Energy Industries of Ohio

Contract # S005242-F

Modular Coil Winding Form

A-5 Documentation Package

11/6/06

This A-5 Documentation consists of:

Part 1

Final documentation package Metal Tek Intl. – Pages 3 – 62
Latest revision 11/6/2006
Foundry documentation

Part 2

Final documentation package Major Tool - Pages 63 -
Latest revision
Machine shop documentation

Part 3

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

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

Energy Industries of Ohio

Contract # S005242-F

Modular Coil Winding Forms

A-5 Documentation Package

Part 1 – Metal Tek International
Casting Data Package

11/6/06

**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-5 Documentation Package

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11/6/06		

MetalTek INTERNATIONAL

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-A5 Coil
CAF Metal Designation CF8MNMnMod
Material Spec CF8MNMnMOD

Cert Number 176200-1
Pour Date 1/13/2006

Weighted average of 3 heats – Ladle 1 #32126 (39%), Ladle 2 #32127 (22%),Ladle 3 #32130 (39%) Total Weight 32599 lbs.

Element	Min	Actual	Max
C	0.04	0.04	0.07
MN	2.3	2.8	2.8
SI	0.0	0.3	0.7
CR	18.0	18.0	18.5
NI	13.0	13.0	13.5
MO	2.1	2.2	2.5
P	0.0	0.033	0.035
S	0.0	0.013	0.025
N	0.24	0.25	0.28

*Over specification, see CA 1536.

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	32126	Button #1	0.04	0.3	2.6	17.9	13.0	2.2	0.25	0.027	0.012
CAF	32126	Button #2	**	0.3	2.6	18.0	13.2	2.2	**	0.027	0.012
WC	32126	Button #2	**	0.3	2.4	17.9	13.2	2.2	**	0.027	0.018
	Ladle #2										
CAF	32127	Button #1	0.04	0.3	2.9	18.0	13.0	2.1	0.25	0.031	0.014
CAF	32127	Button #2	**	0.4	2.8	18.1	13.2	2.2	**	0.031	0.012
WC	32127	Button #2	**	0.4	2.6	17.8	13.1	2.2	**	0.031	0.024
	Ladle #3										
CAF	32130	Button #1	0.04	0.4	2.9	18.1	13.0	2.2	0.24	0.040	0.014
CAF	32130	Button #2	**	0.4	2.9	18.1	13.2	2.2	**	0.034	0.012
WC	32130	Button #2	**	0.4	2.7	17.7	13.2	2.2	**	0.033	0.027

Respectfully Submitted,
Charles A. Ruud
Quality Assurance Manager

Superior Quality Engineered Metal Products

MetalTek INTERNATIONAL

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	Heat Number 29198	Pour Date4/28/2005
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	S/N 5	
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 Class.	LNM 4455 EN 12072-99: G 20 16 3 Mn L	Size(s) mm Lot/Batch Item No.	1,2 3018513/78308 692129
Customer	EUROWELD MOORESVILLE N.C. 28117 UNITED STATES	Quantity Customer ref. LSW Order No.	105,0 KG P.O. 05 -46 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

Cond.	Temp. °C	Rp0.2 N/mm2	Rm N/mm2	A5 %
AW	RT	407	623	41

Impact testing

Cond.	Temp.1 °C	Av1 J
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	Issued by	Function	Date	Cert.No.
Lincoln Smitweld B.V.	P. Nagels	QA Administrator	22/03/2005	3018513/7830

Registered Office
Nieuwe Dukenburgseweg 20
6534 AD NIJMEGEN

Post address
P.O. Box 253
6500 AG Nijmegen

Telephone: 31 24 3522911
Fax: 31 24 3522200

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2810 Clark Avenue • St. Louis, MO 63103-2574 • (314) 531-8080 • FAX (314) 531-8085

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

METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

August 16, 2005
Lab No. 05P-2532
P.O. No. 21324

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
Average	103	0.087	100

Identification of tested specimen provided by client.

Karl Schmitz, Director
Materials Testing

KS/tlv

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METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

August 16, 2005
Lab No. 05P-2532
P.O. No. 21324

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) in.	Elongation (2.0" Gage Length) %	Modules of Elasticity
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.

Karl Schmitz, Director
Materials Testing

KS/tlv

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METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

October 5, 2005
Lab No. 05P-3096
P.O. No. 21324

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): WELD PLATE- 3018513 / 78308

SPECIFICATION: ASTM A 370-03a

SPECIMEN TYPE: "A" Vee Notch

SPECIMEN SIZE: 10 mm x 10 mm

TEMPERATURE OF TEST: -320°F

REQUIREMENTS: minimum 35 ft / lbs.

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
3018513/78308-1	48	0.033	50
3018513/78308-2	65	0.045	50
3018513/78308-3	48	0.033	50
Average	54	0.037	50

Identification of tested specimen provided by client.

Karl Schmitz, Director
Materials Testing

KS/tlv

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

ACCREDITED
621-01 & 621-02

Accredited Nadcap Materials Testing Laboratory

October 18, 2005

CERTIFICATION

Section 1 of 1
WMT&R Report No. 5-35979
Requisition No. 4972

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.
DISPOSITION: Report
MATERIAL: METALTEK CF8MNMNMOD

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\U\R
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

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

Roy E. Starr/Matt Wojton
Technical Services Manager____ Tensile Supervisor

10-18-05
October 18, 2005

7

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

ACCREDITED
621-01 & 621-02

Accredited Nadcap Materials Testing Laboratory

March 29, 2006

CERTIFICATION

Section 1 of 1

WMT&R Report No. 6-26364
P.O. No. 19386
Requisition No. 7592

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: 316 S/S

DISPOSITION: Acceptable

Coil No.	Specimen	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\U\R
A5	Z1	D36087	-320	165.9	103.1	37	23	27.4	15780	9809	0.3480	0.3048	1.40	1.92	0.09511486	M9	A
A5	Z2	D36088	-320	164.8	98.9	59	58	26.5	15660	9400	0.3478	0.2263	1.40	2.23	0.09500556	M9	A
A5	Z3	D36089	-320	164.9	100.9	50	49	25.3	15790	9661	0.3492	0.2494	1.40	2.10	0.09577195	M9	A

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

Roy E. Starr\Matt Wolton
Technical Services Manager\ Tensile Supervisor

3-29-06
March 29, 2006

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METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

February 9, 2006
Lab No. 06P-0404
P.O. No. 21324

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): A5 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 min

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-1	69	0.045	50
Z1-2	88	0.049	50
Z1-3	65	0.033	40
Average	74	0.042	47
SAMPLE ID	**FOOT LBS.**	**LATERAL EXPANSION**	**% SHEAR**
Z2-1	77	0.047	50
Z2-2	78	0.032	50
Z2-3	57	0.025	30
Average	71	0.035	43
SAMPLE ID	**FOOT LBS.**	**LATERAL EXPANSION**	**% SHEAR**
Z3-1	67	0.036	30
Z3-2	66	0.036	30
Z3-3	66	0.037	30
Average	66	0.036	30

2030 S C

2/9/06

Identification of tested specimen provided by client.

