

**PRELIMINARY**

**Energy Industries of Ohio**

**Contract # S005242-F**

**Modular Coil Winding Forms**

**C-3 Documentation Package**

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

**12/13/2005**

## C-3 Documentation Package

### List of Documents 12-22-2005

Doc #	Description	# Pages
1	MTR for weighted average of chemistry – 3 ladles replaced by product analysis	1
2	MTR from Wisconsin Centrifugal	1
3	MTR for C-3 Shim dated 9/24/05	1
5	MTR for Lincoln lot # 3018926 78309	1
6	Westmoreland Tensile test report @ -320°F dated 6-30-05	1
7	St Louis Test Lab dated 6-24-05 – incl. tensile test results @ room temp & Charpy V Notch (CVN) at 77°K & 293°K	3
8	Westmoreland CVN of Lincoln weld material @ -320°F dated 8/23/2005	1
9	Westmoreland tensile test report of Lincoln weld material @ -320°F dated 8/23/2005 – failed – See CA 1379	2
10	St Louis Test Lab dated 8-8-05 tensile test results @ & Charpy V Notch (CVN) @293°K of Lincoln weld material lot # 3018926 78309	3
11	Westmoreland CVN of Lincoln weld material @ -320°F dated 9/13/2005	1
12	Westmoreland tensile test report of Lincoln weld material @ -320°F dated 9/13/2005	1
13	Westmoreland shim tensile tests @ -320°F	1
14	St Louis Testing Labs CVN shim material @ 77°K & 293°K + mechanical test results at RT dated 6-13-05	3
15	Weld map	10
16	Reader Sheets C-3 Coil – MQS & MTK	16
17	Radiographic Interpretation Sheets – C-3 shim	4
18	Heat Treat Chart C-3 coil dated 6-17-05	1
19	Stress relief chart C-3 coil dated 9-19-05	1
20	HT chart C-shim dated 6-2-05	1
21	C-3 coil signed MTS	12
22	C-shim MTS	6
23		
24	CA 1308 – shim chemistry out of spec	2
25	CA 1323 – CA for sulfur & phosphorus readings dated 7/26/05 + addendum dated 8/17/05 – 9/8/05 & 9/30/05	10
26	CA 1379 Failed weld test	2
27	CA 1403 – Lack of fusion in weld repairs	1
28		
29	C-3 coil final inspection dated 9/20	1
30	C-shim final inspection dated 9-13-05	1
31	C-shim C of C dated 9-13-05	1
32		
33		
34		
35		
36		
12/13/05		



### 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

Cert Number S75920-2

Pattern Number MCWF-C3

Pour Date 6/10/2005

CAF Metal Designation CF8MNMnMod

Material Spec CF8MNMnMOD

Weighted average of 3 heats - 29716(40%),29717(21%),29720(39%) Total Weight 32016 lbs.

Revised 10/26/05

Element	Min	Actual	Max
C	0.04	0.04	0.07
MN	2.3	2.5	2.8
SI	0.0	0.4	0.7
CR	18.0	18.2	18.5
NI	13.0	13.3	13.5
MO	2.1	2.3	2.5
P*	0.0	0.023	0.035
S*	0.0	0.013	0.025
N	0.24	0.25	0.28

\*P & S taken from cast on bar, zones 1,2,&3 and analyzed by wet chemistries, ASTM E1019-03 for sulfur and Colormetric for phosphorous.

#### PRODUCT ANALYSIS

Results of spectrometer analysis of cast on test bar after spectrometer preventive maintenance performed and at Wisconsin Centrifugal.

\*\*\*Not analyzed on spectrograph.

Element	CAF after PM	WC Analysis
C	***	0.06
MN	1.6	1.6
SI	0.6	0.6
CR	18.1	18.3
NI	13.5	13.7
MO	2.4	2.4
P	0.023	0.029
S	0.011	0.009
N	***	0.24

Charles A. Ruud  
Quality Assurance Manager

Superior Quality Engineered Metal Products

[www.MetalTekInt.Com](http://www.MetalTekInt.Com)



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## Material Test Report

ENERGY INDUSTRIES OF OHIO

Purchase Order Number PPPL-FP-LTS-2

Pattern Number MCWF-C3

CAF Metal Designation CF8MNMnMod

Material Spec CF8MNMnMOD

Analysis performed by Wisconsin Centrifugal

Cert Number S75920-2

Pour Date 6/10/2005

Revised 11/3/05

Element	Min	Actual	Max
C	0.04	0.06	0.07
MN*	2.3	1.6	2.8
SI	0.0	0.6	0.7
CR	18.0	18.3	18.5
NI*	13.0	13.7	13.5
MO	2.1	2.4	2.5
P	0.0	0.029	0.035
S	0.0	0.009	0.025
N	0.24	0.24	0.28

\* See Corrective Action Number 1323.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

Superior Quality Engineered Metal Products

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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 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 9/24/05

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.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

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045

ER316 MNN F  
**LINCOLN®  
ELECTRIC**

# PRODUCT CONFORMANCE REPORT

Product	LNM 4455	Size(s) mm	1,2
Class.	EN 12072-99: G 20 16 3 Mn L	Lot/Batch	3018926/78309
		Item No.	692129
Customer	CK SUPPLY Contact Ernie Simpson Eureka (MISSOURI) 63025 UNITED STATES	Quantity	450,0 KG
		Customer ref.	P.O.: SL 057549
		LSW Order No.	SD424496

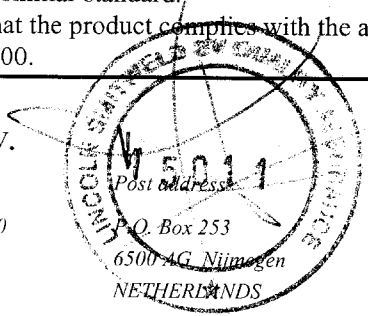
Chemical analysis (%)										EN10204 3.1B
C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N	
0,02	0,4	7,3	0,019	0,001	20,1	16,3	2,9	0,1	0,200	

Mechanical tests, all weld metal	EN10204
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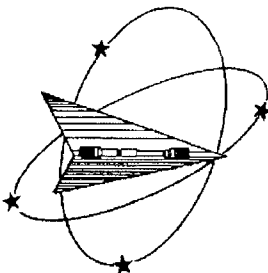
Additional information	EN10204
Other tests	

Remarks

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. van Etteger	QS Manager	10/02/2005	3018926/7830
Registered Office	Telephone:	Fax:		
Nieuwe Dukenburgseweg 20	31 24 3522911	31 24 3522200		
6534 AD NIJMEGEN				



# 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



June 30, 2005

## CERTIFICATION

Section 1 of 1

WMT&R Report No. 5-29805

Req. No. 5404

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

Attention: Rick Suria

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

*C-3 Coil CR*

SOAK TIME: 5 Minutes

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

MATERIAL: Metaltek CF8MNm

DISPOSITION: Report

Sample	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	AU/R
Z1	C07850	-320	161.7	102.2	45	33	27.0	32600	20611	0.5067	0.4145	2.00	2.89	0.20164697	M9	R
Z2	C07851	-320	164.4	94.9	60	63	24.1	33080	19100	0.5062	0.3096	2.00	3.20	0.20124920	M9	R
Z3	C07852	-320	163.3	94.2	62	56	23.7	32870	18970	0.5063	0.3361	2.00	3.23	0.20132872	M9	R

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

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*Matthew J. Woyton*  
Roy E. Stamm Matt Woyton  
Technical Services Manager Tensile Supervisor

*6-30-05*  
June 30, 2005

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

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

June 24, 2005  
 Lab No. 05P-1885  
 P.O. No. 12516  
 Page 1 of 3

**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** C3 Coil- Alloy CF8 MNMNMOD, Z1,Z2,Z3  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 73°F  
**REQUIREMENTS:** 50 ft/ lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-7	193	0.121	100
Z1-8	165	0.100	100
Z1-9	113	0.079	100
<b>Average</b>	157	0.100	100
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-7	144	0.098	100
Z2-8	142	0.070	100
Z2-9	138	0.081	100
<b>Average</b>	141	0.083	100
SAMPLE ID	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-7	132	0.089	100
Z3-8	160	0.098	100
Z3-9	230	0.062	100
<b>Average</b>	174	0.083	100

*identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
 Materials Testing



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

AN OFFICIAL COPY OF TEST REPORT WILL BE PROVIDED BY THIS LABORATORY ON REQUEST.  
 NOT OFFICIAL WITHOUT THE RAISED SEAL OF ST. LOUIS TESTING LABORATORIES, INC.  
 SEE REVERSE FOR CONDITIONS.





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June 24, 2005  
 Lab No. 05P-1885  
 P.O. No. 12516  
 Page 2 of 3

**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** C3 Coil- Alloy CF8 MNMNMOD, 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/ lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z1-7	110	0.086	100
Z1-8	68	0.041	100
Z1-9	104	0.068	90
<b>Average</b>	94	0.065	97
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z2-7	92	0.059	90
Z2-8	85	0.052	100
Z2-9	94	0.056	100
<b>Average</b>	90	0.056	97
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
Z3-7	99	0.067	100
Z3-8	148	0.087	100
Z3-9	99	0.076	100
<b>Average</b>	115	0.077	100

*Identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
 Materials Testing



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 8600 Commercial Blvd.  
 Pevely, MO 63070

June 24, 2005  
 Lab No. 05P-1885  
 P.O. No. 12516  
 Page 3 of 3

**Attention: CHUCK RUUD**

**REPORT OF MECHANICAL TESTS**

**SAMPLE ID:** C3 COIL- ALLOY CF8MNMNMOD, Z1, Z2, Z3

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
Z1	0.1963	0.1257	36.0	22.6	37800	83300	0.95	47.5
Z2	0.1963	0.1257	36.0	21.2	42700	83300	0.10	55.0
Z3	0.1924	0.1257	34.7	21.0	34300	81500	0.1	55.0

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

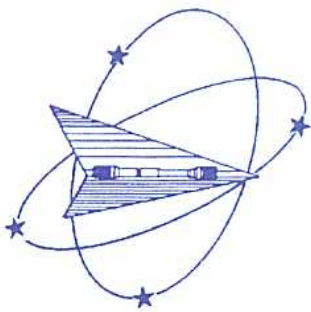
KS/tlv



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 Certificate No. 0397-02

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 SEE REVERSE FOR CONDITIONS.





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



621-01 & 621-02

August 23, 2005

## CERTIFICATION

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

WMT&R Report No. 5-32228  
Requisition No. 4335

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: IMPACT and TENSILE

### IMPACT RESULTS: ASTM E23-02

No Requirements

MATERIAL: Lincoln LNM4455

SAMPLE TYPE: Charpy V-Notch

DISPOSITION: Report

Reference	Lot No.   Batch No.   Specimen ID	TestLog Number	Sample Size	Temp. °F	Energy ft-lbs	Mils Lat Exp	% Shear Fracture	AUUR
Lincoln LNM4455	3018926   78309   CVN-1	C26832	Standard	-320	33	17	20	Report
Lincoln LNM4455	3018926   78309   CVN-2	C26833	Standard	-320	36	22	25	Report
Lincoln LNM4455	3018926   78309   CVN-3	C26834	Standard	-320	40	18	40	Report
Lincoln LNM4455	3017006   72262   CVN-1	C26835	Standard	-320	55	26	30	Report
Lincoln LNM4455	3017006   72262   CVN-2	C26836	Standard	-320	53	34	30	Report
Lincoln LNM4455	3017006   72262   CVN-3	C26837	Standard	-320	51	34	30	Report

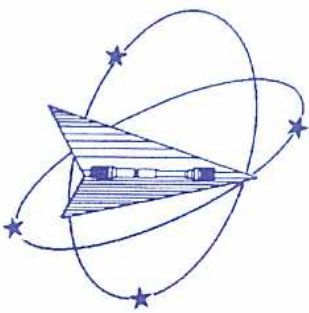
AUUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

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

August 23, 2005

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621-01 & 621-02



August 23, 2005

**CERTIFICATION**

**WMT&R Report No. 5-32228**

MetalTek International

**TENSILE RESULTS: ASTM E21-03a**

**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: 0.0030 in./in./min., 0.0500 in./min./in.**

**MATERIAL: Metrude B316NF**

**DISPOSITION: Acceptable**

Reference	Lot No.   Batch No.   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	AUUR
Metrude B316NF	W021735   T1	C26831	-320	166.6	102.1	38	31	24.3	16070	9842	0.3504	0.2912	1.40	1.93	0.09643131	M9	A

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

**TENSILE RESULTS: ASTM E21-03a**

**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: 0.0030 in./in./min., 0.0500 in./min./in.**

**MATERIAL: Lincoln LNM4455**

**DISPOSITION: Unacceptable**

Reference	Lot No.   Batch No.   Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Codes	Ult. Load lbf	0.2% YLD. lbf
Lincoln LNM4455	3018926   78309   T1	C26829	-320	157.5	114.3	16	18	23.3	H	15210	11030

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


**DISPOSITION: Unacceptable**

Reference	Lot No.   Batch No.   Specimen ID	TestLog Number	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUUR
Lincoln LNM4455	3018926   78309   T1	C26829	0.3506	0.3168	1.40	1.63	0.09654142	M9	U

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

Requirements provided by MetalTek International

H - Failed outside gage length.

