0.90/22.86	0.02488456/16.054520	WELD/DUCTILE	M9	R

A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

*Matthew Wojton*  
Roy E. Starr/Matt Wojton

Technical Services Manager / Tensile Supervisor

*4-20-05*

April 20, 2005

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Testing Specialists for Aerospace, Automotive, and Material Testing Fields

Locations in Youngstown, PA U.S. ~ Tel. (724) 537-3131 and

Banbury U.K. ~ Tel. +44 (0) 1295 261211

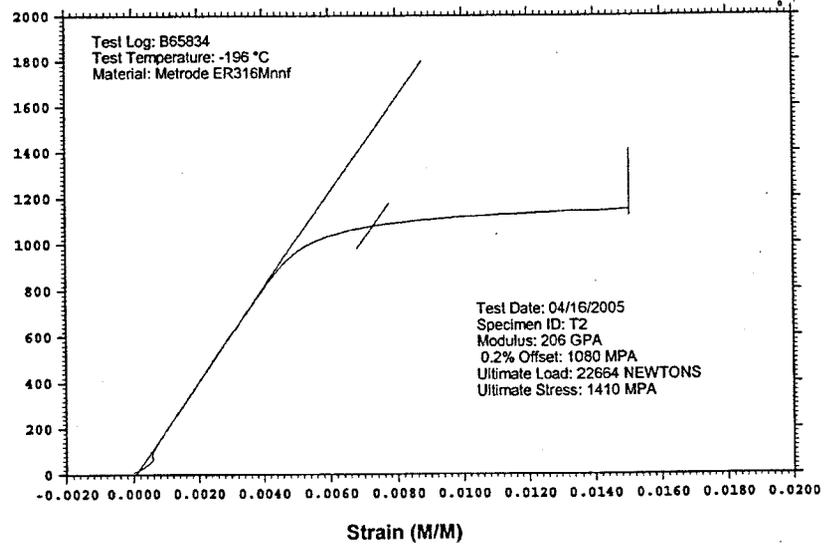
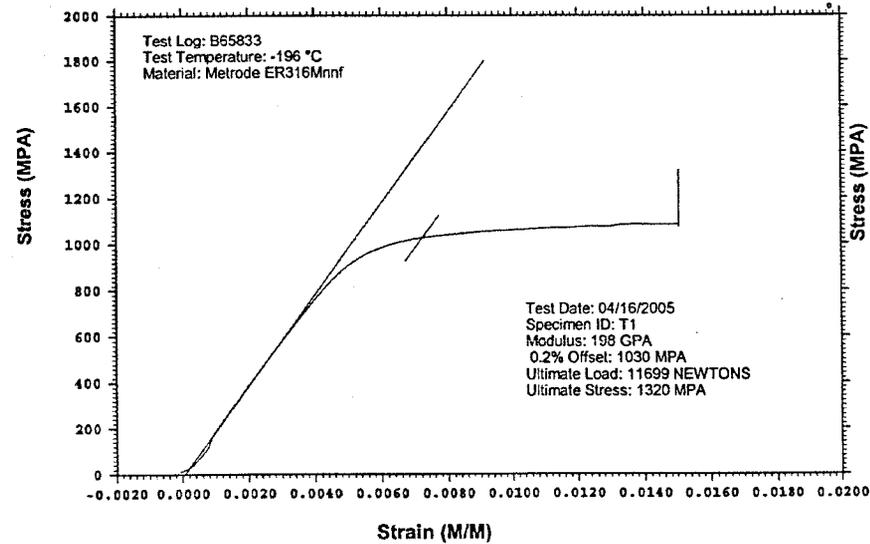
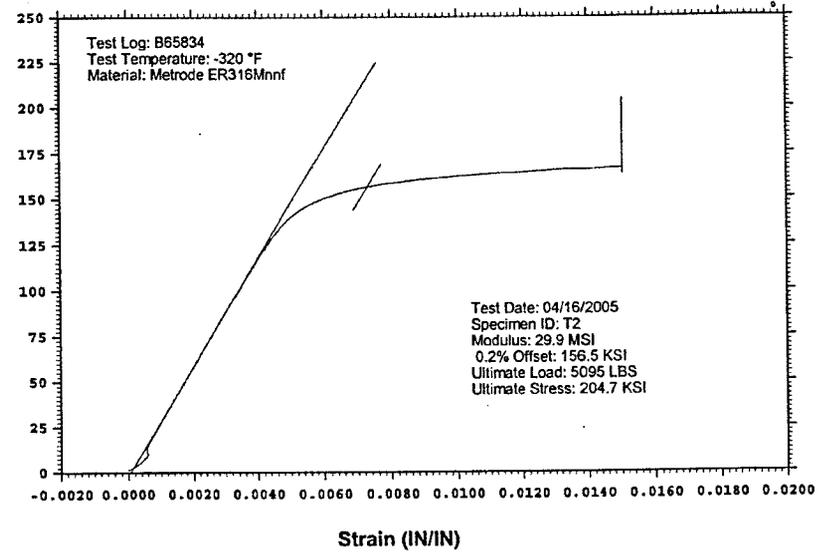
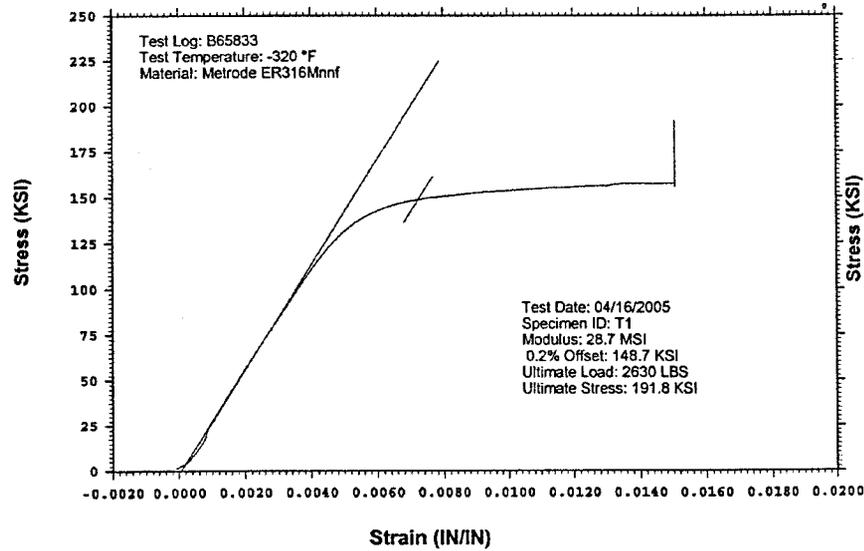
# WESTMORELAND MECHANICAL TESTING & RESEARCH, Inc