Karl Schmitz, Director
Materials Testing

KS/tlv

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

MEMBER ACIL

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METALTEK INTERNATIONAL
8600 Commercial Blvd.
Pevely, MO 63070

February 9, 2006
Lab No. 06P-0404
P.O. No. 21324

Attention: Chuck Ruud

REPORT OF CHARPY IMPACT TEST

MATERIAL (SAMPLE ID): A5 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
Z1-4	158	0.088	100
Z1-5	126	0.080	100
Z1-6	146	0.087	100
Average	143	0.085	100
SAMPLE ID	**FOOT LBS.**	**LATERAL EXPANSION**	**% SHEAR**
Z2-4	144	0.054	70
Z2-5	134	0.085	90
Z2-6	166	0.067	50
Average	148	0.069	70
SAMPLE ID	**FOOT LBS.**	**LATERAL EXPANSION**	**% SHEAR**
Z3-4	142	0.087	100
Z3-5	142	0.074	90
Z3-6	160	0.062	80
Average	148	0.074	90

2/9/06

Identification of tested specimen provided by client.

Karl Schmitz, Director
Materials Testing

KS/tlv

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

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8600 Commercial Blvd.
Pevely, MO 63070

February 9, 2006
Lab No. 06P-0404
P.O. No. 21324

Attention: Chuck Ruud

REPORT OF MECHANICAL TESTS

SAMPLE ID: A5 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.	Elongation (2.0" Gage Length) %
Z1	0.1886	0.1152	38.9	22.9	42200	81100	1.04	52.0
Z2	0.1917	0.0683	64.3	23.8	42300	83500	1.09	54.5
Z3	0.1901	0.1238	34.9	22.7	42600	82100	0.89	44.5

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.

Karl Schmitz, Director
Materials Testing

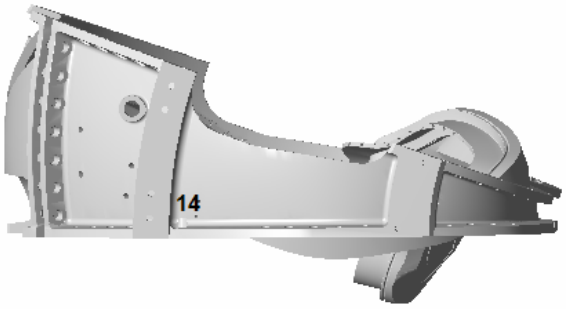
KS/tlv

A-5 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10^2 inches

Defect Number	Drawing View	Length (inches)	Width (inches)	Depth (inches)
1	Right	5 ½	3	Thru
2	Right	7 ½	5	Thru
3	Right	4 ¼	4	1 ⅛
4	Right	13	5	1 ½
5	Right	7	2 ½	1 ¼
6	Right	2	2	1 ¼
7	Right	6	4	1
8	Right	17	3 ½	2 ½
9	Right	7	5	1 ⅛
10	Bottom	3	3	2 ½
11	Back	2	2	1 ½
12	Back	4	2	1 ½
13	Back	9 ½	2	1
14	Top	2	2	1
15	Left	6	5 ½	3

Top View

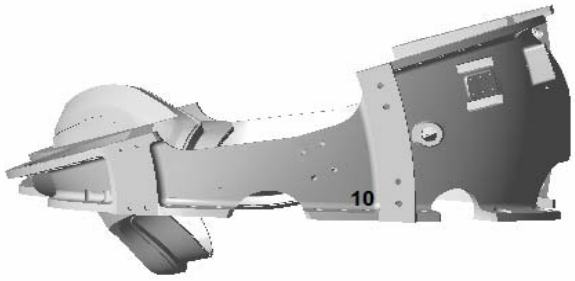


A-5 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10^2 inches

Right View

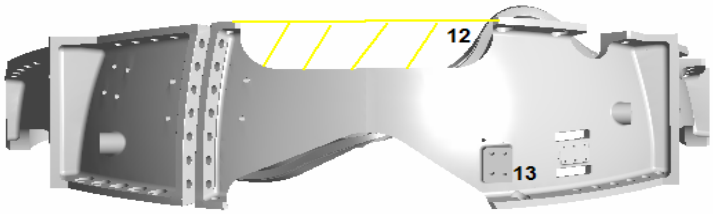
Bottom View



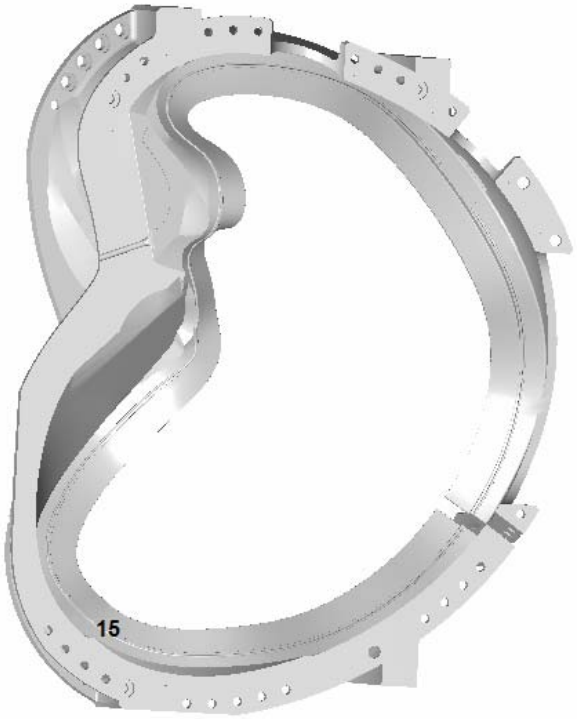
A-5 Coil Weld Map – Metal Tek

Map of all major welds exceeding 20% of wall, over 1 inch or over 10^2 inches

Back View



Left View



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 02/07/2006

WORK ORDER NO. 361-02844

P.O. NUMBER Chuck Rudd

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Dross Inclusion	Dross or Slag	Incomplete Penetration: Porosity	Lack of Fusion	Shrinkage: Gas Cracks	Hot Tears	Under cut	Film Artifacts: Surface	REMARKS
MCWFA-5		1-2	✓										
		2-3	✓										
Z103990		3-4	✓										
HT# M176200		4-5	✓										
CO 40851		5-6		R					4				
		6-7		R					4				
		7-8	✓						2				
		8-9	✓										
		9-10	✓										
		10-11	✓									✓	
		11-12	✓		3								
		12-13	✓										
		13-14	✓										
		V15	✓									✓	
		16-17	✓										
		17-18	✓										
		18-19	✓									✓	
		19-20	✓									✓	
		20-21	✓									✓	
		21-22	✓										
		22-23	✓									✓	
		23-24		R						R			
		24-25		R						R			
		2526	✓										

NO. ACCEPTED Ø NO. REJECTED 1

MQS TECH. NO. 12970 SHT. REV.

CUST. RSS NO. SHT. REV.

COMMENTS

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 02/07/2006

WORK ORDER NO. 361-02844

P.O. NUMBER Chuck Rudd

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Inclusion	Dross or Slag	Porosity	Incomplete Penetration: Lack of Fusion	Gas	Cracks	Shrinkage: Hot Tears	Under cut	Surface	Film Artifacts	REMARKS
MCWFA-5		26-27	✓											✓	
		27-28	✓												
Z103990		28-29	✓											✓	
HT# M176200		29-1	✓												
CO 40851															

NO. ACCEPTED 0 NO. REJECTED 1

COMMENTS

MQS TECH. NO. 12970 SHT. REV.

CUST. RSS NO. SHT. REV.

REVIEWER John Petroske

CERTIFIED NDT LEVEL (RT)

John Petroske RT II Exp. 01/08

TEAM COOPERHEAT-MQS, INC.