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

8-23-05  
 August 23, 2005

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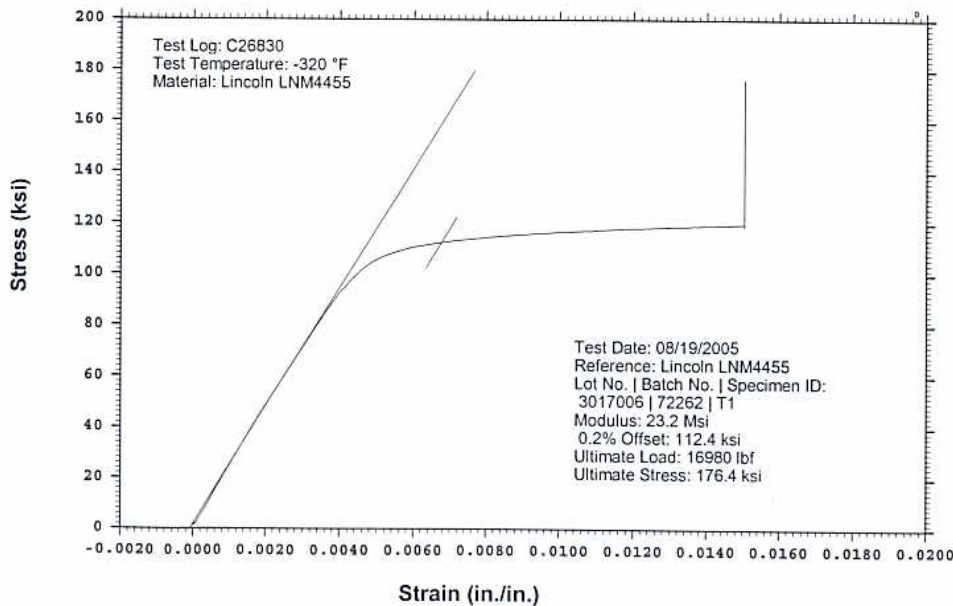
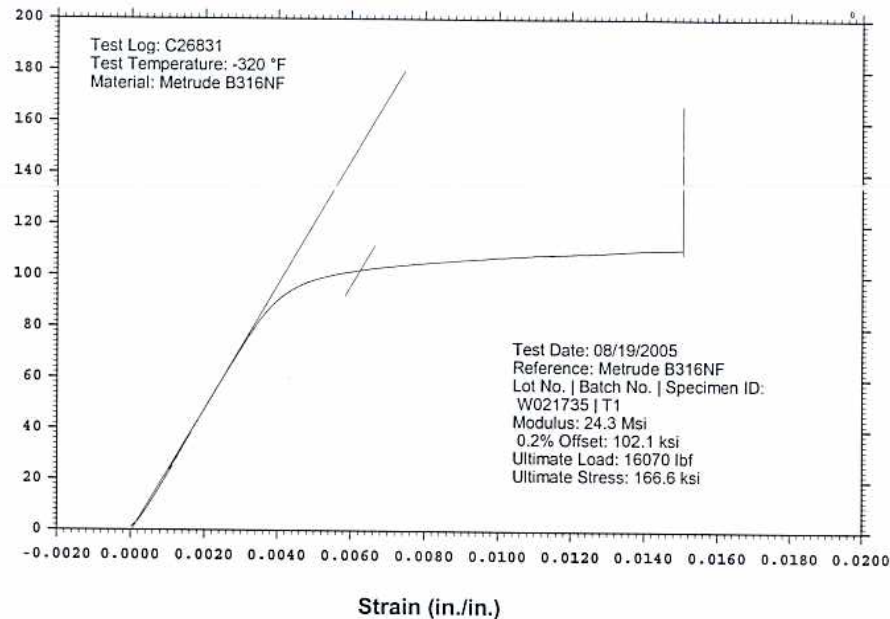
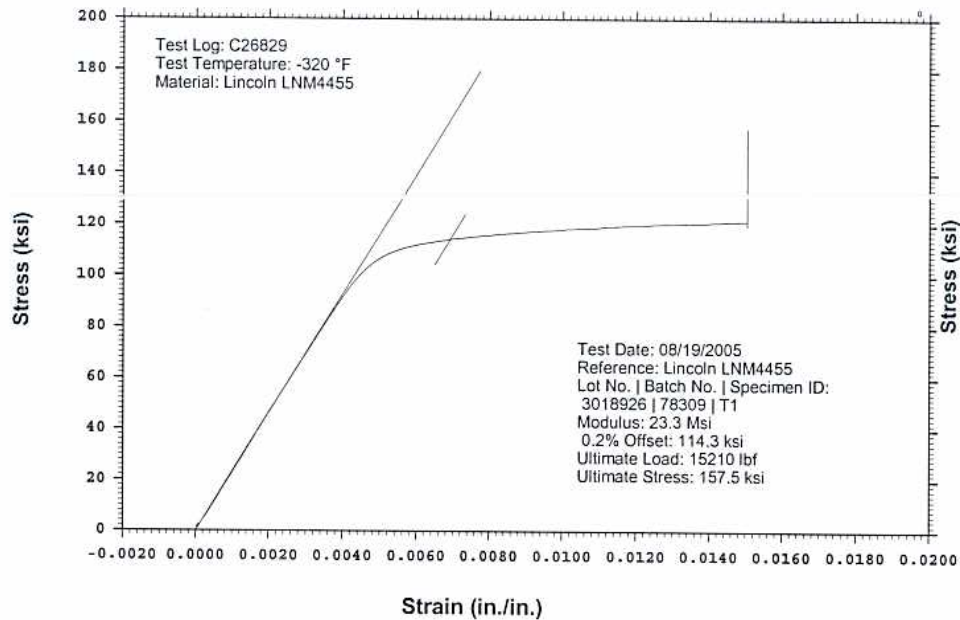
# WESTMORELAND MECHANICAL TESTING & RESEARCH, Inc

Stress vs. Strain

Phone: (724)537-3131

Customer: MetalTek International  
WMT&R Report: 5-32228

Requisition No.: 4335



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 8, 2005  
 Lab No. 05P-2334  
 P.O. No. 21324  
 Page 1 of 3

**Attention: CHUCK RUUD**

**REPORT OF MECHANICAL TESTS**

- SAMPLE ID:**
- 1) STOCK# LNM 4455, LINCOLN LOT 3018926/78309
  - 2) STOCK# LNM 4455, LINCOLN LOT 3017006/72262
  - 3) STOCK# LNM 4455, LINCOLN LOT 3012668/82743
  - 4) STOCK# B316NF METRODE, W021735

Sample ID	Original Area Sq. Inches	Reduced Area Sq. Inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
1	0.1385	0.0897	54.3	24.5 Msi	56900	93900	0.84	42.0
2	0.1886	0.0935	50.4	24.9 Msi	54900	92100	0.85	42.5
3	0.1909	0.0951	50.2	22.6 Msi	57400	93700	0.83	41.5
4	0.1901	0.0962	49.4	23.0 Msi	54800	88200	0.75	37.5


Round, reduced section all weld tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

*Identification of tested specimens provided by the client.*

KS/tlv

  
 Karl Schmitz, Director  
 Materials Testing



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

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 Pevely, MO 63070

August 8, 2005  
 Lab No. 05P-2334  
 P.O. No. 21324  
 Page 2 of 3

**Attention: Chuck Ruud**

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** STOCK# LNM 4455, LINCOLN LOT 3018926/78309  
 STOCK# LNM 4455, LINCOLN LOT 3017006/72262

**SPECIFICATION:** ASTM A 370-03a

**SPECIMEN TYPE:** "A" Vee Notch


**SPECIMEN SIZE:** 10 mm x 10 mm (All Weld)

**TEMPERATURE OF TEST:** 293°K

**REQUIREMENTS:**

ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
78309-7	97	0.074	50
78309-8	96	0.076	50
78309-9	108	0.075	50
<b>Average</b>	100	0.075	50
ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
72262-7	126	0.098	50
72262-8	102	0.080	50
72262-9	123	0.087	50
<b>Average</b>	117	0.088	50

*Identification of tested specimen provided by client.*

  
 Karl Schmitz, Director  
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August 8, 2005  
 Lab No. 05P-2334  
 P.O. No. 21324  
 Page 3 of 3

**Attention: Chuck Ruud**

AUG 10

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** STOCK# LNM 4455, LINCOLN LOT 3012668/82743  
 STOCK# B316NF METRODE, W021735  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm ( All Weld)  
**TEMPERATURE OF TEST:** 293°K  
**REQUIREMENTS:**

ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
82743-7	100	0.082	50
82743-8	99	0.076	50
82743-9	94	0.072	50
<b>Average</b>	98	0.077	50
ALL WELD	FOOT LBS.	LATERAL EXPANSION	% SHEAR
W021735-7	102	0.101	50
W021735-8	88	0.073	50
W021735-9	88	0.080	50
<b>Average</b>	93	0.085	50

*Identification of tested specimen provided by client.*

KS/tlv

  
 Karl Schmitz, Director  
 Materials Testing

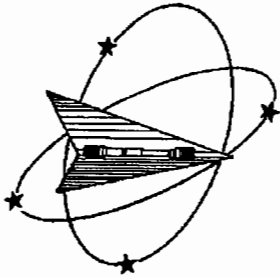


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# Westmoreland Mechanical Testing & Research, Inc.

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)

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621-01 & 621-02

September 13, 2005

## CERTIFICATION

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

WMT&R Report No. 5-34328

P.O. No. 19386 Rel No.18

Requisition No. 4934

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: IMPACT and TENSILE

IMPACT RESULTS: ASTM E23-02

REQUIREMENTS: Energy (Min 35\Max --)

MATERIAL: Lincoln LNM4455

SAMPLE TYPE: Charpy V-Notch

DISPOSITION: Acceptable

Reference	Lot No.   Batch No.   Specimen ID	Test Log Number	Sample Size	Temp. °F	Energy ft-lbs	Mils Lat Exp	% Shear Fracture	AIUR
Lincoln LNM4455	3018926   78309   Cvm-1	C43939	Standard	-320	56	18	40	Acceptable
Lincoln LNM4455	3018926   78309   Cvm-2	C43940	Standard	-320	52	18	40	Acceptable
Lincoln LNM4455	3018926   78309   Cvm-3	C43941	Standard	-320	53	12	40	Acceptable

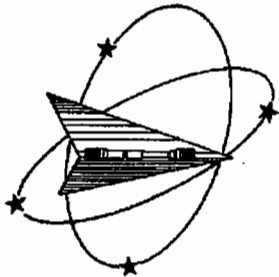
Requirements supplied by MetalTek International.

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Roy E. Star (Matt Wagoner)  
Technical Services Manager / Tensile Supervisor

9-13-05  
September 13, 2005

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821-01 & 821-02

September 13, 2005

## CERTIFICATION

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

WMT&R Report No. 5-34328  
P.O. No. 19386 Rel No.18  
Requisition No. 4934

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: IMPACT and TENSILE

### TENSILE RESULTS: ASTM E21-03a

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: 0.0030 in./in./min., 0.0500 in./min./in.

MATERIAL: 316 S/S

DISPOSITION: Acceptable

Reference	Lot No.   Batch No.   Specimen ID	TestLog Number	Temp. °F	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf
Lincoln LNM4455	3018926   78309   Tensile	C43938	-320	182.1	128.2	34	24	27.0	17560	12360

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

DISPOSITION: Acceptable

Reference	Lot No.   Batch No.   Specimen ID	TestLog Number	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUUR
Lincoln LNM4455	3018926   78309   Tensile	C43938	0.3504	0.3048	1.40	1.87	0.09643131	M9	A

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

Requirements supplied by MetalTek International.

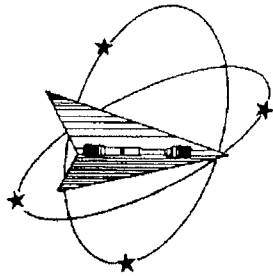
  
 Roy E. Starr  
 Technical Services Manager

  
 Matt Wojton  
 Tensile Supervisor

9-13-05  
 September 13, 2005

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621-01 & 621-02



June 20, 2005

## CERTIFICATION

Section 1 of 1

WMT&R Report No. 5-29403

Req. No. 5394

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

Attention: Rick Suria

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

Sample	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
29198 (1)	C03696	-320	166.1	96.0	57	62	28.6	33330	19260	0.5054	0.3103	2.00	3.14	0.20061359	M9	R
29198 (2)	C03697	-320	161.4	96.8	38	33	28.8	32390	19430	0.5055	0.4130	2.00	2.75	0.20069299	M9	R
29198 (3)	C03698	-320	165.0	92.6	62	62	27.6	33100	18581	0.5054	0.3109	2.00	3.23	0.20061359	M9	R

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

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Roy E. Starr, Matt Wojton  
Technical Services Manager Tensile Supervisor

6-20-05

June 20, 2005

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 Pevely, MO 63070

June 13, 2005  
 Lab No. 05P-1739  
 P.O. No. 12516  
 Page 1 of 3

Attention: Chuck Ruud

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** HT # 29198  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 293° K / 68° F  
**REQUIREMENTS:** 50 ft. / lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
1-7	132	0.085	100
1-8	176	0.084	100
1-9	152	0.082	100
<b>Average</b>	<b>153</b>	<b>0.084</b>	<b>100</b>
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
2-7	160	0.112	100
2-8	144	0.107	100
2-9	140	0.069	100
<b>Average</b>	<b>148</b>	<b>0.096</b>	<b>100</b>
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
3-7	176	0.110	100
3-8	124	0.087	100
3-9	144	0.107	100
<b>Average</b>	<b>148</b>	<b>0.101</b>	<b>100</b>

Identification of tested specimen provided by client.

*[Signature]*  
 Karl Schmitz, Director  
 Materials Testing



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

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June 13, 2005  
 Lab No. 05p-1739  
 P.O. No. 12516  
 Page 2 of 3

Attention: Chuck Ruud

**REPORT OF CHARPY IMPACT TEST**

**MATERIAL (SAMPLE ID):** HT # 29198  
**SPECIFICATION:** ASTM A 370-03a  
**SPECIMEN TYPE:** "A" Vee Notch  
**SPECIMEN SIZE:** 10 mm x 10 mm  
**TEMPERATURE OF TEST:** 77° K / -321° F  
**REQUIREMENTS:** 35 ft / lb

BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
4-7	84	0.055	50
4-8	83	0.035	50
4-9	76	0.058	50
<b>Average</b>	81	0.049	50
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
5-7	82	0.059	50
5-8	82	0.040	50
5-9	98	0.075	80
<b>Average</b>	87	0.058	60
BASE METAL	FOOT LBS.	LATERAL EXPANSION	% SHEAR
6-7	82	0.050	50
6-8	93	0.052	50
6-9	94	0.051	50
<b>Average</b>	90	0.051	50

Identification of tested specimen provided by client.

Karl Schmitz, Director  
 Materials Testing



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June 13, 2005  
Lab No. 05P-1739  
P.O. No. 12516  
Page 3 of 3

Attention: **CHUCK RUUD**

### REPORT OF MECHANICAL TESTS

**SAMPLE ID:** 3 EA., 29198

Sample ID	Original Area Sq. inches	Reduced Area Sq. inches	Reduction in Area %	Modules of Elasticity	Yield Strength PSI	Tensile Strength PSI	Elongation (2.0" Gage Length)	
							in.	%
29298-1	0.1817	0.0855	52.9	21.2 Msi	40600	91900	1.00	50.0
29198-2	0.1825	0.0962	47.3	20.9 Msi	42700	88500	1.00	50.0
29198-3	0.1840	0.1170	36.4	21.1 Msi	39500	88300	0.97	48.5

Round, reduced section room temperature tensiles

Yield taken at .2% offset

Tested in accordance with ASTM A 370-03a

*Identification of tested specimens provided by the client.*

KS/tiv

Karl Schmitz, Director  
Materials Testing



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## C-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	Right	19	1 1/8	1/2
2	Right	7	4 1/2	1/2
3	Right	15 1/2	3 1/2	3
4	Right	19 1/2	6 1/2	3/4
5	Right	5	2 1/2	1 1/2
6	Front	9	5	1
7	Right	4 1/2	4	1
8	Back	30	12	1
9	Back	6 1/2	5	3/4
10	Front	7 3/4	3	1/4
11	Font	6	4	3/4
12	Front	4 3/4	2 3/4	1 1/2
13	Front	9 1/2	6	Thru
14	Front	26	7	3/4
15	Right	13	4 1/2	3/4
16	Right	13	7	Thru
17	Right	7	4 1/2	3
18	Right	9	5	3/4
19	Right	12	6	2
20	Right	6	3	Thru
21	Right	6 1/2	5 3/4	3/4
22	Right	8	2	3
23	Front	6	2 1/2	1
24	Front	9	2	3/4
25	Front	8	2	3/4
26	Front	12	2	3/4
27	Front	5	4 1/2	1/4
28	Bottom	4	3	1 1/8
29	Bottom	7	2	Thru
30	Bottom	8	2 1/2	3/4
31	Bottom	10 1/2	4	3/4
32	Bottom	6 1/2	3 1/2	2
33	Back	8	2	2
34	Back	4	2 1/2	Thru
35	Back	12	4	Thru

## C-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>
36	Back	9	2	¾
37	Back	8	5	¾
38	Back	4	4	¼
39	Back	18	1 ½	¼
40	Back	6	4 ½	¼
41	Back	6	1	Thru
42	Back	13	4 ½	¾
43	Back	7	5	1
44	Back	11 ½	3 ¾	¾
45	Back	13	4	Thru
46	Back	8 ½	8 1/8	Thru
47	Back	6	2 ½	1 ½
48	Back	6	3	¾
49	Top	8 ½	2	¾
50	Top	15	3	Thru
51	Top	7	2	2
52	Top	7	2	1
53	Top	3	2	3
54	Left	4	4	3
55	Left	14	10	3
56	Left	4	4	2 ¾
57	Left	6	1 ¾	1
58	Left	14	2	½
59	Left	2	2	1 ¼
60	Left	6 ½	3 ¾	1
61	Left	29	9	1
62	Left	26	10	1 ½
63	Left	19	6	¾
64	Left	18	11	¾
65	Left	10	6	¾
66	Left	4 ½	2 ½	2 ¾
67	Left	10	4	3 ½
68	Left	12	4 ¼	4
6	Left	3 ¾	2	1 ¼
70	Left	19 ½	8	4
71	Front	5 ¼	4 ¾	Thru
72	Right	2	2	1