Stress vs. Strain

Phone: (724)537-3131

Customer: Major Tool & Machine Inc.  
WMT&R Report: 5-25008

P.O. No.: P05-01764  
PQR No.: 434  
Welder: Jason Bever #465





# Nondestructive Test

## Certification for Liquid Penetrant Examination

Quality Assurance Documentation for Part ID: SE141-114 - Item: 13

1458 E. 19th Street, Indianapolis, In 46218  
 TEL:(317)636-6433 FAX:(317)634-9420

**Date of Inspection:** 07/20/2006

**Type of Material:** CAST STAINLESS

**NDT#:** 17396

<b>Stage of Inspection:</b> <input type="checkbox"/> Incoming Inspection <input type="checkbox"/> In-Process Inspection <input type="checkbox"/> After Repair <input checked="" type="checkbox"/> Final Inspection	<b>Manufacturing Process:</b> <input type="checkbox"/> Weldment <input checked="" type="checkbox"/> Casting <input type="checkbox"/> Bar Stock <input type="checkbox"/> Plate <input type="checkbox"/> Forging <input type="checkbox"/> Other	<b>Surface Condition:</b> <input checked="" type="checkbox"/> Machined <input type="checkbox"/> Rough <input type="checkbox"/> Other FINAL MACHINED	<b>Test Being Run to:</b> <input checked="" type="checkbox"/> Router Instructions <input checked="" type="checkbox"/> Drawing <input type="checkbox"/> Test Plan <input type="checkbox"/> Technique Card SEE NOTES	<b>Heat Treated:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--	--	---	---	--

<b>Part Information:</b> MTM Job Number: 65709/3.0 -Sub:1 -Op:100 Resource ID: 810-LIQUID PENETRANT INSPE Part ID: SE141-114 Part Name: MODULAR COIL WINDING FOR Serial Number: Customer P.O.: S005242-F Customer Unit/Plant:	<b>Test Results:</b> Quantity Inspected: 1 Quantity Accepted: 0 Quantity Rejected: 1  Run Hours: 0.0	<b>Inspection Results:</b> Customer N/C #: <input type="checkbox"/> Accepted <input checked="" type="checkbox"/> Rejected <input type="checkbox"/> N/C-Report <input type="checkbox"/> Rework MTM N/C #: 20166
--	---	--

<b>Customer Inspection Plan:</b> SEE NOTES <b>Test Step:</b> <b>Revision:</b> <b>Material Test Number:</b>	<b>Inspection Criteria:</b> <b>Customer Specification:</b> ASTM A903/A903M <b>MTM Spec Number:</b> PS582 (REF NDT-WI-09) <b>Acceptance Standard:</b> ASTM A903 (SEE NOTES)
---	---

<b>Inspection Materials Used:</b> <b>Manufacturer:</b> SHERWIN <b>Type of Penetrant:</b> DP-51 <b>Batch Number:</b> 69-E47 <b>Developer:</b> D-100 <b>Batch Number:</b> 65-C6	<b>Penetrant Examination Processes:</b> <b>Type:</b> II (Visible) / Dwell Time: 20 Minutes <b>Method:</b> A (Water Wash) <b>Method of Drying:</b> Forced Air Fan <b>Form:</b> e (nonaqueous for Type II visible dye) / Dwell Time: 20 Min
--	---

**Inspection Requirements:**

100 % of all accessible surfaces     Joint Preps     Root Pass     Back Gouge     Cover Pass     Other

**Notes:**

INSPECT 100% OF SURFACES ON PRODUCTION MODULAR COIL WINDING FORM TYPE-A.  
 SPECIFICATION: ASTM A903/A903M  
 METHOD: ASTM E165

ACCEPTANCE CRITERIA: ASTM A903/A903M LEVEL I FOR MACHINED SURFACES INCLUDING THE ENTIRE "T" SECTION (HIGH STRESS AREAS)

PART HAS 17 REJECTABLE INDICATIONS PER CUSTOMER REQUIREMENTS ON MACHINED SURFACES. SEE NCR-20044 AND PHOTOS FOR MORE DETAILED INFO.

This is to certify that the pieces specified have been inspected in accordance with the specifications shown.