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PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Inclusion	Dross or Slag	Porosity	Incomplete Penetration: Lack of Fusion	Gas	Cracks	Shrinkage: Hot Tears	Under cut	Film Artifacts: Surface		REMARKS
MCWFA-5		30-31	✓										✓		
		31-32		R							R		✓		
Z103990		32-33		R							R				
HT# M176200		33-34		R							R				
CO 40851		34-35	✓												
		35-36		R							R				
		37-38		R							R				
		38-39	✓												
		39-40	✓												
		41-42	✓												
		43-44	✓												
		44-45	✓												
		45-46	✓										✓		
		46-47	✓												
		47-48	✓												
		48-49	✓												
		50-51	✓												
		51-52	✓												
		52-53		R							R				
		54-55	✓												
		55-56	✓										✓		
		57-58	✓												
	58	58A-59	✓												
		59-60	✓												
		60-61	✓										✓		

NO. ACCEPTED 0 NO. REJECTED 1

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CUST. RSS NO. SHT. REV.

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CITY PEVELY STATE MO ZIP 63070

DATE 02/07/2006

P.O. NUMBER Chuck Rudd

WORK ORDER NO. 361-02844

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Dross Inclusion	Dross or Slag	Incomplete Penetration: Porosity	Lack of Fusion	Gas	Shrinkage: Cracks	Hot Tears	Under cut	Film Artifacts: Surface		REMARKS
MCWFA-5		G1-62	✓										✓		
		62-63		R							R				
Z103990	62#-63A			R							R				
HT# M176200		63-64		R						4					
CO 40851		64-65		R						4			✓		
	C5-C5A-66			R							R				
		66-67	✓							2			✓		
		67-68	✓						2				✓		
		68-69	✓										✓	✓	
		69-70		R						4					
		70-71		R						4	R				
		71-72		R					2	4					
		72-73	✓							*					See 71-72
		73-74	✓												
		74-75	✓												
		75-76	✓												
		76-77		R						4					
		77-78	✓												
		78-79	✓											✓	
		79-80	✓												
		80-81	✓							3					
		81-82	✓							1				✓	
		82-83	✓							1			✓		
		84-85	✓												
		85-86	✓												

NO. ACCEPTED Ø NO. REJECTED 1

MQS TECH. NO. 12970 SHT. REV.

CUST. RSS NO. SHT. REV.

COMMENTS

REVIEWER John Petroske

CERTIFIED NDT LEVEL (RT)

John Petroske RT II Exp. 01/08

TEAM COOPERHEAT-MQS, INC.

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CITY PEVELY STATE MO ZIP 63070

DATE 02/07/2006

WORK ORDER NO. 361-02844

P.O. NUMBER Chuck Rudd

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Incomplete Penetration: Inclusion	Dross or Slag	Porosity	Lack of Fusion	Gas	Shrinkage: Cracks	Hot Tears	Under cut	Surface	Film Artifacts	REMARKS
MCWFA-5		86-87	✓												
		87-88A	✓												
Z103990		88-89		R							R				
HT# M176200		89-90	✓											✓	
CO 40851		90-91	✓						2						
		92-93	✓							1					
		94-95	✓						-	2					
		95-96	✓						2	2-3					
		96-97	✓							1					
		97-98		R						4					
		98-99	✓							2-3					
		99-100		R						4					
	100-101		✓												
	102-103		✓							1					
	103-104		✓							2					
	104-105			R						4					
	106-107		✓												
	107-108		✓												
	108-109		✓							2					
	109-110		✓							1					
	111-112		✓							2					
	112-113		✓										✓		
	113-114		✓												
	115-116		✓												
	116-117		✓												

NO. ACCEPTED 6 NO. REJECTED 1

COMMENTS

MQS TECH. NO. 12970 SHT. REV.

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

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CUSTOMER

NAME METAL TEK INTERNATIONAL

ADDRESS 8600 COMMERCIAL BLVD

CITY PEVELY STATE MO ZIP 63070

DATE 02/07/2006

WORK ORDER NO. 361-02844

P.O. NUMBER Chuck Rudd

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Accep-table	Reje-cted	Incomplete Penetration: Inclu-sion	Dross or Slag	Por-osity	Lack of Fusion	Shrinkage: Gas	Cracks	Hot Tears	Under cut	Film Artifacts: Sur-face		REMARKS
MCWFA-5	118-119		✓												
	119-120		✓											✓	
Z103990	121-122		✓												
HT# M176200	122-123		✓												
CO 40851	123-124		✓												
	124-125		✓												
	125-126			R							R				
	126-127		✓		2										
	127-128		✓												
	128-129		✓										✓		
	130-131		✓												
	131-132		✓												
		V133	✓												
		V134	✓												

NO. ACCEPTED 14 NO. REJECTED 1

COMMENTS

MQS TECH. NO. 12970 SHT. REV.

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

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CUSTOMER

NAME METAL TEK INTERNATIONAL

ADDRESS 8600 COMMERCIAL BLVD

CITY PEVELY STATE MO ZIP 63070

DATE 03/10/06

P.O. NUMBER 23335

WORK ORDER NO. 361-03019

XRAY X

GAMMA

PROCEDURE SPECIFICATION ASTM E94-93

ACCEPTANCE CRITERIA MSS-SP-54-1999

SHEET ____ OF ____

PART NUMBER	Serial No	View	No Apparent Indications: Acceptable	Rejected	Dross or Slag Inclusion	Incomplete Penetration: Porosity	Lack of Fusion	Shrinkage: Gas	Cracks	Hot Tears	Undercut	Film Artifacts: Surface		REMARKS
MCWF-A5	R1	5-6	✓											
		6-7	✓					2-3						
E.I.O. C040851		23-24	✓									✓	✓	
		24-25	✓											
M176200		31-32	✓											
		32-33	✓										✓	
Z103990		33-34	✓										✓	
		35-36	✓											
		37-38	✓											
		52-53		R						R				
		62-63	✓										✓	
	62A	-63A	✓											
		63-64		R						4				
		64-65		R						4*				See 63-64
	65-	65A-66	✓											
		69-70	✓							2				
		70-71		R						2	R			
		71-72	✓					1		1				
		76-77	✓							1				
		88-89	✓							2				
		97-98	✓							1				
		99-100	✓					1						
	104-	105	✓							2				
	125-	126	✓											

NO. ACCEPTED 0 NO. REJECTED 1

COMMENTS

MQS TECH. NO. 13043 SHT. REV. 1

CUST. RSS NO. SHT. REV.

REVIEWER

CERTIFIED NDT LEVEL (RT)

J Petrotte RT II

MetalTek INTERNATIONAL

RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER	PURCHASE ORDER NUMBER	DATE	CONTROL NO.	PAGE
Energy Ind. of Ohio	PPPL-FP-LTS-2	3-13-06	4065 1	1 of 1

PART NO.	SPECIFICATION	CLASS	TOTAL PIECES	PIECES ACCEPTED
MCWFA-5	E446/E186/~~E280~~ Om	See spec	1	1

RADIOGRAPHED BY:	INTERPRETED BY:	ASNT LEVEL
Midgett/Rippergen	Midgett	II

FILM TYPE	MATERIAL	ISOTOPE	CODE
29 F9/80	CF8MNWN mod	IRIDIUM 192 COBALT 60 ✓	ASTM E94 ✓ ASME MIL-STD-453

	VIEW	PENE	ACCEPT	REJECT	SHRINK	INCLUSION	POROSITY	LINEAR	SURFACE	LOF/LOP	COMMENTS
M176200-3 MCWFA-5											
	52-53	50		X				X			
R2	63-64	30 80 50	✓			2			✓		
	64-65	30	✓						✓		
	70-71	30 60 80	✓		3	2	Om 21		✓		
R3	~~52-53~~ ~~30 50~~ ~~80~~ Om			X				X			
R4	52-53	50	✓				1		✓		