## C-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>
73	Right	6 ¼	5	4
74	Right	10 ½	2 ½	1 ¼
75	Front	8 ½	3 ¾	Thru
76	Front	9	5	Thru
77	Front	12 ¼	11	Thru
78	Front	5	3 ½	¼
79	Front	5 ¾	2 ½	¾
80	Front	5	5	1 ½
81	Front	3	3	1 ¼
82	Front	8	2 ½	1
83	Front	3	2	1
84	Front	9	2	1
85	Front	10 ¼	3	1
86	Front	6	4	Thru
87	Front	4	2 ½	1
88	Front	10	2 ½	1 ½
89	Front	3	2	1
90	Front	6 ½	5	Thru
91	Front	4	2	1
92	Front	3	3	1 ½
93	Top	8	4	¾
94	Top	3	1 ½	1
95	Right	5	4	¾
96	Right	12	4	¾
97	Bottom	5	3 ¾	¾
98	Bottom	4 ½	4	¾
99	Back	11 ½	4	3 ½
100	Front	8	4	½
101	Front	9	7	2
102	Front	8	4 ½	½
103	Front	11	3 ½	¾
104	Left	3	3	1
105	Back	6	4 ½	1
79R1	Front	6	5	1
71R1	Front	7	6	3
71R2	Front	5	4 ¼	2 ½
79R2	Front	9	5	1

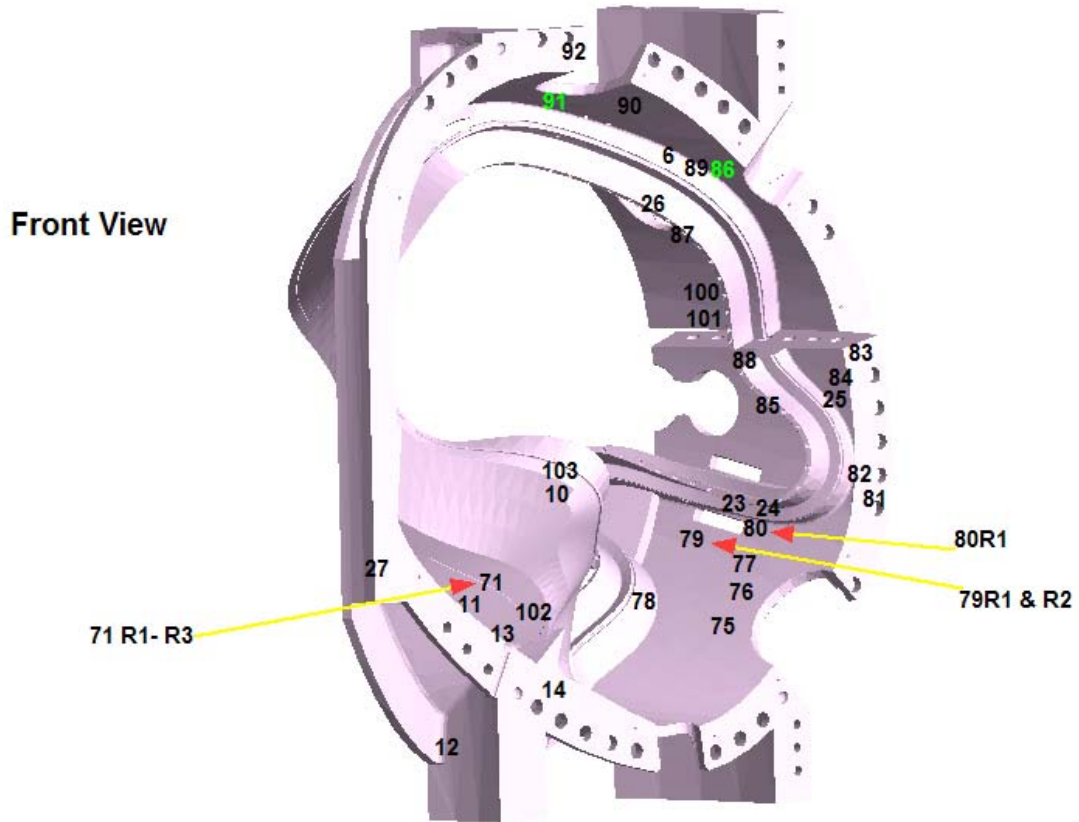
# C-3 Coil Weld Map – Metal Tek

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

Defect Number	Drawing View	Length (inches)	Width (inches)	Depth (inches)
104R1	Left	8 1/2	5 1/2	3/4
80R1	Front	8 1/2	3	1
71R3	Front	8	4 1/4	4

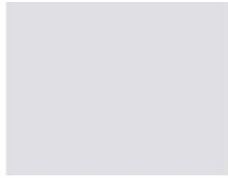
# C-3 Coil Weld Map – Metal Tek

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

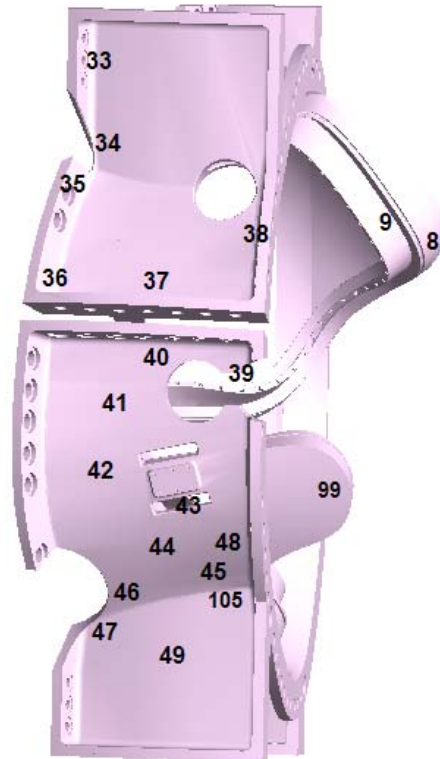


# C-3 Coil Weld Map – Metal Tek

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

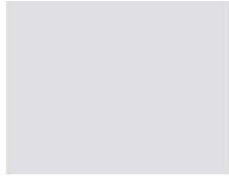


**Back View**

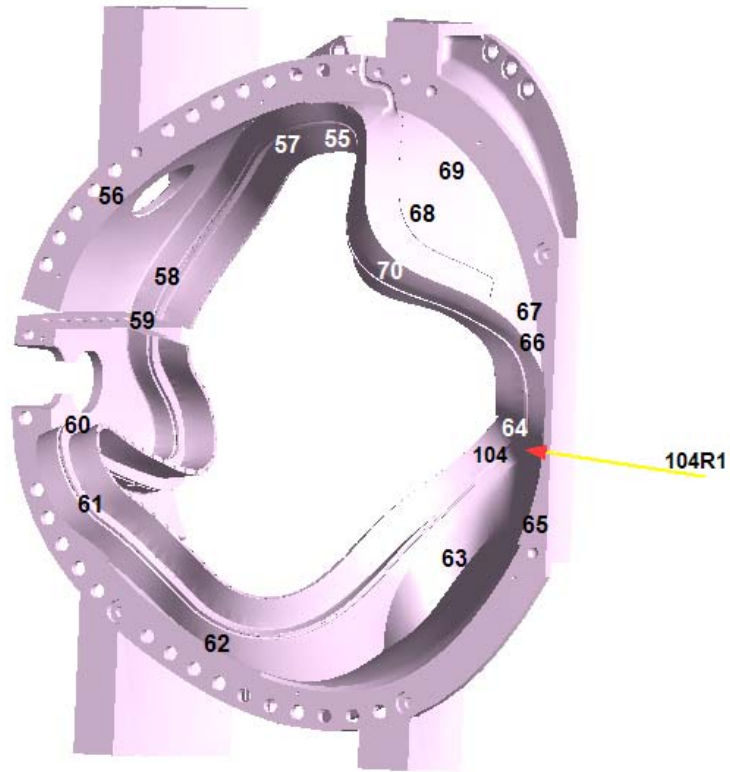


# C-3 Coil Weld Map – Metal Tek

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

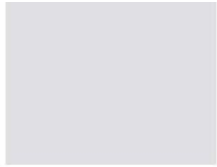


Left View

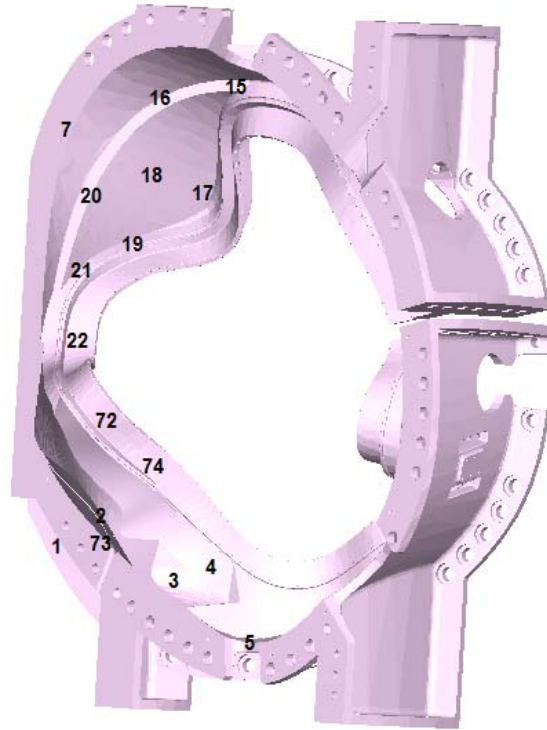


# C-3 Coil Weld Map – Metal Tek

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



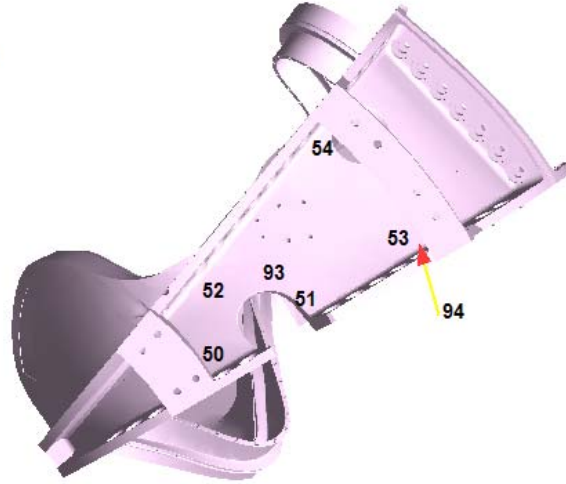
**Right View**



# C-3 Coil Weld Map – Metal Tek

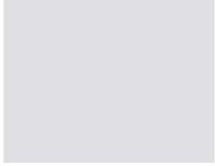
Map of all major welds exceeding 20% of wall, over 1 inch or over 10<sup>2</sup> inches

Top View

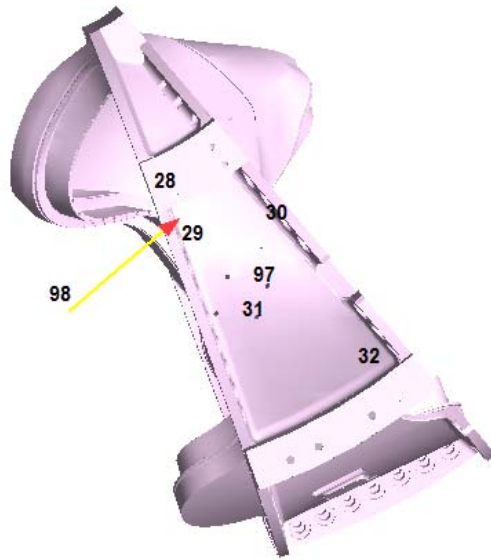


# C-3 Coil Weld Map – Metal Tek

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



**Bottom View**





RADIOGRAPHIC STANDARD SHOOTING SKETCH

Customer <b>EIO</b>	Pattern Number <b>MCWF-C3</b>
Material	Traceability Number <b>Repair Views</b>
Film Manufacturer <b>Fuji</b>	Source Number <b>23.2 060</b>
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)	42-43	45-46	47-48	48-49	62-63	83-84	92-93	96-97	97-98	116	117	I-J	X-Y
Thickness (IN.)	1 1/2 X 2"					1 1/2 X 3"	1 1/2 X 2"	2 3/4"				3 X 6"	
S/F Distance (IN.)	20"							18"				20"	
Penetrameter	30/40					30/40	30/40	50X2				60X2	
Time (MIN.)	6m30s	7m	6m30s	7m		15m	6m30s	10m				1hr 45min	
Focal Spot (IN.)	1.1												
Film Size (IN.)	14X17												
Screen Size (Pb)	101												
Front/Back													
S.W.E./D.W.E.	SWF												
S.W.V./D.W.V.	SWV												
Film Type	59/80					29/80	59/80	80/80				29/80	
Acceptance Standard	E446					E186	E446	E186					
Severity Level	SP 54												

Shooting Sketch (Use Additional Pages as Needed)

See original Technique Drawing

Technique Prepared By: Doug Midgett Level: II  
 Technique Approved By: \_\_\_\_\_ Level: \_\_\_\_\_

Date: 8-31-05  
 Date: \_\_\_\_\_

# 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		07/12/2005	361-02386
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		21418	GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET 1 OF 6	

PART NUMBER	Serial No	View	No Apparent Indications		Incomplete Penetration		Shrinkage		Film Artifacts		REMARKS
			Acceptable	Rejected	Dross or Porosity	Lack of Fusion Gas Cracks	Hot Tears cut	Under surface			
MCWF-C-3	3	1-2		R							3-4
		2-3		R							3-4
E.I.O. C040851		3-4	✓								
		4-5		R							4
MS75920		5-6		R							4
		7-8	✓								
		8-9	✓								
		9-10	✓								
		11-12	✓								
		12-13		R							5
		13-14		R							4-5
		15-16	✓								
		16-17	✓								
		18-19		R							
		19-20	✓								
		20-21	✓								
		21-22		R							3-4
		23-24	✓								
		24-25	✓								
		26-27	✓								
		27-28	✓								
		29-30	✓								
		30-31	✓								
		32-33	✓								
		33-34	✓								

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	12970	SHT.	REV.
COMMENTS				CUST. RSS NO.		SHT.	REV.
<p>Large packets of Burned on Sand are causing some views to fall out of Density. This sand can also mask defects.</p>				REVIEWER	<i>John Petroske</i>		
				CERTIFIED NOT LEVEL (RT)		John Petroske RT II Exp. 01/08	

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CUSTOMER		DATE	WORK ORDER NO.
NAME <u>METAL TEK INTERNATIONAL</u>		<u>07/12/2005</u>	361-02386
ADDRESS <u>8600 COMMERCIAL BLVD</u>		P.O. NUMBER	XRAY X
CITY <u>PEVELY</u> STATE <u>MO</u> ZIP <u>63070</u>		21418	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET <u>2</u> OF <u>6</u>	
ASTM E94-93	MSS-SP-54-1999		