**Inspector:** 674-S.WILLIAMS

**Date:** 07/20/2006

*Sylvester Williams Level II* MIN P.1



**INSPECTION DATA CHECKLIST**

Quality Assurance Documentation for Part ID: SE141-114 - Item: 14

Workorder: 65709/3-0 Sub:1 Op:130

Part: SE141-114 - MODULAR COIL WINDING FORM TYPE-A - PRODUCTION MODULAR COIL WINDING FORM TYPE-A

Drawing ID: SE141-101 Rev: 3			INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY		
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT
2*	D3	Ø.001 - Ø.002 CHECK CLEARANCE OF ITEM 5 TO ITEM 6.		MFG			LESS THAN .002	825-B.J		A
(10)								07-21-06		
*		THE GAP BETWEEN THE POLOIDAL BREAK BUSHINGS AND FLANGE SHAL BE LESS THAN .002"		MFG			LESS THAN .002	825-B.J		A
(15)								07-21-06		
*		ENSURE THAT THE CUMULATIVE GAP AT ANY SINGLE CROSS SECTION OF THE POLOIDAL FLANGE ELEMENTS IS LESS THAN .005".		MFG			LESS THAN .002	825-B.J		A
(20)								07-21-06		
*		THE MAX. GAP AT THE POLOIDAL BREAK PERIMETER IS .015" AND CANNOT EXCEED 1/8" FROM THE EDGE		MFG			LESS THAN .002	825-B.J		A
(30)								07-21-06		
1*	F2	TORQUE ASSEMBLY TO 1500 +/- 30 FT-LBS PER DRAWING NOTE 15.	TORQUE MULTIPLI	MFG		J-1240	1500	825-B.J		A
(40)								07-21-06		

Quality Assurance Documentation for Part ID: SE141-114 - Item: 15

Workorder: 65709/3-0 Sub:1 Op:132

Part: SE141-114 - MODULAR COIL WINDING FORM TYPE-A - PRODUCTION MODULAR COIL WINDING FORM TYPE-A

Drawing ID: SE141-114 Rev: 7			INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY			
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT	
1* (10)	F3	NOTE 14 - BACK SPOTFACE ALL THRU HOLES TO MINIMUM CLEAN UP.		QA		VISUAL	ACCEPT	339-E.R 07-27-06			A
1* (20)	E8	FLANGE PROFILE +/- .25 IN THIS AREA	CMM	QA		00064	.0045	339-E.R 07-27-06			A
1* (30)	D8	∥ .02 A	CMM	QA		00064	.004	339-E.R 07-27-06			A
1* (40)	D8	54.20 ± .03	CMM	QA		00064	54.200	339-E.R 07-27-06			A
1* (50)	C8	54.20 ± .03	CMM	QA		00064	54.199	339-E.R 07-27-06			A
1* (60)	B8	∥ .02 A	CMM	QA		00064	.002	339-E.R 07-27-06			A
1* (70)	D5	∥ .02 A	CMM	QA		00064	.004	339-E.R 07-27-06			A
1* (80)	D5	48.50 ± .03	CMM	QA		00064	48.480	339-E.R 07-27-06			A
1* (90)	C5	48.50 ± .03	CMM	QA		00064	48.508	339-E.R 07-27-06			A
1* (100)	B5	∥ .02 A	CMM	QA		00064	.009	339-E.R 07-27-06			A
1* (110)	D4	VERIFY PART MARKING: MAJOR TOOL SE141-114 A(casting number) (weight) LBS.	CMM	QA		00064	ACCEPT	339-E.R 07-27-06			A
1* (120)	D4	RECORD WEIGHT	CMM	QA		00064	5440	339-E.R 07-27-06			A
1* (130)	D3	∇ .5 A B C OUTER AS CAST SURFACES	CMM	QA		00064	-.056 TO .457 [N/C: 20201-Doc:NC20201]	339-E.R 07-27-06			R
2*	F8		CMM	QA		00064	0.39 TO 0.41	339-E.R			A



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INSPECTION DATA CHECKLIST

(140)		2 X .40						07-27-06		
2*	F8		CALIPER	QA		J-707	.010 TO .040 [N/C:2	533-B.C		R
(150)		4 X .03 X 45					0201-Doc:NC20201]	07-26-06		
2*	G6		PIN GAGE	QA		J-651-2	.184 TO .207	533-B.C		A
(160)		2 X R.187 +.025 / -.005						07-26-06		
2*	G5		CMM	QA		00064	.0149 TO .076	339-E.R		A
(170)		P TO M						07-27-06		
2*	F5		CMM	QA		00064	-.020 TO .017 [N/C:	339-E.R		R
(190)		M TO M1					20201-Doc:NC20201]	07-27-06		
2*	E5		CMM	QA		00064	-.011 TO .022	339-E.R		A
(200)		M1 TO N1						07-27-06		
2*	G3		CMM	QA		00064	-.007 TO .094	339-E.R		A
(210)		Q TO N						07-27-06		
2*	F3	DATUM E SIDE VERIFY SHELL INTERSECT CLEARANC USING GAGE MTMFX-3473		QA		MTMFX-3473	ACCEPT	533-B.C		A
(220)								07-26-06		
2*	F3		CMM	QA		00064	-.024 TO .015 [N/C:	339-E.R		R
(230)		N TO N1					20201-Doc:NC20201]	07-27-06		
2*	B4		CALIPER	QA		J-707	030 TO .068 [N/C:20	533-B.C		R
(240)		2 X .06/.09 X 45					201-Doc:NC20201]	07-26-06		
2*	B5	Ø .375-16 UNC ∇ .750 +.1 -0 96 X	THREAD PLUG GA	QA	100%	A-444	ACCEPT [N/C:20201-D oc:NC20201]	242-M.G		A
(250)								07-27-06		
2*	B5		DEPTH MICROMET	QA		J-1024	.620 TO .621 DIA. DEPTH .183 TO .191 [N/C:20201-Doc:NC20	242-M.G		A
(260)			PIN GAGE			J-652-3	201]	07-27-06		
2*	B5		CMM	QA		00064	.0052 TO .072 [N/C:	339-E.R		R
(270)		.375-16 HOLES					20201-Doc:NC20201]	07-27-06		
3*	H3		CMM	QA		00064	.011 [N/C:20201-Doc :NC20201]	339-E.R		R
(280)		DATUM E FLANGE						07-27-06		
3*	H4	√ <sup>125</sup>	PROFILOMETER	QA		J-1109	20 TO 100	533-B.C		A
(285)		DATUM E FLANGE						07-26-06		
3*	F2		CMM	QA		00064	.007	339-E.R		A
(290)		DATUM D FLANGE						07-27-06		
3*	F3	√ <sup>125</sup>	PROFILOMETER	QA		J-1109	40 TO 125 [N/C:2020 1-Doc:NC20201]	242-M.G		A
(295)		DATUM D FLANGE						07-27-06		