Metal Tek INTERNATIONAL

RADIOGRAPHIC STANDARD SHOOTING SKETCH

Customer Energy Ind. OF OHio	Pattern Number WCWFA-5
Material CF8MNMN mod	Traceability Number
Film Manufactuer Fuji	Source Number 21.7 ci COGO
IQI LEVEL 2-2T From CQP 401 X Other (Specify, E.G. 2-4T, 2-1T) N/A	

Exposures (views)	52-53	63-64	64-65	70-71								
Thickness (IN.)	2 3/4"	1.5-4"	1 1/2"	1.5-4"								
S/F Distance (IN.)	20"	→	→	24"								
Penetrameter	50	30X2 50/80	30X2	30X2 60/80								
Time (MIN.)	17m	28m	13m	45m								
Focal Spot (IN.)	.1	→	→	→								
Film Size (IN.)	14X17	→	→	→								
Screen Size (Pb) Front/Back	.01	→	→	→								
S.W.E./D.W.E.	SWE	→	→	→								
S.W.V/D.W.V.	SWV	→	→	→								
Film Type	59/80	29X2 59/80	29/59	29 80/59								
Acceptance Standard	see	spec										
Severity Level	See	spec										

Shooting Sketch (Use Additional Pages as Needed)

See original Drawing for view placement

Technique Prepared By: Doug Midgett Level: II Date: 3-13-06

Technique Approved By: _____ Level: _____ Date: _____

MetalTek INTERNATIONAL

RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER	PURCHASE ORDER NUMBER	DATE	CONTROL NO.	PAGE
Energy Industries of OHIO	PPL-FP-LTS-2	12-16-05	40851	1 of 1

PART NO.	SPECIFICATION	CLASS	TOTAL PIECES	PIECES ACCEPTED
SE-141-033-5	E 186	III	1	1

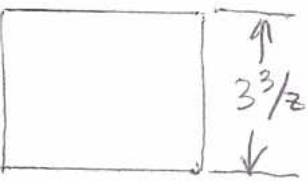
RADIOGRAPHED BY:	INTERPRETED BY:	ASNT LEVEL
Midgett	Midgett	II

FILM TYPE	MATERIAL	ISOTOPE	CODE
60	CF8MN MN MOD	IRIDIUM 192 COBALT 60 ✓	ASTM E94 ✓ ASME MIL-STD-453

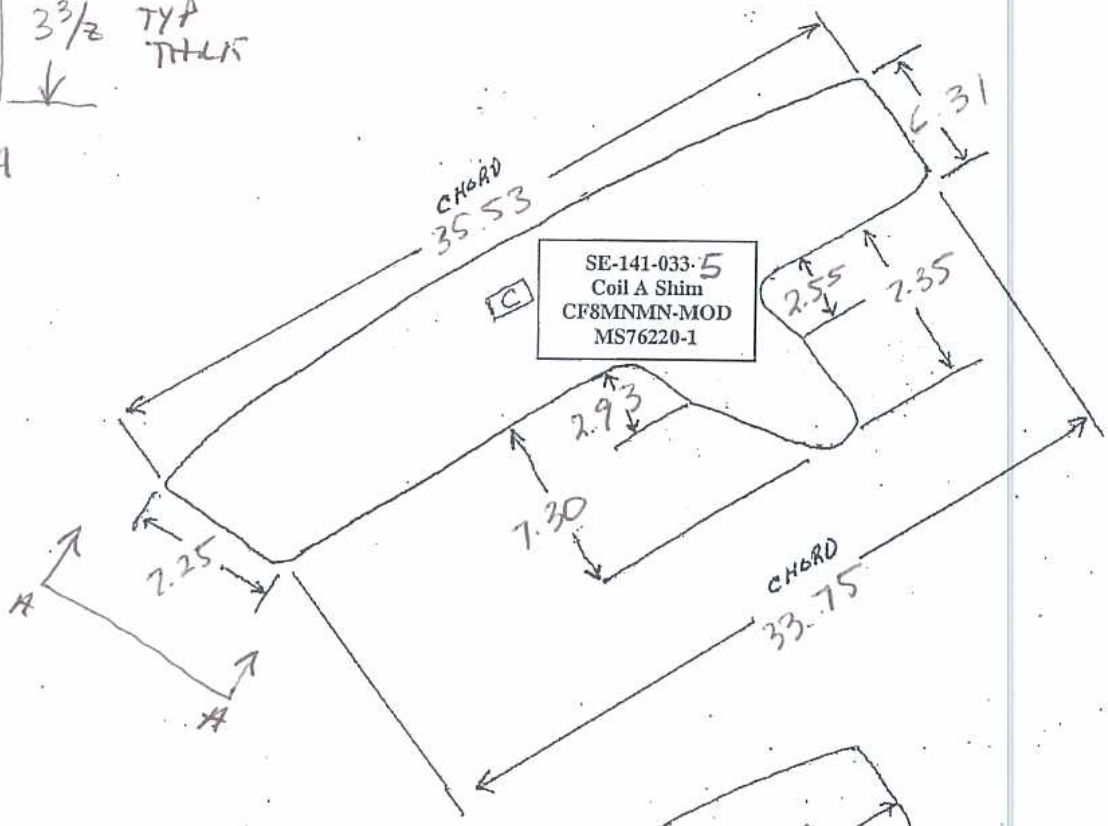
	VIEW	PENE	ACCEPT	REJECT	SHRINK	INCLUSION	POROSITY	LINEAR	SURFACE	LOF/LOP	COMMENTS
M576220											
RT-5	A	50	/						/		
	B	|	/						/		
	C	|	/						/		
	D	6	/								

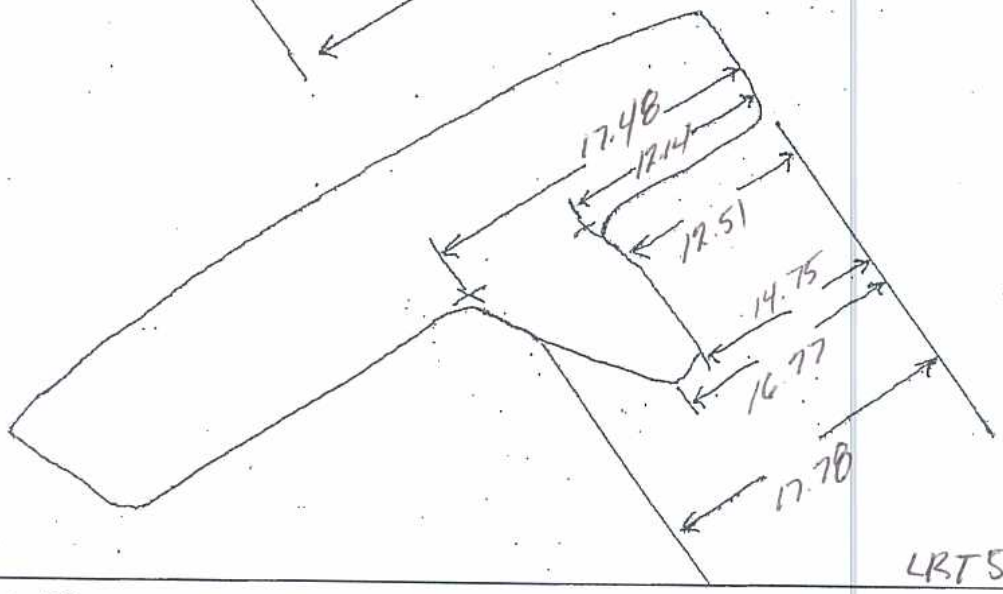
S:DRIVE/MANUAL FORMS/RADIOGRAPHY
RIR-01 REV. 0 6/9/03