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		
MCWF-C-3	35-36		✓							
	36-37		✓							
E.I.O. C040851	38-39		✓							
	39-40		✓							
MS75920	41-42		✓							
	42-43			R						
	44-45		✓							
	45-46			R						
	47-48			R						
	48-49			R						3-4
	50-51			R						3-4
	52-53			R						3-4
	53-54		✓							3-4
	54-55			R						3-4
	55-56			R	R					4
	56-57		✓							
	57-58			R						
	58-59		✓							
	59-60		✓							
	60-61			R						
	62-63			R						
	63-64			R						4
	65-66			R						
	67-68			R						
	68-69			R						

NO. ACCEPTED <u>0</u>	NO. REJECTED <u>1</u>	MQS TECH. NO. 12970	SHT.	REV.
COMMENTS		CUST. RSS NO.	SHT.	REV.
		REVIEWER <u>John Petroske</u>	CERTIFIED NDT LEVEL (RT)	
		John Petroske RT II Exp. 01/08		

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CUSTOMER		DATE	WORK ORDER NO.
NAME <u>METAL TEK INTERNATIONAL</u>		<u>07/12/2005</u>	361-02386
ADDRESS <u>8600 COMMERCIAL BLVD</u>		P.O. NUMBER	XRAY X
CITY <u>PEVELY</u> STATE <u>MO</u> ZIP <u>63070</u>		21418	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET <u>3</u> OF <u>6</u>	
ASTM E94-93	MSS-SP-54-1999		

PART NUMBER	Serial No	View	No Apparent Indications		Dross		Incomplete Penetration		Shrinkage			Film Artifacts			Indication Levels	REMARKS
			Acceptable	Rejected	Inclusion	or Porosity	Lack of Fusion	Gas	Cracks	Hot Tears	Under cut	Surface				
MCWF-C-3	3	69-70	✓													
		V64		R					R	R						4
E.I.O. C040851		71-72	✓													
		72-73	✓													
MS75920		73-74	✓													
		74-75	✓													
		75-76		R					R							2-3
		76-77	✓						✓							
		78-79	✓													
		79-80	✓													
		80-81	✓													
		81-82		R					R							2-3
		83-84		R						R						5
		85-86	✓										✓			
		86-87	✓										✓			
		87-88	✓						✓				✓			
		88-89		R						R			✓			4-5
		90-91	✓						✓				✓			5
		92-93		R					R							
		V94	✓										✓			
		V95	✓										✓			
		96-97		R						R						5
		97-98		R					R	R	R	R				Q.3-4/5
		98-99		R					R							3-4
		V100-101	✓						✓							

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	12970	SHT.	REV.
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>John Petroske</i>		
				CERTIFIED NDT LEVEL (RT)			
				John Petroske RT II Exp. 01/08			

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CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		07/12/2005	361-02386
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER 21418	XRAY X
CITY PEVELY STATE MO ZIP 63070			GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET 4 OF 6	

PART NUMBER	Serial No	View	No Apparent Indications		Dross		Incomplete Penetration		Shrinkage		Film Artifacts		Inclusion Levels	REMARKS
			Acceptable	Rejected	Inclusion	or Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface			
MCWF-C-3	3	101-102		R					R					
		102-103	✓											
E.I.O. C040851		103-104		R					R	R			3-4	
		104-105		R					R	R			4	
MS75920		106-107		R						R				
		107-108	✓											
		108-109	✓		✓									
		109-110	✓		✓									
		111-112	✓						✓					
		112-113		R	R			✓					5	
		114-115		R	R					R			Incl. O.K.	
		115-116	✓		✓									
		116-117		R						R				

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	12970	SHT.	REV.
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>John Petroske</i>		
				CERTIFIED NDT LEVEL (RT)			
				John Petroske RT II Exp. 01/08			

# TEAM COOPERHEAT-MQS, INC.

# CERTIFIED RADIOGRAPHIC INSPECTION REPORT

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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 <u>METAL TEK INTERNATIONAL</u>		<u>07/12/2005</u>	361-02386
ADDRESS <u>8600 COMMERCIAL BLVD</u>		P.O. NUMBER	XRAY X
CITY <u>PEVELY</u> STATE <u>MO</u> ZIP <u>63070</u>		21418	GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET <u>5</u> OF <u>6</u>	

PART NUMBER	Serial No	View	No Apparent Indications		Incomplete Penetration		Shrinkage		Fusion	Gas	Cracks	Hot Tears	Under cut	Sur-face	REMARKS
			Acceptable	Rejection	Dross or Slag	Porosity	Lack of	Cracks							
MCWF-C-3	3	1-2		R											5
		2-3		R											5
E.I.O. C040851		3-4		R											5
		4-5		R											4
MS75920		5-6		R				R							4/4
		6-7		R				R							4/4
Inside Rail		7-8		R				R							5/5
		8-9		R				R							5/5
		9-10		R				R							5/5
		10-11	✓					✓							
		11-12		R					R						
		12-13		R					R	R					4/4
		13-14		R					R	R					4/4
		14-15		R					R						4
		15-16	✓					✓							
		16-17		R					R						4
		17-18	✓					✓					✓		
		18-19		R					R	R			✓		4
		19-20		R							R				
		20-21	✓					✓					✓		
		21-22	✓					✓					✓		
		22-23		R					R	R					4/4
		23-24		R						R			✓		4
		24-25		R						R					5
		25-26		R					R						5

NO. ACCEPTED	NO. REJECTED	MQS TECH. NO. 12970	SHT.	REV.
COMMENTS		CUST. RSS NO.	SHT.	REV.
		REVIEWER <u>John Petroske</u>		
		CERTIFIED <u>NOT</u> 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  
07/12/2005

WORK ORDER NO.  
361-02386

P.O. NUMBER  
21418

XRAY X  
GAMMA

PROCEDURE SPECIFICATION  
ASTM E94-93

ACCEPTANCE CRITERIA  
MSS-SP-54-1999

SHEET 6 OF 6

PART NUMBER	Serial No	View	No Apparent Indications		Incomplete Penetration		Shrinkage			Film Artifacts	Indication Levels	REMARKS
			Acceptable	Rejected	Dross or Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Undercut			
MCWF-C-3	3	26-27		R			R					5
		128		R			R					4
E.I.O. C040851		29-30		R			R			✓		5
		30-1		R			R			✓		4
MS75920												
Inside Rail												

NO. ACCEPTED 8 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

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 <u>METAL TEK INTERNATIONAL</u>		<u>08/23/2005</u>	361-02386
ADDRESS <u>8600 COMMERCIAL BLVD</u>		P.O. NUMBER	XRAY X
CITY <u>PEVELY</u> STATE <u>MO</u> ZIP <u>63070</u>		21771	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET ____ OF ____	
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	or Porosity	Lack of Fusion	Gas Cracks	Hot Tears	Under cut	Surface		
MCWF-C-3	1	1-2	✓						3			✓	
R1		2-3	✓						2-3				
E.I.O. C040851		4-5	✓										
		5-6	✓						1				
MS75920		12-13	✓										
		13-14	✓										
		18-19	✓						1				
		21-22	✓										
		42-43			R					3			
		45-46			R			R					
		47-48			R			R		2			
		48-49			R			R		2			
		50-51	✓			2			1				
		52-53	✓									✓	
		54-55	✓						2-3				
		55-56	✓						1				
		57-58	✓			2							
		60-61	✓									✓	
		62-63			R				3				
		63-64	✓			1						✓	
		65-66	✓			2-3							
		67-68	✓							2			
		68-69	✓							2			
		75-76	✓						2			✓	
		81-82	✓										

NO. ACCEPTED <u>8</u>	NO. REJECTED <u>1</u>	MQS TECH. NO. 12970	SHT.	REV.
COMMENTS View 64 was Not Included. This shot was only taken for A large excavation in that Area on a previous Casting. View 63-64 covers that Area.		CUST. RSS NO.	SHT.	REV.
		REVIEWER <u>John Petroske</u>		
		CERTIFIED NDT LEVEL (RT)		
		John Petroske RT II Exp. 01/08		



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CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		08/23/2005	361-02386
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER 21771	XRAY X
CITY PEVELY STATE MO ZIP 63070			GAMMA
PROCEDURE SPECIFICATION ASTM E94-93	ACCEPTANCE CRITERIA MSS-SP-54-1999	SHEET ____ OF ____	

PART NUMBER	Serial No	View	No Apparent Indications		Rejection	Inclusion	Dross or Porosity		Lack of Fusion	Gas	Shrinkage Cracks	Hot Tears	Undercut	Surface	Film Artifacts	REMARKS
			Acceptable	Not Acceptable			Slag	osity								
MCWF-C-3	1	56-57	✓								2					
R1		69-70	✓													
E.I.O. C040851		73-74	✓												✓	
MS75920		74-75	✓													

NO. ACCEPTED	/	NO. REJECTED	0	MQS TECH. NO.	12970	SHT.	REV.
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>[Signature]</i>		
				CERTIFIED NDT LEVEL (RT)			
				John Petroske RT II Exp. 01/08			

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CUSTOMER		DATE	WORK ORDER NO.
NAME METAL TEK INTERNATIONAL		08/23/2005	361-02386
ADDRESS 8600 COMMERCIAL BLVD		P.O. NUMBER	XRAY X
CITY PEVELY STATE MO ZIP 63070		21771	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET ____ OF ____	
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-C-3	1	83-84		R				R					
R1		88-89	✓						2			✓	
E.I.O. C040851		92-93		R				R					
		96-97		R				R					
MS75920		97-98		R						R			
		98-99	✓										
		101-102	✓						2				
		103-104	✓										
		104-105	✓										
		106-107	✓										
		112-113	✓					1					
		114-115	✓						1-2				
		116-117		R				R					

NO. ACCEPTED	0	NO. REJECTED	1	MQS TECH. NO.	12970	SHT.	REV.
COMMENTS				CUST. RSS NO.		SHT.	REV.
				REVIEWER	<i>John Petroske</i>		
				CERTIFIED MDT LEVEL (RT)			
				John Petroske RT II Exp. 01/08			

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CUSTOMER		DATE	WORK ORDER NO.
NAME <u>METAL TEK INTERNATIONAL</u>		<u>08/23/2005</u>	361-02386
ADDRESS <u>8600 COMMERCIAL BLVD</u>		P.O. NUMBER	XRAY X
CITY <u>PEVELY</u> STATE <u>MO</u> ZIP <u>63070</u>		21771	GAMMA
PROCEDURE SPECIFICATION	ACCEPTANCE CRITERIA	SHEET ____ OF ____	
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-C-3	1	A-B	✓										
		B-C	✓										
E.I.O. C040851		C-D	✓		1				1				
		D-E	✓						1				
MS75920		E-F	✓						1				
		F-G	✓						2	2			
		G-H	✓						3				
		H-I	✓		1				1				
		I-J		R	1-2			R					
		K-L	✓										
		L-M	✓						1-2				
		M-N	✓										
		N-O	✓										
		P-Q	✓										
		R-S	✓										
		S-T	✓						1				
		U-W	✓										
		W-X	✓										
		X-Y		R				R	1				
		Y-Z	✓		3				2				
		Z-AA	✓						3				
		BB	✓										
		CC-DD	✓		1				1				
		DD-AA	✓		1				1				

NO. ACCEPTED	NO. REJECTED	MQS TECH. NO.	SHT.	REV.
0	1	12970		
COMMENTS		CUST. RSS NO.	SHT.	REV.
		REVIEWER		
		CERTIFIED NOT LEVEL (RT)		
		John Petroske RT II Exp. 01/08		

# MetalTek

## INTERNATIONAL

### RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <b>ETO</b>		PURCHASE ORDER NUMBER <b>PPPL-FP-LTS-2</b>			DATE <b>6-31-05</b>		CONTROL NO. <b>40851</b>		PAGE <b>1 of 1</b>														
PART NO. <b>MCWF-C3 coil</b>		SPECIFICATION <b>E446/E186</b>		CLASS <b>See spec</b>		TOTAL PIECES <b>1</b>		PIECES ACCEPTED <b>1</b>															
RADIOGRAPHED BY: <b>Midgett/Kelley</b>				INTERPRETED BY: <b>Midgett/Kelley</b>				ASNT LEVEL <b>II</b>															
FILM TYPE <b>29/59/80</b>		MATERIAL <b>CF8 MNMn mod</b>		ISOTOPE <b>IRIDIUM 192 COBALT 60 Y</b>				CODE <b>ASTM E94 ✓ ASME MIL-STD-453</b>															
<b>Repair Views</b>		<b>VIEWS</b>		<b>PENET</b>		<b>ACCEPT</b>		<b>REJECT</b>		<b>SHRINK</b>		<b>INCLUSION</b>		<b>POROSITY</b>		<b>LINEAR</b>		<b>SURFACE</b>		<b>LOF/LOP</b>		COMMENTS	
<b>m575920-2</b>		<b>R2</b>		<b>42-43</b>		<b>30/40</b>		<b>/</b>		<b>2</b>													
				<b>45-46</b>		<b>/</b>				<b>2</b>													
				<b>47-48</b>				<b>X</b>						<b>X</b>									
				<b>48-49</b>				<b>X</b>						<b>X</b>									
				<b>62-63</b>		<b>↓</b>		<b>/</b>		<b>1 1 2</b>													
				<b>83-84</b>		<b>30/40</b>		<b>X</b>						<b>X</b>									
				<b>92-93</b>		<b>30/40</b>		<b>X</b>						<b>X</b>									
				<b>96-97</b>		<b>50</b>		<b>/</b>		<b>1 1</b>													
				<b>97-98</b>		<b>↓</b>		<b>X</b>						<b>X</b>									
				<b>116-117</b>		<b>↓</b>		<b>/</b>		<b>1 1</b>				<b>/</b>									
				<b>I-J</b>		<b>60/120</b>		<b>X</b>						<b>X</b>									
				<b>X-Y</b>		<b>↓</b>		<b>X</b>						<b>X</b>									

# MetalTek

## INTERNATIONAL

### RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <b>EIO</b>	PURCHASE ORDER NUMBER <b>PPPL-FP-LTS-2</b>	DATE <b>9-7-05</b>	CONTROL NO. <b>40851</b>	PAGE <b>1 of 1</b>
PART NO. <b>McWF-C3 coil</b>	SPECIFICATION <b>E446/E186</b>	CLASS <b>seespec</b>	TOTAL PIECES <b>1</b>	PIECES ACCEPTED <b>1</b>
RADIOGRAPHED BY: <b>Ripperger/Midgett</b>		INTERPRETED BY: <b>Ripperger/Midgett</b>	ASNT LEVEL <b>II</b>	

FILM/TYPE	MATERIAL		ISOTOPE							CODE			COMMENTS
VIEW	P	E	A	R	S	I	P	L	S	L			
			CC	REJECT	SHRINK	INCLUSION	POROSITY	LINEAR	SURFACE	LOF/LOP			
<b>29154180</b>	<b>CF8mmnmvm</b>								<input checked="" type="checkbox"/>				
<b>MS75920-2</b>													
<b>R3</b>	<b>47-48</b>	<b>30/40</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>2</b>	<b>3</b>				<input checked="" type="checkbox"/>			
	<b>48-49</b>	<b>30/40</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<b>3</b>				<input checked="" type="checkbox"/>			
	<b>83-84</b>	<b>30/40</b>	<input checked="" type="checkbox"/>										
	<b>92-93</b>	<b>30/40</b>	<input checked="" type="checkbox"/>		<b>2</b>	<b>3</b>							
	<b>97-98</b>	<b>50</b>	<input checked="" type="checkbox"/>		<b>1</b>	<b>1</b>	<b>1</b>						
	<b>I-J</b>	<b>60/120</b>		<input checked="" type="checkbox"/>	<b>4</b>					<input checked="" type="checkbox"/>			
	<b>X-Y</b>	<b>60/120</b>		<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>			