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INSPECTION DATA CHECKLIST

3* (300)	E4	Ø2.50 THRU	CALIPER	QA		J-707	2.497	533-B.C 07-26-06			A
3* (310)	F4	Φ .060 A B C Ø2.50	CMM	QA		00064	SEE IGES	339-E.R 07-27-06			A
3* (320)	C7	8X Ø1-8UNC ▽ 2	THREAD PLUG GA	QA		A-71	ACCEPT	533-B.C 07-26-06			A
3* (330)	C7	Φ .010 A B C 8X Ø1-8 UNC	CMM	QA		00064	.001 TO .025 [N/C:2 0201-Doc:NC20201]	339-E.R 07-27-06			R
3* (340)	D5	8X Ø1-8UNC THRU	THREAD PLUG GA	QA		A-71	ACCEPT	533-B.C 07-26-06			A
3* (350)	D5	Ø .010 A B C 8X Ø1-8 UNC	CMM	QA		00064	.007 TO .048 [N/C:2 0201-Doc:NC20201]	339-E.R 07-27-06			R
3* (360)	D3	Ø2.50 THRU	CALIPER	QA		J-707	2.499	533-B.C 07-26-06			A
3* (370)	D3	Φ .060 A B C Ø2.5	CMM	QA		00064	SEE IGES	339-E.R 07-27-06			A
3* (380)	D1	40.90	CMM	QA		00064	SEE IGES	339-E.R 07-27-06			A
4* (390)	H6	┌┐Ø2.000-2.001 ▽0.990-1.000	DIAL BORE GAGE DEPTH MICROMET	QA		J-1400 J-1024	2.000 DEPTH .998	339-E.R 07-27-06			A
4* (400)	F4	Ø1.375-6UNC THRU	THREAD PLUG GA	QA		A-375	ACCEPT	533-B.C 07-26-06			A
4* (410)	F4	Φ Ø.06 M A D Ø1.375-6	CMM	QA		00064	SEE IGES	339-E.R 07-27-06			A
4* (420)	D4 &	Ø1.885 ± .003 THRU	DIAL BORE GAGE	QA		J-1400	1.883 TO 1.886	533-B.C 07-26-06			A
4* (430)	D4 &	Φ Ø.06 M A D Ø1.885	CMM	QA		00064	.0036 TO .044	339-E.R 07-27-06			A
4* (440)	B6	3X Ø1.5	CALIPER	QA		J-1103	1.503 TO 1.505	533-B.C 07-26-06			A
4* (450)	B6	Φ .06 M A D 3X Ø1.5	CMM	QA		00064	.004 TO .018	339-E.R 07-27-06			A
4* (460)	A4	6X .25-20 UNC ▽ .5 .5 X 82° CHAMFER	THREAD PLUG GA	QA		A-726	ACCEPT	533-B.C 07-26-06			A
5*	D8/D6	Ø1.885 ± .003	CMM	QA		00064	1.8855 ,1.8858, 1 H OLE 2.0515" [N/C:20	242-M.G			R



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INSPECTION DATA CHECKLIST

(470)							124-Doc:NC20124]	07-27-06		
5* (480)	D8/D6	Φ Ø.06 N A E	CMM	QA	00064	.013 TO .053		339-E.R 07-27-06		A
		Ø1.885								
5* (490)	F8	Ø1.375-6UNC THRU	THREAD PLUG GA	QA	A-375	ACCEPT		495-D.C 07-26-06		A
5* (500)	F8	Φ Ø.06 N A E	CMM	QA	00064	.048		339-E.R 07-27-06		A
		Ø1.375-6 UNC								
5* (510)	F6		THREAD PLUG GA	QA	A-375	ACCEPT 23 PLACES		495-D.C 07-26-06		A
		8X 1/4 -20 UNC-2B								
5* (520)	D6	3X Ø1.5 ∇ 2.33	CALIPER DEPTH MICROMET	QA	J-1103 J-1024	1.503 TO 1.505 D EPTH 2.337		533-B.C 07-26-06		A
5* (530)	D6	Φ Ø.06 N A E	CMM	QA	00064	.002 TO .032		339-E.R 07-27-06		A
		3X Ø1.5								
5* (540)	B3	6X .25 - 20 UNC ∇ .6 Ø.5 X 82° CHAMFER	THREAD PLUG GA	QA	A-726	ACCEPT		533-B.C 07-26-06		A
6* (550)	H7	6.00	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (560)	H7	1.00	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (570)	G8	6.70	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (600)	F8	6.70	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (610)	E7	5.75	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (620)	E7	1.00	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
6* (630)	E6	4X Ø1.00	PIN GAGE	QA	J-921	.993 TO 1.00		533-B.C 07-26-06		A
6* (640)	G5	2X .88 - 1.13	CALIPER	QA	J-707	1.120 TO 1.130		533-B.C 07-26-06		A
6* (650)	F5	.06-.09 X 45° TYP	CALIPER	QA	J-707	.080		533-B.C 07-26-06		A
7* (660)	G2	19.00	CMM	QA	00064	SEE IGES		339-E.R 07-27-06		A
7*	F2		CMM	QA	00064	SEE IGES		339-E.R		A