FORM CC034



SECT A-A





LRT 5

Inspected By: Date Inspected: 3-8-06

E10 1-22-06

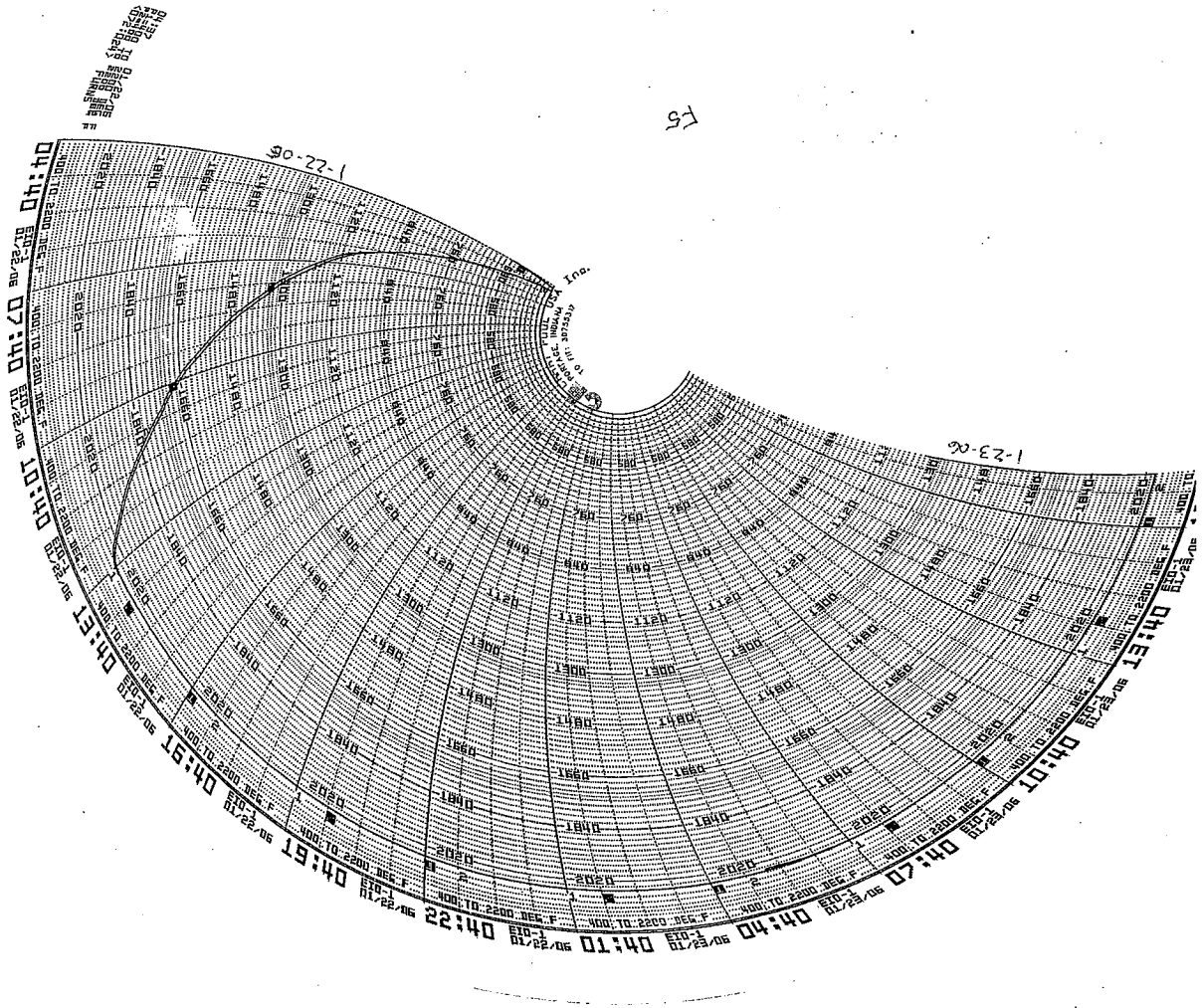
A5

176200-1

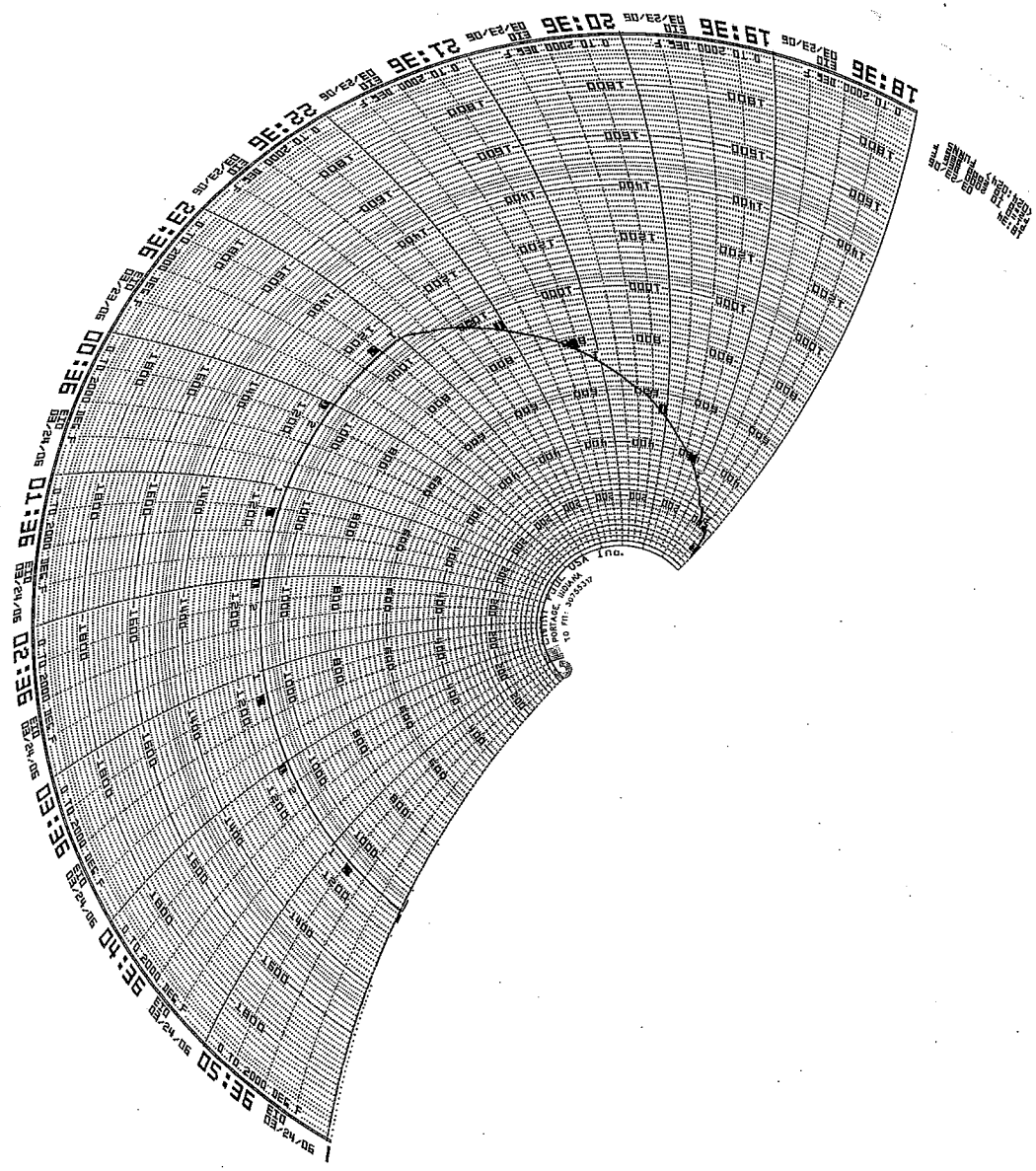
B SHIMS

177360-1 6 PCS.