# MetalTek INTERNATIONAL

## RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <b>EIO</b>	PURCHASE ORDER NUMBER <b>PPPL-FP-LTS-2</b>	DATE <b>9-9-05</b>	CONTROL NO. <b>40851</b>	PAGE <b>1 of 1</b>
PART NO. <b>m CWF-C3 coil</b>	SPECIFICATION <b>F446/E186</b>	CLASS <b>see spec</b>	TOTAL PIECES <b>1</b>	PIECES ACCEPTED <b>1</b>
RADIOGRAPHED BY: <b>midgett</b>	INTERPRETED BY: <b>midgett</b>	ASNT LEVEL <b>II</b>		

FILM TYPE <b>29/9/80</b>	MATERIAL <b>CF8mmnmmod</b>	ISOTOPE <b>IRIDIUM 192    COBALT 60 <math>\checkmark</math></b>	CODE <b>ASTM E94 <math>\checkmark</math>    ASME    MIL-STD-453</b>
-----------------------------	-------------------------------	--------------------------------------------------------------------	------------------------------------------------------------------------

R4  m575920-2	V I E W		P E N E		A C C E P T		R E J E C T		S H R I N K		I N C L U S I O N		P O R O S I T Y		L I N E A R		S U R F A C E		L O F / L O P		COMMENTS	
	47-48		$\frac{30}{40}$				X				4											
	48-49		J				X				4						X					
	I-J		$\frac{60}{120}$				X				3						X					
	X-Y		Y				X										X					

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## INTERNATIONAL

### RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <b>EIO</b>		PURCHASE ORDER NUMBER <b>PPPL-FP-LTS-2</b>				DATE <b>9-14-05</b>		CONTROL NO. <b>40851</b>		PAGE <b>1 of 1</b>									
PART NO. <b>MLWF03 coil</b>		SPECIFICATION <b>E186/E446</b>		CLASS <b>see spec</b>			TOTAL PIECES <b>1</b>		PIECES ACCEPTED <b>1</b>										
RADIOGRAPHED BY: <b>Middlet</b>				INTERPRETED BY: <b>Middlet</b>				ASNT LEVEL <b>II</b>											
FILM TYPE <b>2959/80</b>		MATERIAL <b>CF8M/mm mod</b>		ISOTOPE <b>IRIDIUM 192    COBALT 60 ✓</b>				CODE <b>ASTM E94 ✓    ASME    MIL-STD-453</b>											
<b>Repair Views</b>		<b>VIEW</b>		<b>ACCEPT</b>		<b>REJECT</b>		<b>INCLUSION</b>		<b>POROSITY</b>		<b>LINEAR</b>		<b>SURFACE</b>		<b>LOF/LOP</b>		<b>COMMENTS</b>	
<b>MS75920-2</b>		<b>R5</b>		<b>47-48</b>		<b>30/40</b>		<b>X</b>		<b>4</b>									
				<b>48-49</b>		<b>6</b>		<b>X</b>		<b>4</b>									
		<b>I-5</b>		<b>60/120</b>		<b>/</b>				<b>1 3</b>									
		<b>X-4</b>		<b>6</b>		<b>/</b>		<b>1 1 1</b>											

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### RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <i>Energy Industries of Ohio</i>	PURCHASE ORDER NUMBER <i>PPPL-FP-LTS-2</i>	DATE <i>9-16-05</i>	CONTROL NO. <i>40851</i>	PAGE <i>1 of 1</i>
PART NO. <i>MCWFC-3 COIL</i>	SPECIFICATION <i>E186/E446</i>	CLASS <i>See Spec</i>	TOTAL PIECES <i>1</i>	PIECES ACCEPTED <i>1</i>
RADIOGRAPHED BY: <i>Kelley</i>		INTERPRETED BY: <i>Kelley</i>		ASNT LEVEL <i>I</i>

FILM TYPE	MATERIAL			ISOTOPE					CODE				COMMENTS
				IRIDIUM 192		COBALT 60 /			ASTM E94 /	ASME	MIL-STD-453		
	V I E W	P E N E	A C C E P T	R E J E C T	S H R I N K	I N C L U S I O N	P O R O S I T Y	L I N E A R	S U R F A C E	L O F / L O P			
<i>29/59</i>	<i>CF8MNMN mod</i>												
<i>Repair Views</i>													
<i>MS75920-2</i>													
<i>R6</i>	<i>47-48</i>	<i>30/40 /</i>			<i>1</i>		<i>2</i>						
	<i>48-49</i>	<i>↓</i>		<i>X</i>			<i>2</i>			<i>X</i>			
<i>-R7</i>	<i>48-49</i>	<i>30/40 /</i>				<i>1</i>	<i>2</i>		<i>/</i>				



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## INTERNATIONAL

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### RADIOGRAPHIC INTERPRETATION REPORT

CUSTOMER <b>EIO</b>			PURCHASE ORDER NUMBER <b>PPPL-FP-LTS-2</b>				DATE <b>9-9-05</b>		CONTROL NO. <b>40851</b>		PAGE <b>1061</b>	
PART NO. <b>141-073-4</b> <b>coil shim</b>			SPECIFICATION <b>E186</b>		CLASS <b>see spec</b>		TOTAL PIECES <b>1</b>		PIECES ACCEPTED <b>1</b>			
RADIOGRAPHED BY: <b>R. Paeiger</b>			INTERPRETED BY: <b>R. Paeiger</b>				ASNT LEVEL <b>II</b>					
FILM TYPE <b>80</b>		MATERIAL <b>CFBMMNMOD</b>			ISOTOPE <b>WABK</b>			CODE <b>ASTM E94</b> ✓ <b>ASME</b> <b>MIL-STD-453</b>				
		V I E W	P E N E	A C C E P T	R E J E C T	S H R I N K	I N C L U S I O N	P O R O S I T Y	L I N E A R	S U R F A C E	L O F / L O P	C O M M E N T S
<b>M573220</b>												
<b>shim 4</b>				✓						✓		
				✓						✓		<b>processor marks</b>
				✓								
				✓								

# Metaltek INTERNATIONAL

## RADIOGRAPHIC STANDARD SHOOTING SKETCH

Customer	Energy Industries of Ohio	Pattern Number	SE-141-073 c sh/m
Material	CF8MNMN-MOD	Traceability Number	
Film Manufacturer	Fuji	Source Number	C060 24.7 ci
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)	A	B	C	D										
Thickness (IN.)	3 7/8"	→												
S/F Distance (IN.)	24"	→												
Penetrameter	50	→												
Time (MIN.)	22 min	→												
Focal Spot (IN.)	.1	→												
Film Size (IN.)	14X17	→												
Screen Size (Pb)	.01	→												
Front/Back		→												
S.W.E./D.W.E.	SWE	→												
S.W.V./D.W.V.	SWV	→												
Film Type	80	→												
Acceptance Standard	E186	→												
Severity Level	III	→												

Shooting Sketch (Use Additional Pages as Needed)

use spec. MSS-SP-54

TYP. Source Placement

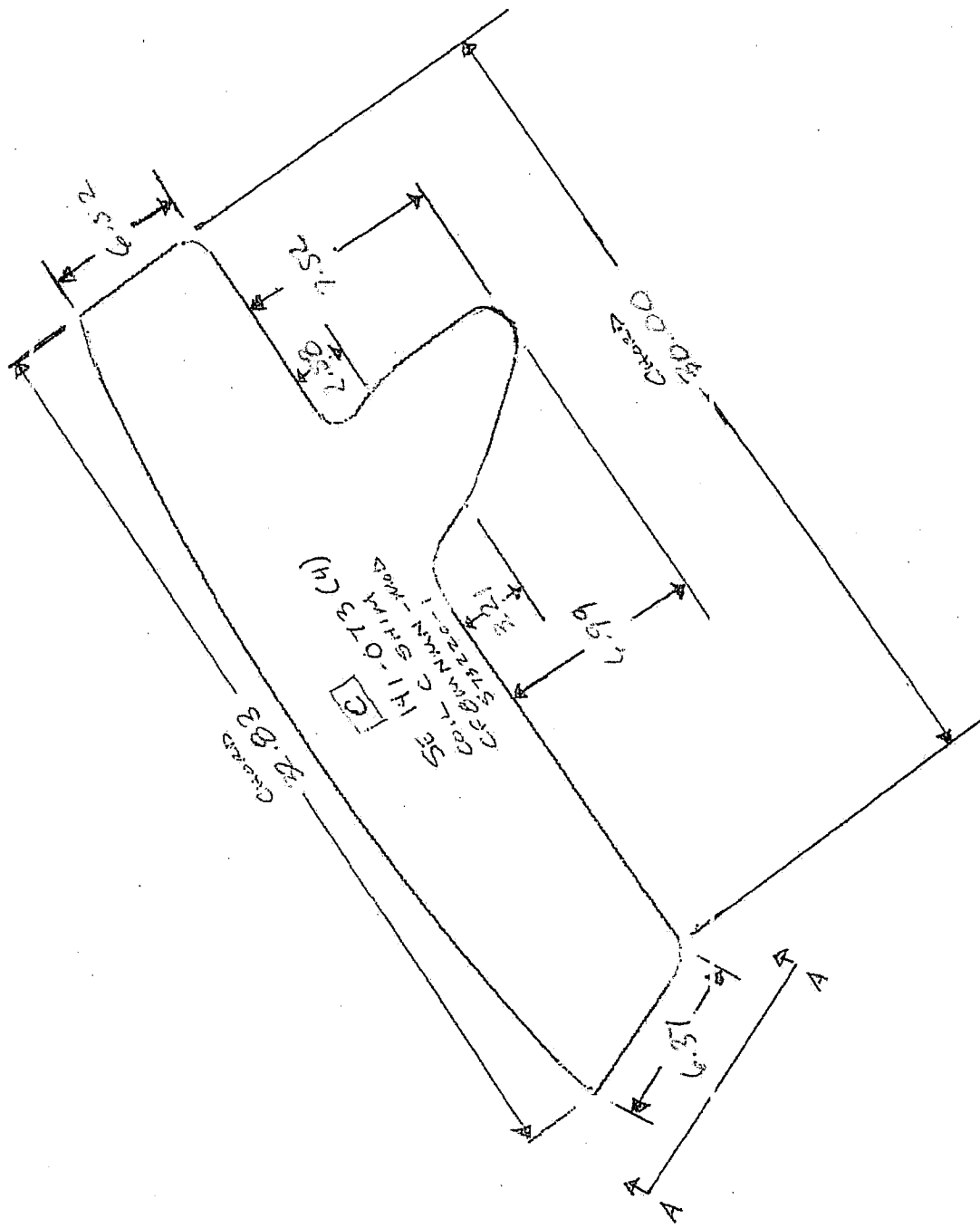
TYP. Film Placement

Technique Prepared By: RON Kelley Level: II Date: 9-9-05

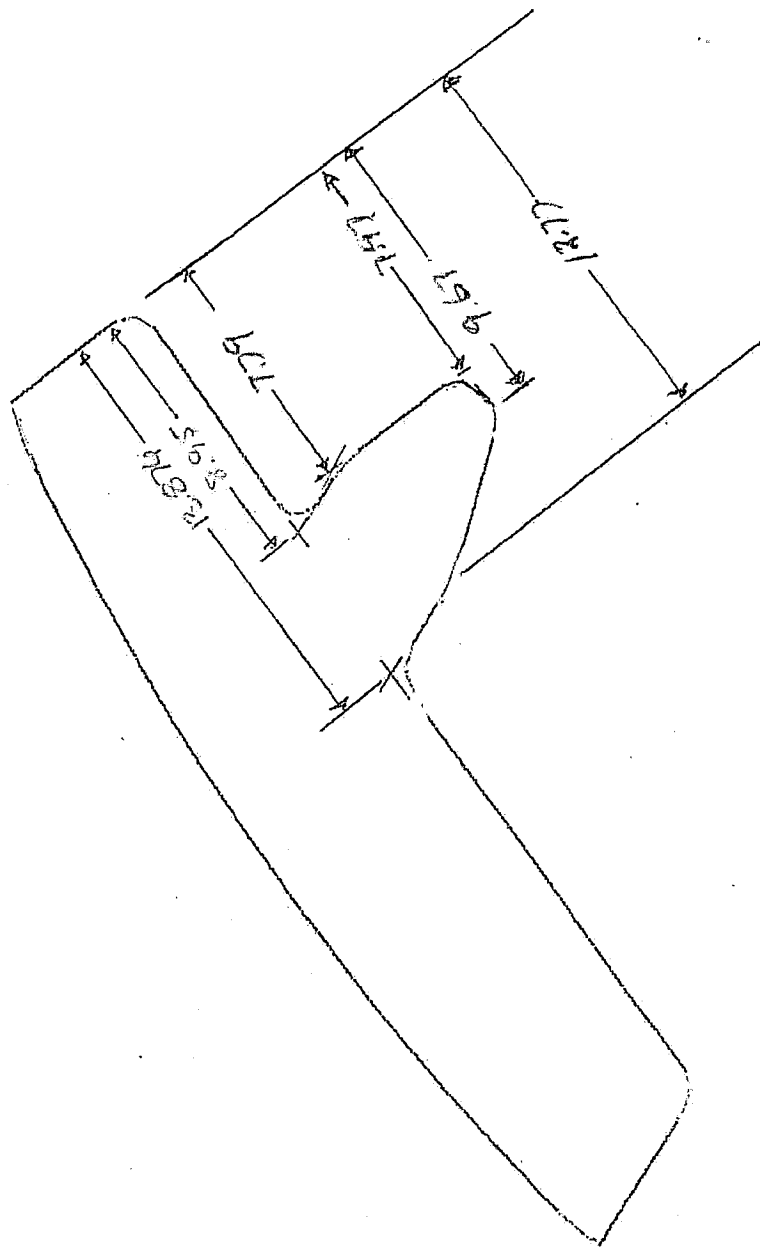
Technique Approved By: RS Level: III Date: 9/10/05