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INSPECTION DATA CHECKLIST

(670)		2.00						07-27-06			
7*	F2		CMM	QA		00064	SEE IGES	339-E.R		A	
(680)		6.75						07-27-06			
7*	F2		CMM	QA		00064	SEE IGES	339-E.R		A	
(690)		3.75						07-27-06			
7*	F1	4X Ø.75-10 UNC ▽ 1.50	THREAD PLUG GA	QA		A-681	THREAD AND DEPTH	495-D.C		A	
(700)							CEPT	07-26-06			
7*	D1		CALIPER	QA		J-707	1.56 / 1.56	339-E.R		A	
(710)		2X 1.56 OPEN THRU						07-27-06			
7*	C1	.375-16 UNC-2B TAP ▽ .75 .03 X 45° CHAMFER	THREAD PLUG GA	QA		A-444	ACCEPT	339-E.R		A	
(720)		6X						07-27-06			
7*	C4			QA		VISUAL	ACCEPT	533-B.C		A	
(730)		VERIFY THAT HOLE LOCATIONS ARE SCRIBED ON THE PART.						07-26-06			
7*	B3		CALIPER	QA		J-1389	8.51	495-D.C		A	
(740)		8.50 DISTANCE BETWEEN SCRIBE MARKINGS.						07-26-06			
9*	H1	2X Ø.50	PIN GAGE	QA		J-651-2	.500	533-B.C		A	
(750)								07-26-06			
9*	B7		DEPTH MICROMET	QA		J-1024	.628 DIA. DEPTH 2. 639 AND 3.640	533-B.C		A	
(760)		TC2 HOLE TO BE .625" IN DIAMETER APPRO 2.52" DEEP AND .25" IN DIAMETER AT LEAST 1" DEEP.	CALIPER			J-707		07-26-06			
*			DEPTH MICROMET	QA		J-1024	.625 DIA. DEPTH 1.060	533-B.C		A	
(770)		TC1 LOCATION AND CONFIGURATION MODIFIED. HOLE TO HAVE .625 CLEARANCE AND AT LEAST 1" OF DEPTH AT THE .25" DI	CALIPER			J-707		07-26-06			
10*	F5		CMM	QA		00064	-.444 TO .053 [N/C: 20201-Doc:NC20201]	339-E.R		R	
(780)		INNER AS CAST SURFACES						07-27-06			
10*	D5		CMM	QA		00064	-.122 TO -.209	339-E.R		A	
(790)		WING SURFACES						07-27-06			
Drawing ID: NCSX-CSPEC-141-03 Rev: 11			INSPECTION INSTRUCTIONS			RESULTS			INSPECTED BY		
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT	