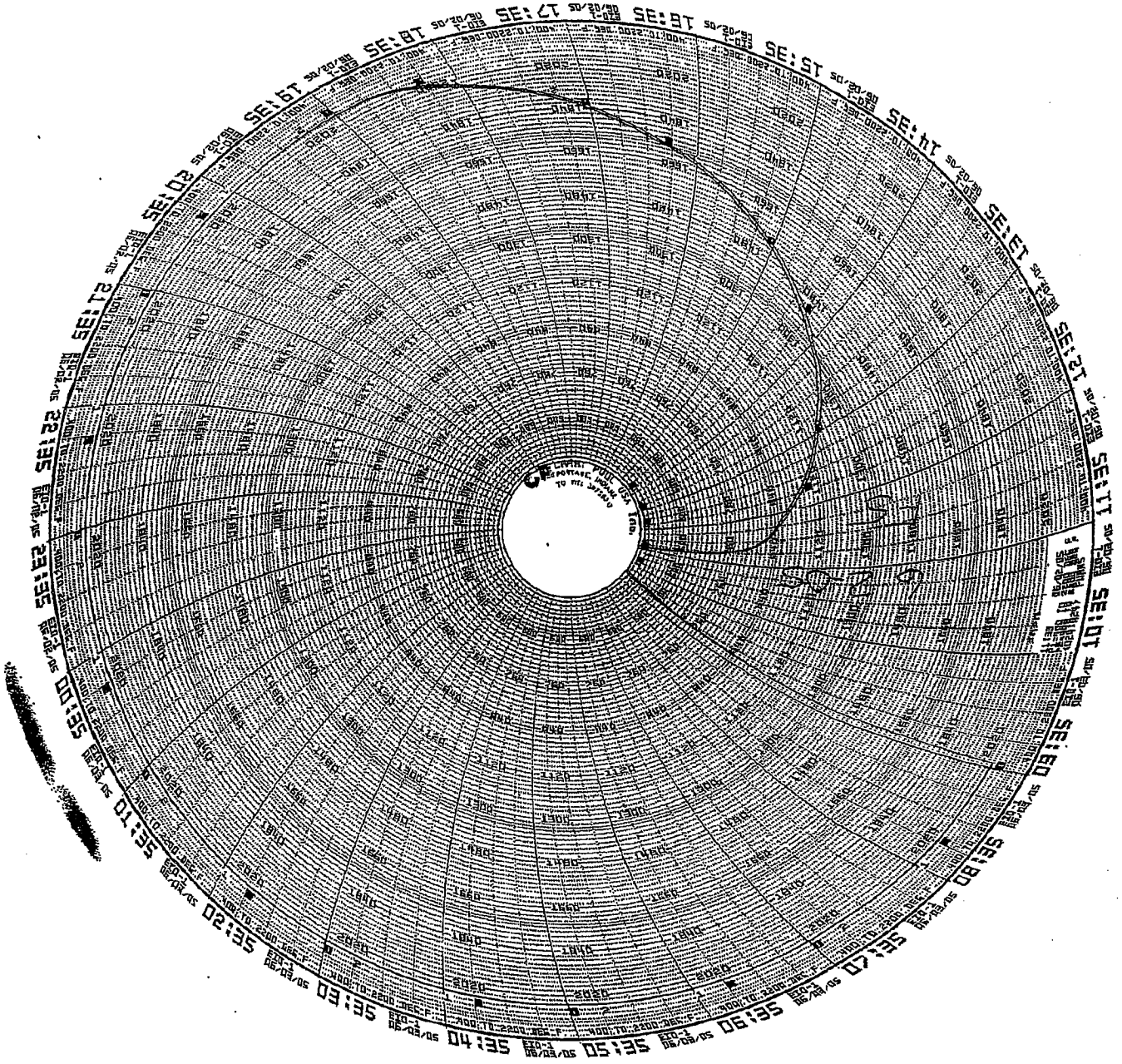
SERIAL # 1 THRU 6



E10 3-23-06
A5
176200-1



A+C Shims CAR



Energy Industries of Ohio
Manufacturing and Test Sequence (MTS) A 5 Coil
1 OF 11 **CO# 40851 Dated 3-9-05 Revision: Rev 9 Dated Issued:12/21/05**

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		12/21/05
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.		
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.	RB	1/11/06
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.		1/17/06
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: 2758 CASTING POURED AT: 2753 DATE: 1/14/06 HEAT #'s: B2126 ELAPSED POUR TIME 52 sec. KEEL BLOCKS POURED: NA Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: SR Analyzed: GH Date: 1/14	SR	1/14/06
50	MELT SOP 0800R2	SHAKEOUT	CH	1/20
60	ARC RISE SOP 0100R1	REMOVE RISERS AS DIRECTED BY SUPERVISOR.	DC	1/20/06

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.	F5.1	KMR 1-22-06
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	1/22
NOTE		**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.**		
90	GRIND GSWA SOP 0100R3	SWING GRIND TO REMOVE RISER REMAINS AND FLASH IF REQUIRED.	JJ	1-29-06
100	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND SURFACE OF PART AS REQUIRED FOR CONTOUR.	NS	1-31-06
110	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	MMS	1-31-06
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF X-RAY . EIO NOTIFIED ON 1/15 DCMA NOTIFIED ON 1/15	Q ENG OR QA MGR	
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 RBK 2-20-06	
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 RBK 2-20-06	
140	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% RT INSPECTION.	TAD	2/20/06
150	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION AS REQUIRED.	MG AB.	2/21/06

Energy Industries of Ohio
Manufacturing and Test Sequence (MTS) A 5 Coil
 CO# 40851 Dated 3-9-05 Revision: Rev 9 Dated Issued:12/21/05

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	
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 ~~TLC~~	~~3/7/06~~ 2/21/06
180	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% VISUAL AND LP INSPECTION.	BW	~~3/7/06~~ 2/21/06
190	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION OR VISUAL DEFECTS AS REQUIRED.	MG	~~3/7/06~~ 2/22/06
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 CC	~~3/7/06~~ 2/24/06
210	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	CS	~~3/7/06~~ 2/24/06
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".	JRB	2/24/06
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR	
230	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____, _____, _____ LIST ALL MATERIAL/LOTS USED: _____ 18308 _____, _____, _____ QUALITY ENG. Name: _____ Date: 2/24/06		
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	TAD	2/24/06

		REV 0 (Vertical) FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2						
250	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.					MG	2/24/06
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 _____					LP - LEVEL II TKL	2/24/06
270	REPEAT	REPEAT STEPS S180 TO S250AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION. IF OK CHECK HERE _____ AND PROCEED TO STEP 280.					N/A	
280	REPEAT STEPS	SUPPLEMENTAL REPAIR STEPS	1ST	2ND	3RD	4TH	5TH	
S180	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.						
S190	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION OR VISUAL DEFECTS AS REQUIRED.						
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					
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.						
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR					
S220	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____, _____, _____ MATERIAL /LOT USED :_____, _____, _____ QUALITY ENG. Name: _____ 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)						

		FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2					
S240	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.					
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.				
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 _____.				CIA	2/26/06
290	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 280. REPEAT UNTIL COMPLIANCE IS ACHIEVED.				N/A	
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 ✓. RADIOGRAPH AT CAF CHECK HERE _____.				QA ENGINEER	Dwm 2-26-06
310 A	MQS X-RAY DEFECTS REPAIRED BY WELDING	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. **ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.** ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.				LEVEL II	Dwm 3-12-06
310 B	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. **ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.** ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.				RT - LEVEL II	Dwm 3-12-06
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 ✓ MARK UP DEFECTS AND SEND THE CASTING TO STEP S321.				RT - LEVEL II	Dwm 3-13-06
	REPEAT STEPS	SUPPLEMENTAL REPAIR STEPS	1ST Rej Dwm 3-13-06	2ND Accept XRAY 3-25-06 RBK	3RD	4TH	5TH

S321	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.	TAD 3/13				
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 JDR 3/13				
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 APPROXIMATLY 3.3"X3.3". SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING. SUBMIT MAP WITHIN 24 HOURS OF START OF WELDING.	N/A	JAR 3/18/06			
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON 3/2 DCMA NOTIFIED ON 3/7	Q ENG OR QA MGR				
S324 *	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____, _____ MATERIAL /LOT USED : CR 78308, _____, _____ QUALITY ENG. Name: _____ Date: _____					
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	TAD 3/13	TAD 3/23			
S326	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.	TAD 3/13	KLS 3/23			
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 JDR 3/13	OK JDR 3/22	OK REJ	OK REJ	OK REJ
S 328 A	MQS X-RAY DEFECTS REPAIRED BY WELDING	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. **ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.** ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT-LEVEL II N/A				

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. **ALL RT REJECTS, INCLUDING SURFACE DEFECTS WILL BE VERIFIED BY RT.** ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	RT - LEVE L II	KJA			
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 _____ AND SEND TO STEP 340. REJECTED CHECK HERE _____ MARK UP DEFECTS AND SEND THE CASTING TO STEP S321.	RT - LEVE L II				
	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.		CA			
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____		Q ENG OR QA MGR			DOC AT 460
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 _____. 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			
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 _____		LP - LEVEL II			
380	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING FINAL PENETRANT INSPECTION. N/A		R.TG 3-27-06			
385	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND EXCAVATION AS REQUIRED.		KLB 3/27/06			

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 _____ IF REJECTED SEND BACK TO STEP 385.	LP - LEVEL II	NA
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 APPROXIMATLY 3.3"X3.3".			
420	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL/LOT USED:_____ QUALITY ENG. Name: _____ Date: _____		
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		
440	GRIND GCHI SOP 0100 REV 2	HAND GRIND WELDS.		
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	
	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 _____.		
452	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 451. REPEAT UNTIL COMPLIANCE IS ACHIEVED.		
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF LAYOUT. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____ APPROVAL RECEIVED ON _____	Q ENG OR QA MGR	

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.	JNS	3/17/06
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. F5-1	KMR	3/23/06
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON 3/15 DCMA NOTIFIED ON 3/15	Q ENG OR QA MGR CA	
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 ✓. IF REJECTED CHECK HERE _____. MARK AND REPAIR AT STEP 510. MUST BE PERFORMED BY LEVEL II in VT.	VT - LEVEL II KA 3-29-06	
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 ✓ WASH AND SEND TO STEP 500. IF REJECTED CHECK HERE _____. DOCUMENT REPAIRS USING A SUPPLEMENTAL MTS.	LP - LEVEL II JDR	3/27/06
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF MAG PERM STEPS. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR	
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 X AND GO TO STEP 530. IF REJECTED CHECK HERE _____.	KA 3-29-06 CC 3-29-6	
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.	KA	
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 _____. IF REJECTED CHECK HERE _____ RETURN TO STEP 510.		
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)		

Release Cust 3/27/06

Release 3/27/06

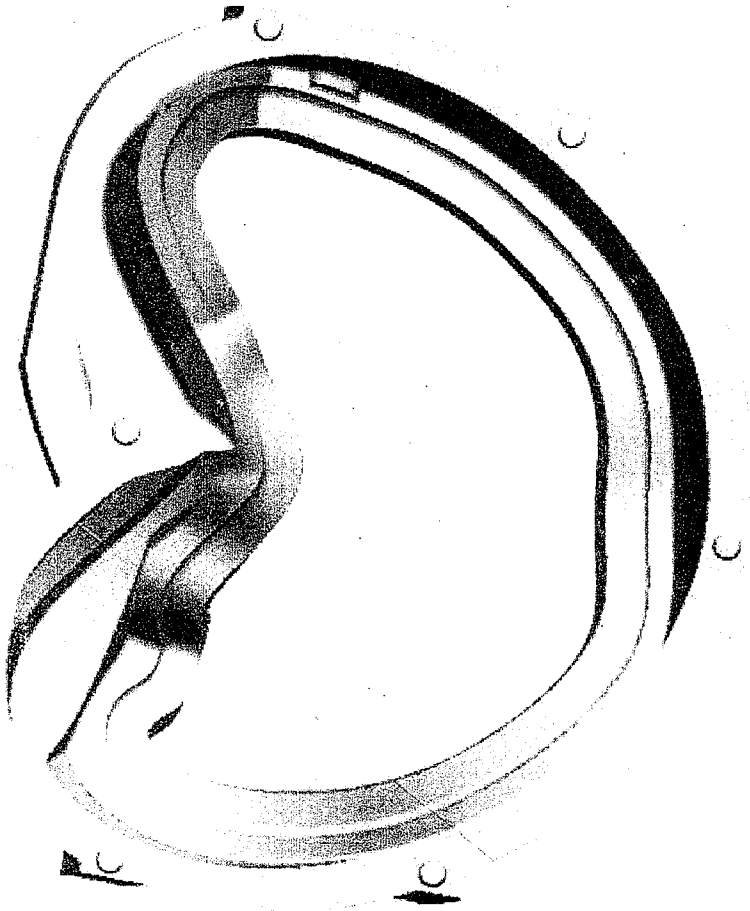
MAKE SURE PART has proper Identifiers ON PART including "A5" + cert #, Ctr