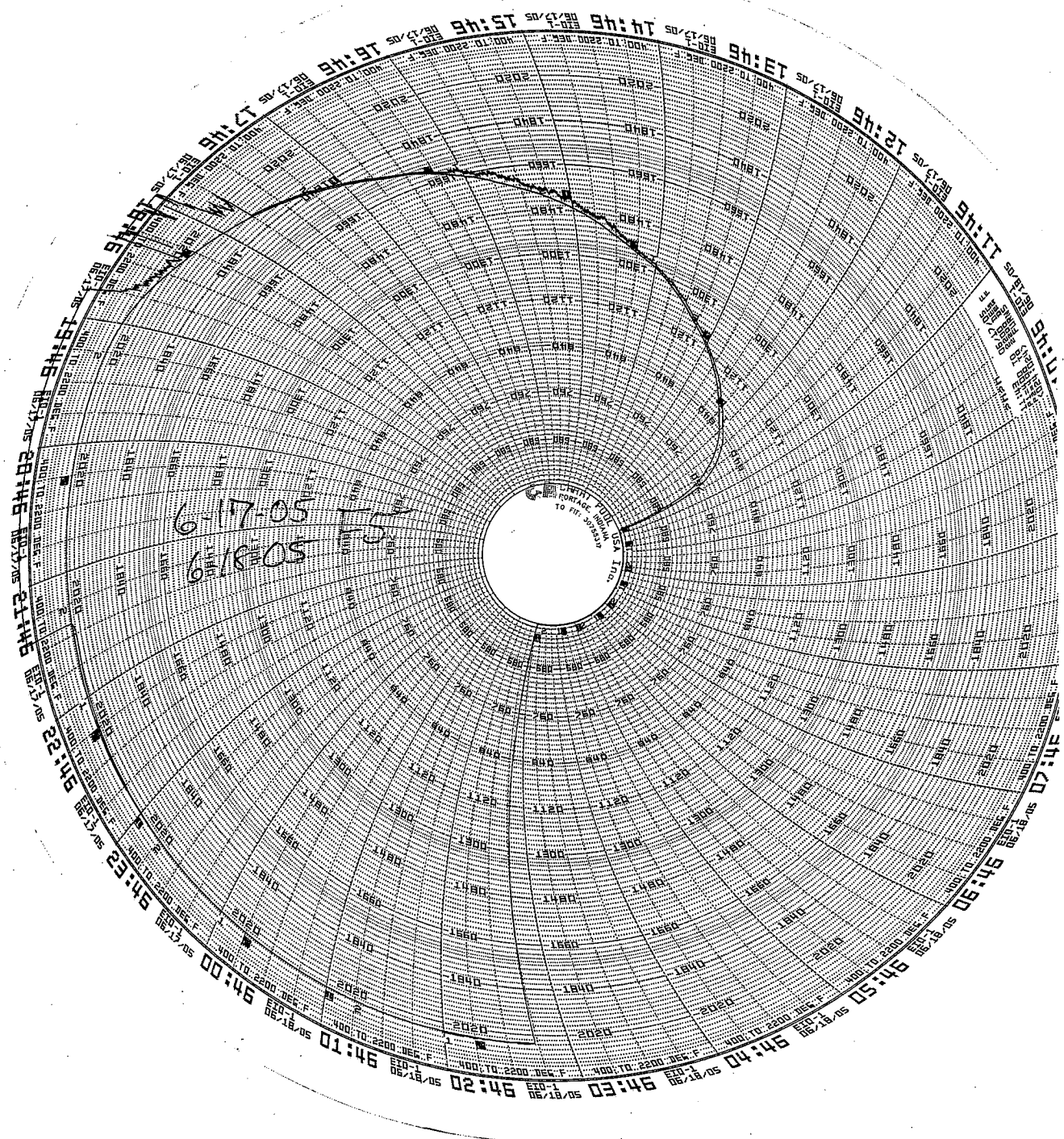
SECT A - A

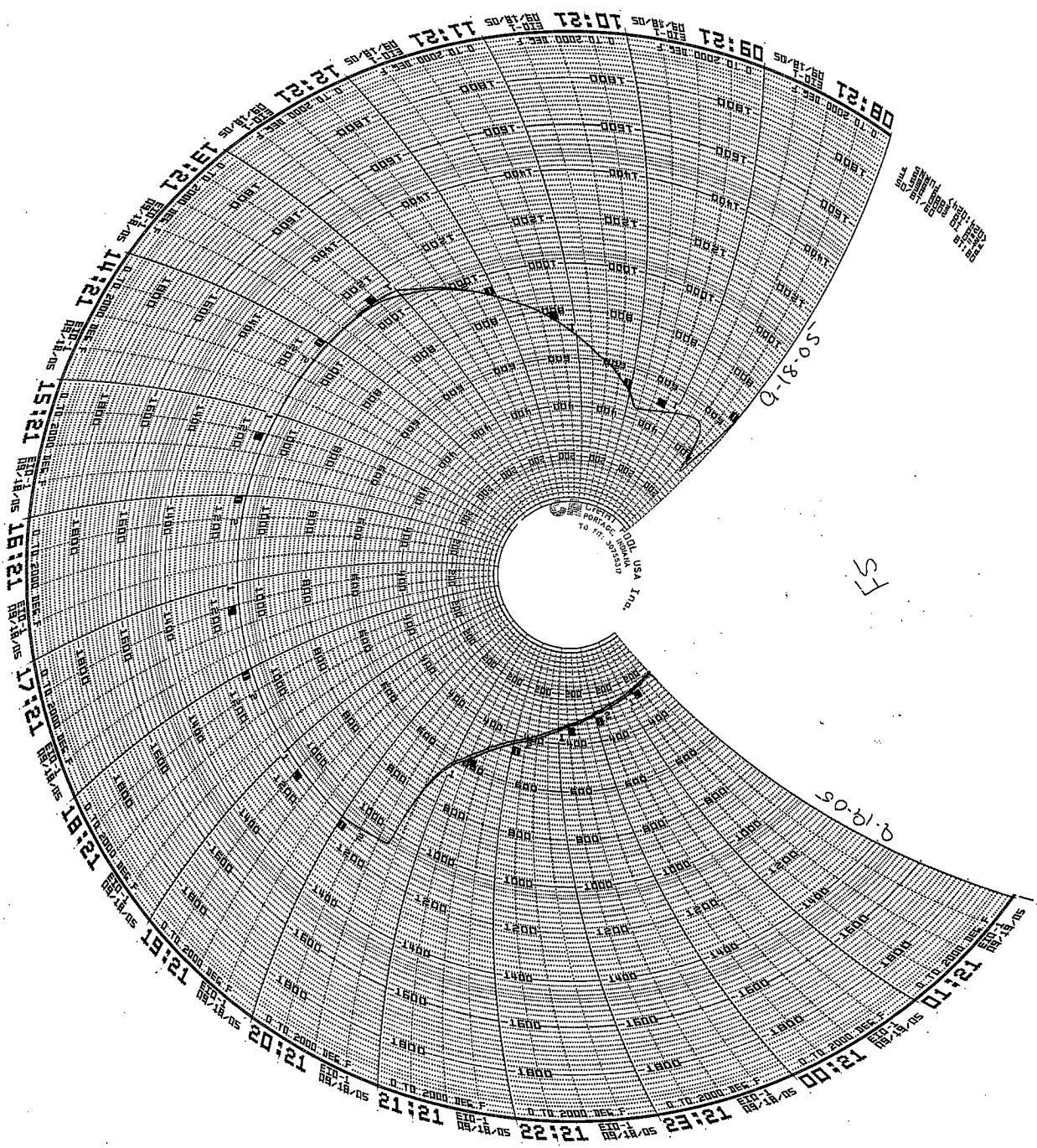


HIM SE 141-073  
SKETCH 9/12/05.  
PAGE 1 OF 2



PAGE 2 OF 2 (4)  
 SHIM SE 141-073 J. An J.  
 SKETCH 9/12/05



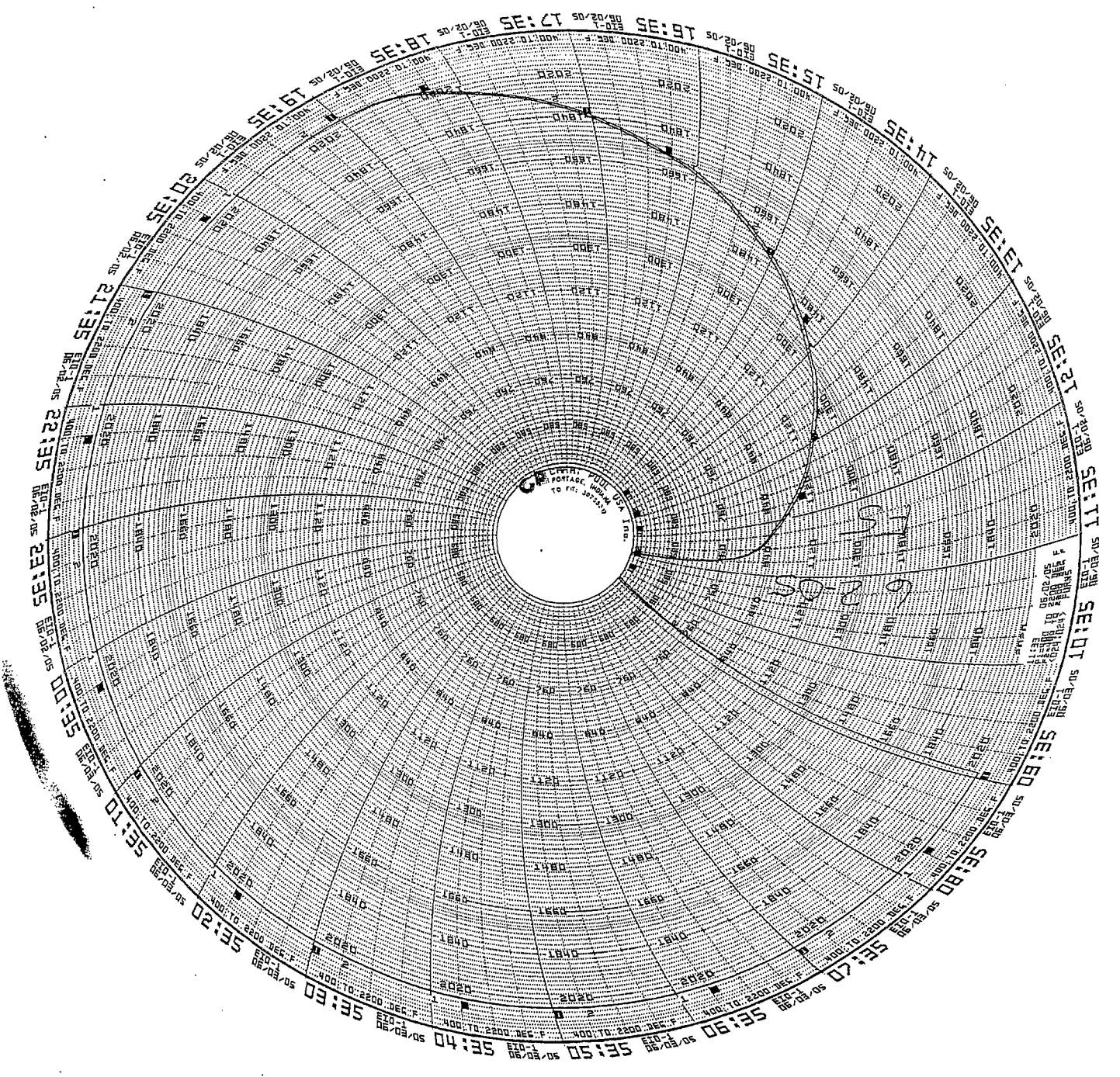


SHOW THE  
 50-81-0  
 50-81-0

57

2-12-05

A+C Shims Ctrl



Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) Serial Number C-3

1 OF 10 CO# 40851 Dated 3-9-05 Revision: Rev 7 Dated Issued: 6-14-05

OPER. #	STATION	DESCRIPTION OF PROCESS	Name	Date
10	QUALITY RELEASE	REVIEW AND APPROVE MTS. RECEIVED APPROVAL FROM EIO ON <u>6/14/05</u> FROM <u>Pete</u> SIGNED QUALITY MANAGER	<u>CAE</u>	<u>6/14/05</u>
15	PATTERN NPAT SOP 0100REV2	APPLY APPROPRIATE PART NUMBER, SERIAL NUMBER, AND FOUNDRY MARK, TO THE PATTERN. CAST ON BARS REQUIRED. Place numbers on the bars as to their location.	<u>Bue</u>	<u>6-10-05</u>
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.	<u>Bue</u>	<u>6-7-05</u>
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.	<u>Bue</u>	<u>6-7-05</u>
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>2730</u> CASTING POURED AT: <u>2:00 AM</u> DATE: <u>6-10-05</u> HEAT #'s: <u>29716, 29717, 29718, 29719, 29720</u> ELAPSED POUR TIME _____ KEEL BLOCKS POURED: <u>6</u> Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: <u>J.W. / R.</u> Analyzed: <u>G. Hurt</u> Date: <u>6-10-05</u>	<u>JWG</u>	<u>6-10-05</u>
50	MELT SOP 0800R2	SHAKEOUT	<u>CAE</u>	<u>6-10-05</u>



Energy Industries of ~~China~~

Manufacturing and Test Sequence (MTS) Serial Number C-3

2 OF 10 CO# 40851 Dated 3-9-05 Revision: Rev 7 Dated Issued: 6-14-05

60	ARC RISE SOP 0100R1	REMOVE RISERS AS DIRECTED BY SUPERVISOR.	BWA BWA	6-14-05 6-22-05
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: 4HR + 1/2 HR/IN, Quench Type: Air Cool		FS-1 DCSC 6/17/05
75	PHYSICAL TESTING	OBTAIN TEST SPECIMENS AND SUBMIT FOR PHYSICAL TESTING. REPORT RESULTS AS PART OF STEP 510.	WT	6/18
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>		
80	GRIND GWA SOP 0100R3	SWING GRIND TO REMOVE RISER REMAINS AND FLASH IF REQUIRED.	TJ	6-23-05
85	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND SURFACE OF PART AS REQUIRED FOR CONTOUR.	CA	6/29
90	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	MWW	6-29 -
NOTICE	WITNESS NOTIFICATION <del>HOLD FOR EIO APPROVAL</del>	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF LAYOUT. EIO NOTIFIED ON <u>6/28</u> DCMA NOTIFIED ON <u>6/28</u> APPROVAL RECEIVED ON _____	Q ENG OR QA MGR	to be performed later Ctn
100	LAYOUT SOP LAYOUT 0100	INSPECT CASTING TO VERIFY DIMENSIONS. THIS STEP MAY BE DELAYED. DIMENSIONED _____ DATE _____ RELEASED _____ (ENGINEER ONLY) 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.		
110	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 120.	VT - LEVEL II	

later  
Ctn  
to RT  
↓

**Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) Serial Number C-3**

3 OF 10 CO# 40851 Dated 3-9-05 Revision: Rev 7 Dated Issued: 6-14-05

*later*

NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF LP STEP. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR
115	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 _____ IF REJECTED CHECK HERE <input checked="" type="checkbox"/> MARK AND REPAIR AT STEP 120.	LP - LEVEL II <i>Perfand later can</i>
120	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% VISUAL AND LP INSPECTION.	
125	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION AS REQUIRED.	
130	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 125.	LP - LEVEL II
165	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	
170	<b>HOLD POINT WELD MAP</b>	MAP ALL 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 SEND REPORT ON ALL WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER. DEFECTS > 10% YES _____, REPORT SENT BY _____ DATE _____ DEFECTS < 10 % _____ SIGN BY QA ENG. <b>MAJOR WELD REPAIRS MAY NOT PROCEED UNTIL INFORMATION IS SUBMITTED.</b>	
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF X-RAY AND DIMENSIONAL STEPS. EIO NOTIFIED ON <u>4/29</u> DCMA NOTIFIED ON <u>6/29</u>	Q ENG OR QA MGR <i>LS</i>
190	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 <i>RS</i>

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**Energy Industries of Ohio  
Manufacturing and Test Sequence (MTS) Serial Number C-3**

4 OF 10    **CO# 40851 Dated 3-9-05 Revision: Rev 7 Dated Issued: 6-14-05**

210	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 220.	RT - LEVEL II RK	7/15/05
220	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.	CA	7/16
225	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION AS REQUIRED.	DB	7/28
230	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 <input checked="" type="checkbox"/> IF REJECTED SEND BACK TO STEP 225.	LP - LEVEL II TC	7/30
240	<b>HOLD POINT</b> WELD MAP	MAP ALL 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. MUST SEND REPORT ON ALL WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER. DEFECTS > 10% YES <input checked="" type="checkbox"/> , REPORT SENT BY <u>CAH</u> DATE <u>8/11/05</u> DEFECTS < 10 % _____ SIGN BY QA ENG. <b>MAJOR WELD REPAIRS MAY NOT PROCEED UNTIL INFORMATION IS SUBMITTED.</b> MUST SEND REPORT ON ALL WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER PRIOR TO REPAIR. ONCE THE REPORT IS SENT, WELDING MAY START.		
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON <u>7/7</u> DCMA NOTIFIED ON <u>7/7</u>	Q ENG OR QA MGR	CAH
260	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL/LOT USED: <u>30189 26/78309</u> QUALITY ENG. Name: <u>CAH</u> Date: <u>7/12</u> <del>3012000</del>		
270	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 <b>ADD WPS FOR VERTICAL WELDS.</b>		
280	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.		