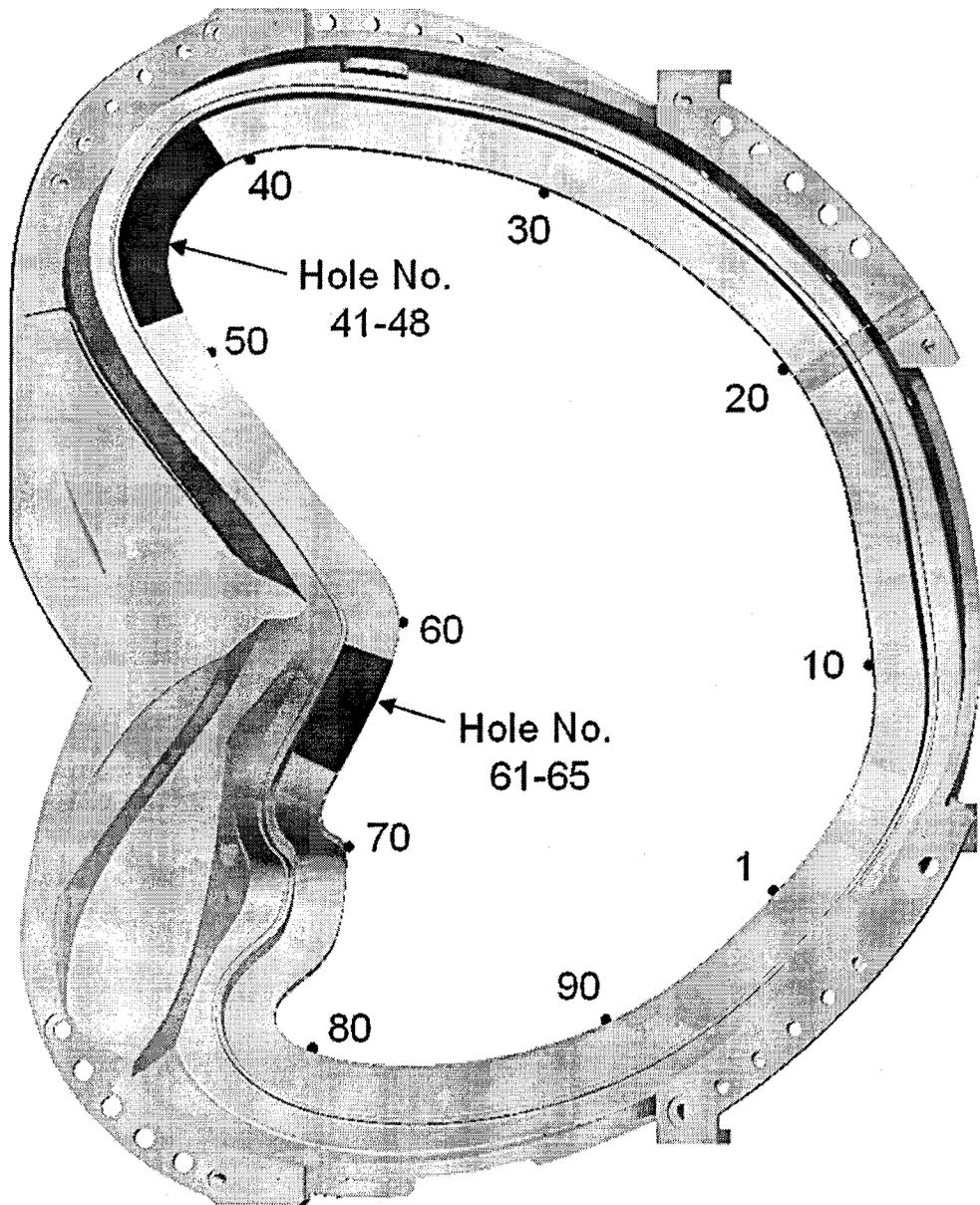
Major

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INSPECTION DATA CHECKLIST

4*	3.1.1.1.125	PROFILOMETER	QA		J-1109	8 TO 30	533-B.C			A
(800)	THE TWO "L" MACHINED SURFACES OF TEE MUST HAVE A RMS OF 125.						07-26-06			

RT Map of High Stress Region



**Figure 1 High Stress Region Identification for Type-A MCWF**

Densitometer S/N 12105	Cal Date 7/26/06
---------------------------	---------------------

Client Major Tool & Machine		Interpreter: Level Robert Weaver/II		Radiographer Robert Weaver		Job No 13860001	P.O. No N/A	Date 7/26/06		
Isotope/X-Ray IR 192	Dia X Len/KV .118" x .094"	Curies/MA 32	Focal Spot Size .151"	SFD 15"	SOD 14.25"	Time 2:00	Film Processing Auto	Film Type / 1 or 2 2	PB Screens .010"	Film Technique Double MFG/Speed Kodak AA
Weld Process / Heat Number N/A		Material Spec 316 SST	Material Diameter N/A	Material Thickness .75"	Penetrameter ASTM IB	Shim N/A	Acceptance Standard No defect > .080"			

Description: 65109/3.0/1/134/818  
SE 141-114 rev. 7 page 1 of 2

Density Readings through IQIs & Area of Interest: 2.0-4.0

Remarks: Refer to Film Identification for Special Requirement for ASME Sec XI

FITTING SEAM OR FITTING	FILM INTERVAL NUMBER	WELDER IDENTIFICATION	PENETRAMEETER		SLAG	POROSITY	POROSITY WITH TAIL	CRACK	LACK OF PEN	LACK FUSION	INTERNAL CONVEXITY	INTERNAL CONCAVITY	TUNGSTEN	MELT-THROUGH	BURN-THROUGH	CRATER/PIT	OXIDATION	INTERNAL UNDERCUT	EXTERNAL UNDERCUT	ALIGNED INDICATIONS	WELD CONTOUR	MIS-MATCH	FILM ARTIFACT	VISUAL CONCERNS	FILM DENSITY	SEE REMARKS	ACCEPT	REJECT		
			SIZE	QUALITY LEVEL																										
Trans	41-45	N/A	IB	.016"																										
	45-48					✓																				✓				
	48-65					✓																				✓				

End View | Side View

**SINGLE WALL**

**DOUBLE WALL**

Penetrometer  
 Shim  
 Location Marker  
 OTHER

Robert Weaver 655514/II  
TEAM Technician Signature

David P. Edwards  
Customer Representative Signature

7/26/06  
Date



Major

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INSPECTION DATA CHECKLIST

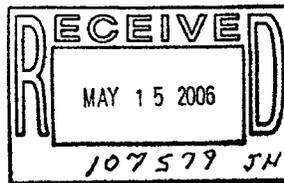
Quality Assurance Documentation for Part ID: SE141-114 - Item: 17

Workorder: 65709/3-0 Sub:1 Op:136

Part: SE141-114 - MODULAR COIL WINDING FORM TYPE-A - PRODUCTION MODULAR COIL WINDING FORM TYPE-A

Drawing ID: SE141-114 Rev: 7			INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY			
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT	
*		D A T U M - E - S I D E MAG PERMEABILITY TO BE NO GREATER THAN 1.02μ. CHECK 3 PLACES ADJACENT TO EVERY 5TH HOLE IN T SECTION.	MASTER GAGE	QA		J-1165	< 1.02	495-D.C			A
(10)								07-26-06			
*		D A T U M - D - S I D E MAG PERMEABILITY TO BE NO GREATER THAN 1.02μ. CHECK 3 PLACES ADJACENT TO EVERY 5TH HOLE IN T SECTION.	MASTER GAGE	QA		J-1165	<1.02	495-D.C			A
(20)								07-26-06			

<b>SOUTH TEXAS BOLT &amp; FITTING, INC</b> 4845 HOMESTEAD RD #500 HOUSTON TEXAS 77028 PH # 713 673 5376 FAX# 713 673 5379	<b>* MATERIAL TEST REPORT *</b> Date 05 17 2006																																																																		
<b>SOLD TO</b> Major Tool & Machine INC 1458 East 19th Street Indianapolis IN 46218	Customer P/O # P06 01393  STBF Order # 81140																																																																		
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SOUTH TEXAS BOLT & FITTING  Lance Byrns Quality Coordinator																																																																			



*Line 1-5*



**SOUTH TEXAS BOLT & FITTING, INC.**  
 4845 HOMESTEAD RD, #500  
 HOUSTON, TEXAS 77028  
 PH # 713-673-5376  
 FAX# 713-673-5379