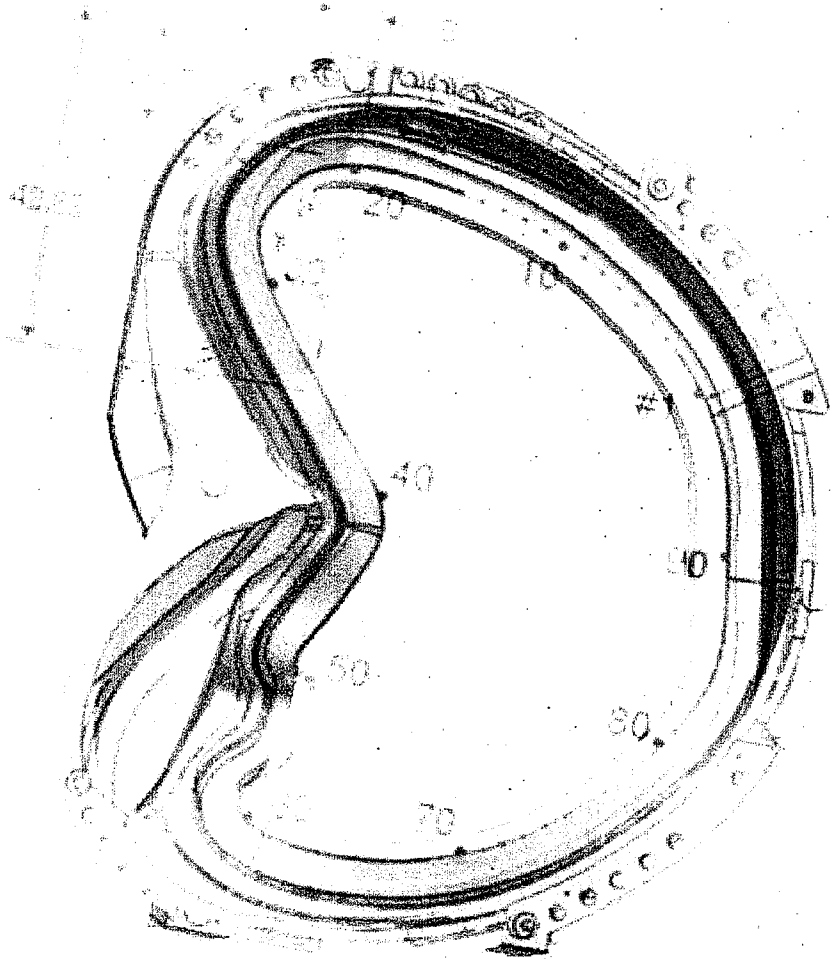
Sign here

CC

NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON 3/29 BY CAR. RECEIVED RELEASE FROM EIO ON 3/22.	Q ENG OR QA MGR	CAR
540	PACK AND SHIP	PACKAGE AND SHIP TO MAJOR TOOL.		
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 5
Dated 12-14-04 Revision:1 Dated Issued:10-25-05

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. **SHADED BOXES NEED NOT BE SIGNED.**	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 #: 29198 Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: SR Analyzed: GH 4/28	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.		
90	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.		
100	VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 ALL CONDITIONS. IF OK CHECK HERE _____. IF REJECTED CHECK HERE ____. MARK AND REPAIR AT STEP 130OR 140 IF WELDING IS REQUIRED. MAY PERFORM STEPS 110 AND 120 TOGETHER.	VT - LEVEL II KBA	12/24

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 _____GO TO 150. IF REJECTED CHECK HERE ✓ MARK AND REPAIR AT STEP 130 OR 140 IF WELDING IS REQUIRED.	LP - LEVEL II JRS 12.29	
130	GRIND GCHI SOP 0100R2	HAND GRIND DEFECTS. CONFIRM REPAIRS VISUALL AND BY LP. ACCEPTANCE AS NOTED ABOVE. IF OK, CHECK HERE _____ AND GO TO STEP 170. IF WELDING IS NEEDED GO TO STEP 130.		
140 IF NEEDED		IF REPAIRS BY WELDING ARE REQUIRED DOCUMENT ON SUPPLEMENTAL MTS ON LAST PAGE.		
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 EBK 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 ✓ AND SEND TO STEP 200. REJECTED CHECK HERE _____ MARK UP DEFECTS. DOCUMENT REPAIRS ON S10 TO S70.	RT - LEVEL II EBK 12-16-05	
	REPEAT	REPEAT STEPS S10 TO S70 AS REQUIRED TILL WELDS CLEAR X-RAY.	QA ENG.	
170	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	1-5-06	
180	LAYOUT SOP 0100 ORIGINAL	INSPECT CASTING TO VERIFY DIMENSIONS. THIS MAY BE PERFORMED EARLIER IF DESIRED. SUBMIT RPORT TO QA.	Joby	3/8
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 ✓. IF REJECTED CHECK HERE _____. MARK AND REPAIR DOCUMENT REWORK ON A SUPPLEMENTAL MTS	VT - LEVEL II RLA	3/28/06
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 ✓ WASH AND SEND TO NEXT STEP. IF REJECTED CHECK HERE _____ MAKE REPAIRS AND DOCUMENT ON SUPPLEMENTL MTS.	LP - LEVEL II RC	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. Mag. Perm OK	BDR	3-13-06
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)		

NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON 3/29 BY Chr. RECEIVED RELEASE FROM EIO ON 3/29.	Q ENG OR QA MGR 3/29 Chr	
	PACK AND SHIP	PACKAGE AND SHIP TO MAJOR TOOL.		
1000	REVISION HISTORY	ORIGINAL12-14-04. Rev1 complete rewrite due to specification changes. Checked for numbering	CARUUD Chr 3/29	
SUPPLEMENTAL MTS FOR WELD REPAIRS.			FOR VT&LP/ FOR RT	
S10	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS.	N/A	
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 STEPSS10 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

MetalTek INTERNATIONAL

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.

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 egree 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 40
CA 1323

Founded 1929 St. Louis Testing Laboratories INCORPORATED

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

RES/nmc

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.

		Shell Type A		Coil Type A		All Coils	
Run #	Configuration	Max. Displacement - mm	Max. Stress - Mpa	Max. Displacement - mm	Max. Stress - Mpa	Max. Displacement - mm	Max. 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

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:

MetalTek INTERNATIONAL

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

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

MetalTek INTERNATIONAL

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

Final Inspection Report

Customer ENERGY INDUSTRIES OF OHIO

Pattern: MCWF-A5 COIL

Order PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 3/29/2006

Type Description	Cert Number	Procedure	Acceptance Criteria	Actual
Liquid Penetrant	176200-1	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	176200-1	SOP Mag Perm 100 Rev 1	<1.02	Acceptable
Radiographic	176200-1	Technique # 12726	MSS SP 54	Acceptable
Visual	176200-1	CQP - 500 REV 4	ASTM A802 LEVEL 2	Acceptable

Liquid Penetrant

Technician: Jason Rees
ASNT Level II

Visual
Technician: Kevin Anderson
ASNT Level II

Respectfully Submitted,
Charles A. Ruud
Quality Assurance Manager

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-A5 COIL

ASTM CF8MNMN MOD

Date 3/29/2006

Cert Number

176200-1

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

Carondelet Division

8600 Commericial 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 5

Order PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 2/06/2006

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: T. Chapman – LP ASNT Level II

Visual Inspection

Technician: K. Anderson – VT ASNT Level II

Respectfully Submitted,
Charles A. Ruud
Quality Assurance Manager

MetalTek INTERNATIONAL

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 5	
Alloy	CF8MNMnMOD	Date	3/06/2006

Cert Number

S76220-1

A shim for A-5 coil was poured from heat number 29198. No weld repairs were necessary.

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

EIO
Energy Industries of Ohio
SUPPLIER QUALITY RELEASE

		Date: 3-29-06

I. General Information:			
Project Name:	Modular Coil Winding Form A5		
PO No:	NCSX-SOW-141-02-01	Rev.:	10
Supplier:	MetalTech		
Procurement Agent:	EIO		
Shipment:	☒ Partial ☐ Final		

II. Material Description
Casting A5 Coil & shim

III. Release Checklist	
Plan Requirements Complete?	☒ Yes ☐ No ☐ N/A (If identified "No" provide explanation in comments section below)
Variances?	☒ Yes ☐ No ☐ N/A (If identified "No" provide explanation in comments section below)
Princeton Notified of Shipment?	☒ Yes ☐ No ☐ N/A (If identified "No" provide explanation in comments section below)
DCMA Notified of Shipment?	☒ Yes ☐ No ☐ N/A (If identified "No" provide explanation in comments section below)
☒ Conditional ☐ Unconditional	Explain conditional releases in comments section.

IV. Comments
See documents package for variances and NC'c

By signing below you acknowledge that the casting has met all applicable standards and contractual requirements

V. Supplier Quality Representative Sign Off		
Supplier Quality Representative (SQR) Print/Type Name	Supplier Quality Representative (SQR) Signature	Date

VI. Supplier Approval For Shipment		
Procurement Agent Notified of Shipment	Date: 3/29/06	
Required Vendor Data Ready for Shipment	Date: 3/29/06	
Peter A Djordjevich		3/29/06
Supplier's Representative Print/Type Name	Supplier's Signature	Date