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220	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.							
225	GRIND GCHI SOP 0100R2	CHIP AND HAND GRIND EXCAVATION AS REQUIRED.							
230	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 225.	LP - LEVEL II						
240	WELD MAP	MAP ALL 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".							
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						
260	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL/LOT USED: <u>3018926/78309</u> QUALITY ENG. Name: <u>CAH</u> Date: <u>8/2</u> <u>30/2/05</u>							
270	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	TL5 TO WPP IC	8-13-05 8-16-05 8-15-05 8-15-05					
280	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.	LG 8-17-05						
290	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 300. IF REJECTED CHECK HERE _____	LP LEVEL II						
	REPEAT	REPEAT STEPS <u>220 TO 290</u> AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION. DOCUMENT REWORK ON STEPS S220 TO S290. IF OK CHECK HERE _____ AND PROCEED TO STEP 295.							
	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>
S220	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.							

*Start  
Rev 8*



*Repair  
documented  
in S321  
to S327  
CAH*

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S230	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				
S240	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".					
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				
S260	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL /LOT USED : _____ QUALITY ENG. Name: _____ Date: _____					
S270	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					
S280	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.					
S290	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 300. IF REJECTED CHECK HERE _____ AND RETURN TO STEP S220.	LP - LEVEL II	OK  REJ	OK  REJ	OK  REJ	OK  REJ
	REPEAT	REPEAT STEPS S220 TO S290 AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION.	QA ENG.				
295	TEST MAG PERM SOP MAG PERM 100, REV 1	TEST MAG PERMEABILITY REPAIR AREAS TEST AT LEAST 5 POINTS PER WELD. ACCEPTANCE 1.02. IF OK CHECK HERE <input checked="" type="checkbox"/> AND GO TO STEP 300. IF REJECTED CHECK HERE _____.					CA
296	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 295. REPEAT UNTIL COMPLIANCE IS ACHIEVED.					
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				

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310 A	MQS X-RAY DEFECTS REPAIRED BY WELDING	X-RAY PER TECHNIQUE # 12726 USE CALIBRATED DENSITOMETER FOR DENSITY VERIFICATION. ATTACH TECHNIQUE, READER SHEET FOR ALL RADIOGRAPHS. MUST INDICATE RADIOGRAPHER AND ASNT CERTIFICATION LEVEL ON READER SHEET.	LEVEL II	mas	8-17-05
310 B	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE # 12726 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	DA	
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 220.	RT - LEVEL II	Down	9-1-05
	REPEAT STEPS	SUPPLEMENTAL REPAIR STEPS			
				1 <sup>ST</sup> R 9-7-05 Down	2 <sup>ND</sup> R 9-11-05 Down
S321	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.		JC 9/8	JC 9/13
				JC 9/15	RBD 9/15
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	CC 9/8	JC 9/13
				CC 9/15	CC 9/15
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".		JB 9/8	JB 9/13
				JB 9/15	N/A
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF WELD STEP. EIO NOTIFIED ON 9/1 DCMA NOTIFIED ON 9/1	Q ENG OR QA MGR		
S324	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL /LOT USED: 3018926/28309 QUALITY ENG. Name: LS Date: 9/8			
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-		JC	JC
				JC	RBD

OK  
on RT

GTZ

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		CF8MNMN MOD REV 0 (Vertical) FOR WELDS <8" - WPS 15-GMAW-CF8MNMN MOD REV 2					
S326	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.	DP 9/8	DP 9/14	DB 9/15		
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 300. IF REJECTED CHECK HERE <input checked="" type="checkbox"/> AND RETURN TO STEP S321.	LP - LEVEL II TC	OK TC (REJ)	(OK) TC REJ	OK REJ	OK REJ
	REPEAT	REPEAT STEPS S321 TO S327 AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION.	QA ENG.		KLA		
340	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.				RJB	9-16-05
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON <u>9/9</u> DCMA NOTIFIED ON <u>9/9</u>				Q ENG OR QA MGR	RS 9/9
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 _____ IF REJECTED CHECK HERE <input checked="" type="checkbox"/> . MARK AND REPAIR AT STEP 385. MUST BE PERFORMED BY LEVEL II in VT.				VT - LEVEL II KLA	9/16
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 455. IF REJECTED CHECK HERE <input checked="" type="checkbox"/>				LP - LEVEL II T.R.C.	9-16-05
380	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING FINAL PENETRANT INSPECTION.				JC	9/16
385	GRIND GCHI SOP 0100R2	CHIP AND HAD GRIND EXCAVATION AS REQUIRED.				DP DB	9/16
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.				LP - LEVEL II	JCR 9/16

NOTE: Layout step #100 performed 9/20/05 JRB  
From page 2 of MCT. ctn

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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. 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".	MA	
420	QA APPROVAL HOLD POINT	QA TO APPROVE ELECTRODE PRIOR TO USE. PROCEDURE USED: _____ MATERIAL/LOT USED: <u>3018926/78309</u> QUALITY ENG. Name: <u>RS</u> Date: <u>9/14</u>		
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	JC/WP	9/16
440	GRIND GCHI SOP 0100 REV 2	HAND GRIND WELDS.	DP/DB	9/17
450	L.P. WELDS CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. IF OK CHECK HERE <input checked="" type="checkbox"/> WASH AND SEND TO STEP 460. IF REJECTED CHECK HERE _____ AND RETURN TO STEP 440.	LP - LEVEL II	OK 9/18
	REPEAT	REPEAT STEPS <u>350 TO 450</u> AS REQUIRED TILL WELDS CLEAR FINAL LIQUID PENETRANT INSPECTION. DOCUMENT REWORK ON A SUPPLEMENTAL MTS	QA ENG.	MA
451	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 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.	MA	
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.	PLS	9/18
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	

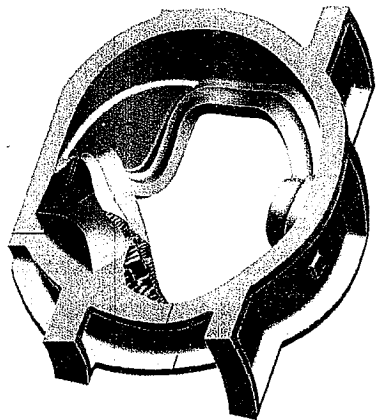
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*corrected*  
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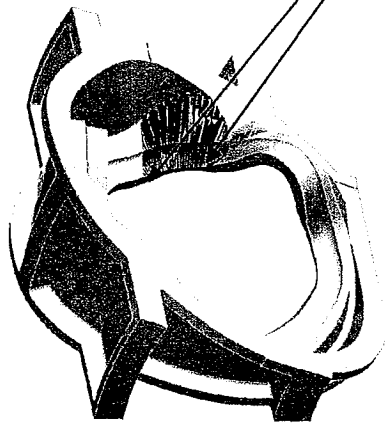
460	FINAL VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 3 ALL CONDITIONS. IF OK CHECK HERE <input checked="" type="checkbox"/> . IF REJECTED CHECK HERE _____ . MARK AND REPAIR AT STEP 390. MUST BE PERFORMED BY LEVEL II in VT.	VT - LEVEL II <i>HAA</i>	<i>9-20</i>
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. IF OK CHECK HERE <input checked="" type="checkbox"/> WASH AND SEND TO STEP 455. IF REJECTED CHECK HERE _____ . DOCUMENT REPAIRS USING S321 THROUGH S327.	LP - LEVEL II <i>HAA</i>	<i>9-20</i>
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF MAG PERM STEPS. EIO NOTIFIED ON <i>9/12</i> DCMA NOTIFIED ON <i>9/20</i>	Q ENG OR QA MGR	<i>ck</i>
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 checked="" type="checkbox"/> AND GO TO STEP 530. <i>RJG</i> IF REJECTED CHECK HERE <input checked="" type="checkbox"/>	<i>RJG</i>	<i>9-20-05</i>
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.	<i>ckm</i>	<i>9-20-05</i>
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 checked="" type="checkbox"/> . IF REJECTED CHECK HERE _____ RETURN TO STEP 510.	<i>RJG</i>	<i>9-20-05</i>
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)	<i>ckm</i>	<i>9/21/05</i>
NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON <i>9/21</i> BY <i>ckm</i> . RECEIVED RELEASE FROM EIO ON <i>9/21</i> .	Q ENG OR QA MGR	<i>ckm</i>
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.	CARUUD	



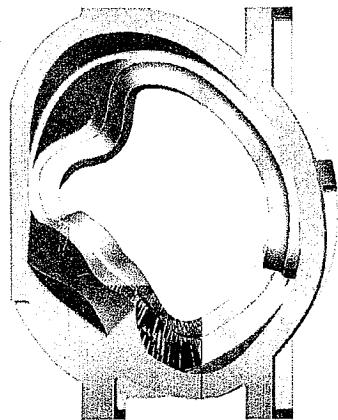
GENERAL ISOMETRIC  
VIEW FROM TOP SIDE

TABS DESIGNATE  
CRITICAL AREA

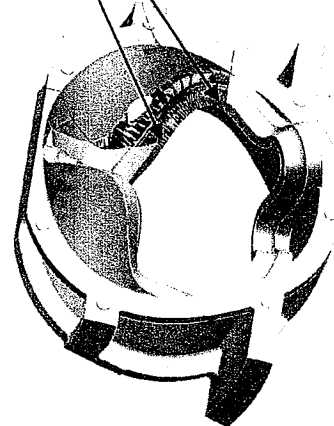
RED AREA INDICATES HIGH STRESSED AREA



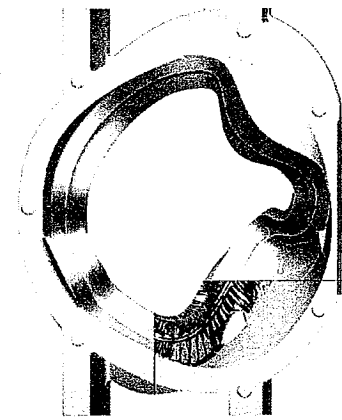
TOP SIDE ISOMETRIC



TOP SIDE VIEW



BOTTOM SIDE ISOMETRIC



BOTTOM SIDE VIEW

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## Energy Industries of Ohio

FIVE PARTS KEEP TOGETHER

Manufacturing and Test Sequence (MTS) Coill C Shim

CO# 40851, Pattern SE 141-073 -4 MS73220-2 Dated December 14, 2004 Revision:Original

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OPER. #	STATION	DESCRIPTION OF PROCESS Keep all parts together. Sign and date each step when all 5 parts have been completed.	Name	Date
10	QUALITY RELEASE	REVIEW AND APPROVE MTS. RECEIVED APPROVAL FROM EIO ON <u>Pete</u> FROM <u>12/15/04</u> SIGNED QUALITY MANAGER	<u>Chr</u>	<u>4/21/05</u>
20	PATTERN NPAT SOP 0100REV2	APPLY APPROPRIATE PART NUMBER, SERIAL NUMBER, FOUNDRY MARK, TO THE PATTERN.	<u>TB</u>	<u>4/22/05</u>
30	MOLD MOLD SOP 0400 REV 8 CALIBRATION PER MOLD SOP 0900 REV 5 PREPARATION PER MOLD SOP 1100R2/1200R2/13 00R1 SAND TESTING PER MOLD SOP 1400R2/1500R3/16 00R2	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.	<u>CR</u>	<u>4/22/05</u>
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>2825</u> CASTING POURED AT: <u>1225 Am</u> DATE: <u>4/28</u> HEAT #'s: <u>29198</u> ELAPSED POUR TIME <u>N/A</u> KEEL BLOCKS POURED: <u>yes</u> Sample from ladle to be analyzed for final chemical analysis and reported on material certifications. Sample Taken by: <u>SR</u> Analyzed: <u>G Hurt</u> Date: <u>4/28/05</u>  <b>Note: Make 15 additional test bars for mechanical testing.</b>	<u>JG</u>	<u>4/28</u>
50	MELT SOP 0800R2	SHAKEOUT	<u>CA</u>	<u>4/29/05</u>
60	ARC RISE SOP 0100R1	REMOVE RISERS AS DIRECTED BY SUPERVISOR.	<u>BW H</u>	<u>6/16/05</u>
70	HEAT TREAT HEAT SOP 0103R5	SOLUTION ANNEAL. With C-1 Coil.	<u>DLS</u>	<u>6/2/05</u>

Energy Industries of Ohio

FIVE PARTS KEEP TOGETHER

Manufacturing and Test Sequence (MTS) Coill C Shim

CO# 40851, Pattern SE 141-073 -4 MS73220-2 Dated December 14, 2004 Revision:Original

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80	PHYSICAL TESTING	OBTAIN TEST SPECIMENS AND SUBMIT FOR PHYSICAL TESTING. REPORT RESULTS AS PART OF STEP 480.	WHT	6/2/05
90	GRIND GSA SOP 0100R3 GCHI SOP 0100R2	SWING GRIND TO REMOVE RISER REMAINS AND FLASH IF REQUIRED. CHIP AND HAD GRIND SURFACE OF PART AS REQUIRED.	X CEG 6-16-05	
100	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	CA 6/16	
110	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 130.	VT - LEVEL II later	
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF LP STEP. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR	}
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 _____ IF REJECTED CHECK HERE _____ MARK AND REPAIR AT STEP 120.	LP - LEVEL II	
130	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING 100% VISUAL AND LP INSPECTION.		
140	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	
150	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.		
160	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 WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER. DEFECTS > 10% YES _____, REPORT SENT BY _____ DATE _____ DEFECTS < 10% _____ SIGN BY QA ENG.		
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF XRAY AND LAYOUT STEPS. EIO NOTIFIED ON _____ DCMA NOTIFIED ON _____	Q ENG OR QA MGR	

Energy Industries of Ohio

FIVE PARTS KEEP TOGETHER

Manufacturing and Test Sequence (MTS) Coill C Shim

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170	CAF X-RAY CQP 401 REV 5	X-RAY PER TECHNIQUE: To be determined. 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 KAR	9-9-05
180	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 310. REJECTED CHECK HERE <input type="checkbox"/> MARK UP DEFECTS AND SEND THE CASTING TO STEP 200.	RT - LEVEL II KAR	9-9-05
190	LAYOUT	INSPECT CASTING TO VERIFY DIMENSIONS. THIS MAY BE PERFORMED BEFORE OR AFTER STEP 180. DIMENSIONED <u>Sony J</u> DATE <u>9-12-05</u> RELEASED _____ (ENGINEER ONLY)	JS	9-12-05
200	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING RADIOGRAPHY.	MA	
210	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	3
220	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.. MUST SEND REPORT ON ALL WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER. DEFECTS>10% YES _____, REPORT SENT BY _____ DATE _____ DEFECTS < 10 % _____ SIGN BY QA ENG.		
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: _____ MATERIAL USED: _____ QUALITY ENG. Name: _____ Date: _____		
240	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		
250	GRIND GCHI SOP 0100R2	HAND GRIND WELDS.		