**\* MATERIAL TEST REPORT \***  
 Date: 05-22-2006

**SOLD TO:** Major Tool & Machine, Inc.  
 1458 East 19th Street  
 Indianapolis, IN 46218

**Customer P/O #** P06-01394  
**STBF Order #** 81140-1A

ITEM	QTY	DESCRIPTION	LOT / HEAT
1	40	1 3/8-6 660B 12-Point Hex Nut Silver Plated Per AMS 2410	xfq / 5407813

**Chemical Properties**

C	Mn	P	S	Si	Ni	Cr	Mo
.034	1.50	.007	.0016	.54	25.00	14.70	1.22
Cu	Co	V	Al	Ti	B	Pb	
.06	.05	.26	.27	2.25	.0074	.0001	

**Mechanical Properties**

Tensile	Yield	Elong	RA	Hardness	Temperature	Macro
160000	109000	27.60	43.10	319hr	720°C	Pass

Remarks: ASTM A453

**Certificate of Conformance**

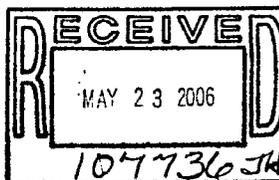
This is to certify that the material purchased on this order was made in accordance with, and to conform to, the specifications and descriptions required by the American Society for Testing Materials (ASTM) and the American Society of Mechanical Engineers (ASME).

**SOUTH TEXAS BOLT & FITTING**

Lance Byrns  
 Quality Coordinator



MAY 23 2006



lines 2-4



INSPECTION DATA CHECKLIST

Quality Assurance Documentation for Part ID: SE141-141 - Item: 20

Workorder: 65709/3-0 Sub:13 Op:30

Part: SE141-141 - BEARING PLATE DETAIL TYPE "A" SHORT -

Drawing ID: SE141-141 Rev: 1			INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY		
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT
1*	G2	RECORD MAGNETIC PERMEABILITY. RESULTS TO BE NO GREATER THAN 1.02μ.	MASTER GAGE	QA		J-1165	ACCEPT	533-B.C		
(10)										06-21-06

A



Major

Tool & Machine, Inc.

INSPECTION DATA CHECKLIST

Quality Assurance Documentation for Part ID: SE141-142 - Item: 21

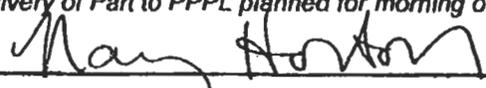
Workorder: 65709/3-0 Sub:14 Op:30

Part: SE141-142 - BEARING PLATE DETAIL TYPE "A" LONG -

Drawing ID: SE141-142 Rev: 1		INSPECTION INSTRUCTIONS			RESULTS		INSPECTED BY			
SHEET	ZONE	CHARACTERISTIC	GAGE/EQUIP	BY	SAMPLE	SER#	DATA/REMARKS	INSP	VERFD	AUDIT
1*	G2	RECORD MAGNETIC PERMEABILITY. RESULTS TO BE NO GREATER THAN 1.02μ.	MASTER GAGE	QA		J-1165	LESS THAN 1.02	503-B.H		
(10)										

Employees: 242-M.Griffith / 339-E.Root / 495-D.Coffman / 503-B.Houk / 533-B.Clevenger / 825-B.Jarrett

**PRINCETON UNIVERSITY  
PLASMA PHYSIC LABORATORY -- PPPL**

PRODUCT CERTIFICATION AND SHIPPING RELEASE					
<b>PROJECT</b> PPPL - NCSX Modular Coil Winding Form	<b>ITEM DESCRIPTION</b> A-1 Modular Coil Winding Form			<b>SHIPMENT NUMBER</b> 8	
<b>PPPL SUBCONTRACT/ ORDER NO.</b> S005242-F	<b>REV.</b> Amend #14	<b>ITEM NO.</b> A-3	<b>SUPPLIER REFERENCE NO.</b> PPPL -FP-LTS-3 with Major Tool & Machine	<b>REV.</b> Amend # 9	<b>QUANTITY SHIPPED</b> 1
<b>SUPPLIER'S CERTIFICATION</b>					
<p>This is to certify that the products and services identified herein have been produced under a controlled quality assurance program and are in conformance with the procurement requirements including applicable codes, standards and specifications as identified in the above-referenced documents unless noted below. Any supporting documentation will be retained in accordance with the procurement requirements.</p> <p><i>Per agreement with PPPL, authorization for shipping release is granted prior to grinding of an as-cast surface and other outstanding items set forth below, as well as completion of documentation package. Delivery of Part to PPPL planned for morning of 31 July '06.</i></p>					
SIGNED: 			DATE: 7/27/06		
TITLE: <u>EIO Program Manager for NCSX</u> COMPANY: <u>Energy Industries of Ohio</u>					
<b>PPPL (AUTHORIZED REPRESENTATIVE) SHIPPING RELEASE</b>					
<p>This is to certify that evidence supporting the above Supplier's Certification statement has been audited and no product/service nonconformances from procurement requirements have been found unless noted below. This product/service is hereby released for shipment.</p> <p>This section serves as the Quality Assurance release for the above described product for shipment. It does not constitute an acceptance thereof and does not relieve the Vendor, Manufacturer or Contractor of any and all responsibility or obligation imposed by the purchase contract. It does not waive any rights the Purchaser may have under the purchase contract, including the Purchaser's right to reject the above described material upon discovery of any deviations from requirements of the purchase contract, drawings and specifications.</p>					
<b>NONCONFORMANCES FROM PROCUREMENT QUALITY REQUIREMENTS:</b>					
<p>As documented on approved Metal Tek Corrective Action Reports, including CA1347 and CA1536, as well as approved Nonconformance NC20166 from Major Tool. In addition, the following NC's, which have been approved by PPPL will remain open pending completion of the corrective actions:</p> <ul style="list-style-type: none"> <li>• NC20124 Rev 1 for oversized hole, to be corrected with an insulating bushing (to be delivered with the casting)</li> <li>• NC 20201 for Rejections on the IDC, which will remain open pending grinding at Major Tool prior to shipment, on the Outer As-Cast Surface, E-side Pocket (Sheet 1 Line Item 130 on page 2 of the IDC).</li> </ul>					
<b>REMARKS/PRODUCT SERIAL NUMBERS:</b>					
Release with open NC action as documented above.					
<b>BY PPPL QA REPRESENTATIVE (Or Designee)</b>				<b>DATE</b>	
F. Malinowski				Digitally signed by F. Malinowski Date: 2006.07.27 16:45:06 -04'00'	

# **Part 4 - Appendix**

**10/11/06**



## Carondelet Division

8600 Commercial Blvd. • Pevely, MO 63070 USA

Phone: 636-475-2199 • Fax: 636-479-3399

E-Mail: Charles.Ruud@MetalTek.com

Corrective Action 1347  
Carondelet Division - CA / PA / RGA Database  
Corrective Action Type NCR  
Date 8/1/2005 Revised 1-31-06  
CA Originator C. Ruud  
Applies to: A-1Coil

### Description of Defect / Non-Conformance

Wall thickness below model minimum. Localized areas were measured below the 1.375" minimum wall thickness during metrology. MetalTek independently verified wall thickness and confirmed condition.

### Root Cause

The tooling produces a casting with a wall thickness less than required by the model. Measurements taken on A-3, A-4 and A-5 are consistent and lower than predicted by the model. Material losses during normal processing and heat treat with A-1 and A-2 are also a factor.

### Corrective Action

Request "Use As Is" disposition on wall thickness related dimensions on A-1 coil.

### Verification of Corrective Action

Not required. PPPL independently verified in conjunction with ORNL the design performance at a wall thickness of 1.05". Results were deemed adequate. Minimum measured dimension is 1.18" (to be verified). **Scans of A-2 and 3 coils shows that the walls are above the 1.18" minimum dimension in all but a few isolated locations. The areas were identified and repaired by approved welding procedures.**

### Preventive Action

Several steps need to be taken to resolve and propose:

1. Validation of 3D Scanco data. MetalTek proposes to use Romer Arm with Laser scanner as validation technique. This instrument will be used to validate subsequent parts and minimizes measurement technique error.  
- Completed - The data provided by 3D Scanco has been validated on A1.
2. Report to PPPL/ORNL. Understanding the concern that the wall not be thinner than measured and the limitations of the process, e.g. setting a large core into a mold with overhead crane, MetalTek will submit layout results to EIO wand set teleconference to review remediations to tool.  
- It was determined to produce A2 with no tooling changes.

3. Upon verification of 3D Scanco data, MetalTek will confirm results to EIO team to begin root cause determination. Additional layout may be required to assure compliance of tooling, depending on results of layout.
  - Transfer caliper dimensions were taken on A-2 and A-3 at pre-clean step and shown to exceed required minimum wall thickness. **However scans performed using Romer Arm on A-2 and A-3 indicated dimensions consistent with A-1.**
4. Modification to tooling. Limited tooling modifications may be performed without severely impacting schedule or negating previous engineering (solidification modeling, etc.). These will be evaluated and proposed, where appropriate.
  - No tooling changes have been made.
5. Permanent deviation. Based on results of above, a permanent deviation may be required to dimensional tolerances in limited areas of the component. These will be known in greater detail later.

**Actual Completion Date**

All items complete, except a deviation.

Signed: C. Ruud



CC: Roger Broman, Barry Craig, Joe Edwards, E.J. Kubick, J. Markham

## NCSX Disposition to CA 1347

Analyses were performed to determine the effect of the thin section on deflections and stresses and are summarized below.

- Thin shell areas like that of A1 **has an extremely minor affect on the stresses and displacements in ANY of the coils or shells** with the thickness being either 1.18" as for A1 or even with the thickness being 1.05" which MTK projects is the minimum if the shell is not changed. Reasons:
  - a) The shape of the tee is not changed by this, and the tee provides most of the bending stiffness
  - b) Some EM forces are transferred to the shell B from the wing.
  - c) The thin wall region is not the location for the peak stress and much of the area will be machined away.

Run #	Configuration	Shell Type A		Coil Type A		All Coils	
		Max.	Max.	Max.	Max.	Max.	Max.
		Displacement - mm	Stress - Mpa	Displacement - mm	Stress - Mpa	Displacement - mm	Stress - Mpa
1	Baseline	0.98	168	1.246	239	2.711	239
5	Updated E	1.17	160	1.513	248	2.934	248
6	Updated E; thin sect. =1.18"	1.169	161	1.516	249	2.984	249
4	Updated E; thin sect. =1.05"	1.168	161	1.517	248	2.971	248

Since the effect has been shown to be extremely minor, the disposition for the A1 winding form is **Accept As Is**.

**However, since the root cause determination is still underway, this NCR should be kept open. It is requested that EIO re-issue an amended CA with the root cause determination and preventive action; PPPL will disposition that portion of the NCR at that time.**

**Approved:**

Phil Heitzenroeder  
2005.08.19 14:10:46 -04'00'

**P. Heitzenroeder, Tech. Rep.**

**Brad Nelson**

Digitally signed by Brad Nelson  
DN: cn=Brad Nelson, c=US,  
o=ORNL, ou=FED,  
email=nelsonbe@ornl.gov  
Date: 2005.08.19 16:56:28 -04'00'

**B. Nelson, RLM**