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260	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 <i>MP</i>	
	REPEAT	REPEAT STEPS 220 TO 260 AS REQUIRED TILL CLEAR THROUGH VISUAL INSPECTION & PENETRANT INSPECTION. DOCUMENT REWORK ON A SUPPLEMENTAL MTS	QA ENG.	
270	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 290. IF REJECTED CHECK HERE _____.		
280	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 270. REPEAT UNTILL COMPLIANCE IS ACHIEVED.		
290	CAF X-RAY DEFECTS REPAIRED BY WELDING CQP 401 REV 5	X-RAY PER TECHNIQUE: To be determined. 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	
300	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 310. REJECTED CHECK HERE _____ MARK UP DEFECTS AND SEND THE CASTING TO STEP 200.	RT - LEVEL II	
	REPEAT	REPEAT STEPS 200 TO 300 AS REQUIRED TILL WELDS CLEAR X-RAY. DOCUMENT REWORK ON A SUPPLEMENTAL MTS	QA ENG.	
310	SAND BLAST BLAS SOP 0100R6	SANDBLAST (REMOVE ALL BLAST MATERIAL FROM CASTING) SANDBLASTING WILL BE DONE USING RECYCLED SHARP ANGULAR AGGREGATE.	<i>BB</i>	<i>9/19</i>
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF VISUAL AND LP STEPS. EIO NOTIFIED ON <u>9/7</u> DCMA NOTIFIED ON <u>9/7</u>	Q ENG OR QA MGR	<i>C/n</i>
320	FINAL VISUAL INSPECTION CQP-500 REV 4	VISUALLY INSPECT 100% of COMPONENT ACCORDING TO ASTM A802 LEVEL 2 ALL CONDITIONS. IF OK CHECK HERE <input checked="" type="checkbox"/> . IF REJECTED CHECK HERE _____ . MARK AND REPAIR AT STEP 340.	VT - LEVEL II <i>KCA</i>	<i>9/19</i>

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		MUST BE PERFORMED BY LEVEL II in VT.		
330	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 <input checked="" type="checkbox"/> WASH AND SEND TO STEP 410. IF REJECTED CHECK HERE <input type="checkbox"/>	LP - LEVEL II	JOR/9/11A
340	WELD SOP 0100 REV 7	EXCAVATE ANY DEFECTS FOUND DURING FINAL PENETRANT INSPECTION.		
350	L.P. EXCAVATION CQP-300 REV 10	L.P. ALL EXCAVATIONS PRIOR TO WELDING TO ENSURE REMOVAL OF DEFECT. ACCEPTANCE PER A903.	LP - LEVEL II	
370	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. MUST SEND REPORT ON ALL WELDS OVER 10% OF NOMINAL WALL THICKNESS TO CUSTOMER. NOMINAL WALL THICKNESS TO CUSTOMER. DEFECTS.>10% YES _____, REPORT SENT BY _____ DATE _____ DEFECTS < 10 % _____ SIGN BY QA ENG.		
380	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		
390	GRIND GCHI SOP 0100 REV 2	HAND GRIND WELDS.		
400	L.P. WELDS CQP 0300 REV 10	L.P. WELD REPAIRS ACCEPTANCE PER ASTM A903. IF OK CHECK HERE _____ WASH AND SEND TO STEP 460. IF REJECTED CHECK HERE _____ AND RETURN TO STEP 390.	LP - LEVEL II	
	REPEAT	REPEAT STEPS 390 TO 410 AS REQUIRED TILL WELDS CLEAR FINAL LIQUID PENETRANT INSPECTION. DOCUMENT REWORK ON A SUPPLEMENTAL MTS	QA ENG.	
410	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 430.	NA	↓



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420	GRIND GCHI SOP 0100R2	GRIND AREAS OF NON COMPLIANCE AND RETURN TO STEP 420. REPEAT UNTILL COMPLIANCE IS ACHIEVED.	NA	NA
NOTICE	WITNESS NOTIFICATION	PROVIDE NOTICE TO EIO AND DCMA AT LEAST FIVE DAYS IN ADVANCE OF MAG PERM STEP. EIO NOTIFIED ON <u>9/7</u> DCMA NOTIFIED ON <u>9/7</u>	Q ENG OR QA MGR	Ctn
430	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 checked="" type="checkbox"/> AND GO TO STEP 470. IF REJECTED CHECK HERE _____	Ctn	7/20
440	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.	NA	
450	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 450		
460	PHOTOGRAPH	TAKE DIGITAL PICTURES.		
470	AUDIT REVIEW	PROCESS DOCUMENT TO PROGRAM MANAGER FOR COMPLIANCE AUDIT.	9/24	Ctn
480	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)	9/24	Ctn
NOTICE	RELEASE FROM EIO	PROVIDE DOCUMENTS TO EIO. SENT ON <u>9/20</u> BY <u>Ctn</u> . RECEIVED RELEASE FROM EIO ON _____.	Q ENG OR QA MGR	Ctn
490	PACK AND SHIP	PACKAGE AND SHIP TO MAJOR TOOL.		
1000	REVISION HISTORY	ORIGINAL 12-14-04.	CARUUD	



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:** MetalTek CA 1308

**Project Disposition:** Use as is.

**Approvals**

Procurement Technical Representative \_\_\_\_\_  
Wayne Reiersen for Phil Heitzenroeder

Responsible Line Manager \_\_\_\_\_  
Mike Cole for Brad Nelson



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.



Addendum to CA1323 8-17-05

Historical:

The proto type coil was poured on February 24, 2004. The chemistry specification at that time permitted a maximum of 0.04% for sulfur and phosphorus. The reported values for these elements were 0.01 and 0.02% respectively.

Prior to pouring the C-1 coil casting the specification was revised. MT failed to incorporate the revisions into our system. The contract review procedure did not detect the changes to the specification. Therefore normal change procedures were not implemented. This was reported in corrective action 1308 on June 13, 2005. The error was recognized when the material poured to cast C and A coil shims did not meet the revised specification.

An investigation was begun immediately to determine compliance of the C-1 and C-2 coils. It was determined that both the C-1 and C-2 met the revised chemistry, except for sulfur and phosphorus. To verify the analysis MT analyzed samples from the cast on bars taken from the coils. By this time the optical card had malfunctioned. This fact, in combination with the human error (believing that the type standard was also in the 0.002% range) led MT to believe that the sulfur and phosphorus were actually in the 0.002% range. As a result MT believed the coils to be compliant and no action was taken.

Current Activities:

Samples from A-1, C-4 and C-5 have been sent to Wisconsin Centrifugal, our parent company for independent analysis of all reported elements.

Repair to the spectrometer is scheduled for this week. In the mean time we continue our surveillance of the suspect elements during melt and chemistry analysis.

C. Ruud

A handwritten signature in black ink, appearing to read "C. Ruud", written over a white background.

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



Addendum to CA1323 9-8-05

This is to supplement and report our progress on this corrective action.

As previously committed, samples from A-1, C-4 and C-5 were sent to Wisconsin Centrifugal, our parent company, for independent analysis of all reported elements. The results indicated a discrepancy in the level of manganese in the results of the analyses performed by the two labs. Consistently, the Pevely lab measured Mn about 0.4 to 0.5% higher than WC measured. To confirm this information we sent three samples to an outside laboratory for wet chemistry analysis. The results correlated well with the results achieved at Wisconsin Centrifugal. See attached report.

In follow-up, samples from C-1, C-2 and C-3 were also sent for verification, with similar outcome. We then located and tested a sample from a test heat #21424 of CF8MNMNMOD made in January 2004. Testing indicated similar results.

It can be stated that, for at least the period of time comprising the Prototype and the Production to the repair of the Spectrometer, that our analysis of Manganese levels has been higher than the level actually present in the alloy. Typically, this deviation is on the order of 0.4-0.5%.

The spectrometer received the preventive maintenance on August 29, 2005. The report was submitted on September 2, 2005. The repair made to the optical card was determined to have rectified the previously reported issue with P and S reporting. No other mechanical or software problem that would affect Mn was determined at the time of the preventative maintenance.

In follow up to the Manganese discrepancy, the same samples were analyzed on the Pevely spectrometer. The levels reported after PM now correlate with the results from WC and the independent laboratory. Further investigation indicates that the BS180 standard used for type standardization may be sufficiently outside the range of Mn and inducing error. No other root cause has been determined, but the investigation continues.

In consideration of the erroneous Mn and other elemental readings, the following actions are proposed:

- Create a type standard that closely matches the Mn in CF8MNMNMOD. (In process)
- Request a revision to the chemistry range for Mn. (propose widening of Manganese since it has been proven to be effective at much lower concentrations than previously thought).
- Have each heat of CF8MNMNMOD verified independently for balance of program.

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

C. Ruud

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

## Chemistry Check with WISCO

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-1	Button #1	0.05	0.3	2.6	18.1	13.4	2.4	0.26	0.023	0.011
CAF	C-5,I-1	Button #2	0.05	0.4	2.6	18.0	13.4	2.6	0.26	0.026	0.013
WC	C-5,I-1	Button #2	0.02	0.3	2.2	18.2	13.5	2.4	0.25	0.025	0.010
STL Wet	C-5,I-1	Button #1			2.2						
CAF	C-5,I-1	Button #1	*	0.3	2.3	18.3	13.4	2.4	*	0.029	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-3	Button #1	0.05	0.4	2.2	17.9	13.4	2.5	0.24	0.033	0.012
CAF	C-5,I-3	Button #2	0.05	0.4	2.2	17.9	13.2	2.4	0.24	0.033	0.012
WC	C-5,I-3	Button #2	0.05	0.4	1.8	18.2	13.4	2.5	0.23	0.034	0.018
STL Wet	C-5,I-3	Button #1			1.8						
CAF	C-5,I-3	Button #1	*	0.4	1.8	18.3	13.3	2.5	*	0.034	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-5,I-6	Button #1	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.030	0.012
CAF	C-5,I-6	Button #2	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.029	0.011
WC	C-5,I-6	Button #2	0.04	0.3	2	18.3	13.3	2.4	0.24	0.031	0.018
STL Wet	C-5,I-6	Button #1			1.9						
CAF	C-5,I-6	Button #1	*	0.3	2.0	18.4	13.3	2.4	*	0.033	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	A-1	Reported	0.04	0.4	2.4	18.2	13.3	2.4	0.26	*	*
CAF	A-1	Cast on sample	*	0.5	2.1	18.0	13.4	2.4	*	0.034	0.009
WC	A-1	Cast on sample	0.06	0.6	1.6	18.1	13.7	2.4	0.25	0.027	0.009
CAF	A-1	Cast on sample	*	0.6	1.6	18.2	13.5	2.4	*	0.028	0.009 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-4	Reported	0.04	0.4	2.5	18.2	13.2	2.2	0.26	.030**	.014**
CAF	C-4	Cast on sample	*	0.6	1.9	17.9	13.5	2.3	*	0.037	0.013
WC	C-4	Cast on sample	0.04	0.6	1.5	17.8	13.6	2.4	0.25	0.030	0.012
CAF	C-4	Cast on sample	*	0.6	1.4	18.2	13.6	2.4	*	0.031	0.009 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-1	Reported	0.06	0.5	2.7	18.1	13.1	2.2	0.27	0.018**	0.014**
CAF	C-1	Cast on sample	*	0.7	2.2	18.1	13.1	2.2	*	0.021	0.010
WC	C-1	Cast on sample	0.06	0.7	1.8	18.3	13.4	2.4	0.24	0.021	0.014
CAF	C-1	Cast on sample	*	0.7	1.9	18.3	13.2	2.4	*	0.024	0.013 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-2	Reported	0.06	0.5	2.8	18.0	13.2	2.3	0.26	0.023**	0.018**
CAF	C-2	Cast on sample	*	0.8	2.2	18.1	13.4	2.2	*	0.030	0.012
WC	C-2	Cast on sample	0.07	0.9	1.6	18.2	13.7	2.2	0.23	0.023	0.014
CAF	C-2	Cast on sample	*	0.8	1.6	18.2	13.5	2.3	*	0.024	0.012 re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	C-3	Reported	0.04	0.4	2.5	18.2	13.3	2.3	0.25	0.023**	0.013**
CAF	C-3	Cast on sample	*	0.6	1.9	18.0	13.3	2.4	*	0.027	0.010
WC	C-3	Cast on sample	0.06	0.6	1.6	18.3	13.7	2.4	0.24	0.029	0.009
CAF	C-3	Cast on sample	*	0.6	1.6	18.1	13.5	2.4	*	0.028	0.011 re-run after PM

Test Heat poured 1/14/04

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S
CAF	24424	Button	0.05	0.4	2.8	18.1	12.9	2.2	0.27	0.020	0.010
CAF	24424	Keel bar	*	0.4	2.2	18.2	13.2	2.2	*	0.018	0.010 re-run after PM

\* not analyzed by spectrometer.

\*\* analyzed by wet chemistry.

For C-5 C and N were analyzed at CAF and at WC by Leco Analyzer, P+S analyzed on spectrometer.



Addendum to CA1323 9-30-05

This is to supplement and report our progress on this corrective action.

We have discussed the variation in reading the Mn levels with the service technician and the spectrometer manufacturer. No new information has been obtained to explain the differences in reading Mn levels.

The chemistry for the shims poured from heat 29198 has been analyzed and is added to the spreadsheet attached. It shows similar readings for Mn.

The chemistry for the C-6 coil is also added to the spreadsheet. We aimed for higher Mn at the furnace to assure the higher Mn levels. The results indicate the effort was successful.

Update as to action steps:

Create a type standard that closely matches the Mn in CF8MNMNMOD.

Completed at WC and has been sent to another laboratory.

Request a revision to the chemistry range for Mn. (propose widening of Manganese since it has been proven to be effective at much lower concentrations than previously thought).

Pending.

Have each heat of CF8MNMNMOD verified independently for balance of program.

Complete for all coils to date.

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

C. Ruud

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



Chemistry Check with WISCO			Revised 9-30-05			Information in blue added 9-30-05						
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
Heat #29198 for 5 C and 6 A shims												
CAF	29198	Reported 9/24/05	0.07	0.7	2.97	18.1	13.12	2.45	0.255	0.013**	0.01**	
CAF	29198	Separate Test bar	*	0.8	2.7	18.2	13.2	2.4	*	0.025	0.011	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-1	Button #1	0.04	0.3	2.5	18.2	13.5	2.4	0.25	0.028	0.010	run after PM
CAF	C-6,I-1	Button #2	*	0.2	2.4	18.1	13.6	2.4	*	0.03	0.012	run after PM
WC	C-6,I-1	Button #2	0.03	0.2	2.4	17.9	13.7	2.5	0.26	0.028	0.010	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-3	Button #1	0.04	0.4	2.4	18.2	13.4	2.3	0.25	0.034	0.011	run after PM
CAF	C-6,I-3	Button #2	*	0.4	2.4	18.2	13.7	2.3	*	0.033	0.012	run after PM
WC	C-6,I-3	Button #2	0.03	0.4	2.2	17.9	13.6	2.4	0.25	0.028	0.013	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,I-6	Button #1	0.04	0.4	2.6	18.3	13.4	2.4	0.26	0.031	0.010	run after PM
CAF	C-6,I-6	Button #2	*	0.4	2.5	18.2	13.7	2.4	*	0.031	0.013	run after PM
WC	C-6,I-6	Button #2	0.04	0.4	2.4	18.2	13.7	2.4	0.26	0.030	0.014	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-6,Z-3	Cast on sample	*	0.6	1.7	18.1	13.6	2.4	*	0.031	0.012	run after PM
WC	C-6,Z-3	Cast on sample	0.04	0.6	1.7	17.8	13.8	2.4	0.26	0.025	0.011	
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-1	Button #1	0.05	0.3	2.6	18.1	13.4	2.4	0.26	0.023	0.011	
CAF	C-5,I-1	Button #2	0.05	0.4	2.6	18.0	13.4	2.6	0.26	0.025	0.013	
WC	C-5,I-1	Button #2	0.02	0.3	2.2	18.2	13.5	2.4	0.25	0.025	0.010	
STL Wet	C-5,I-1	Button #1			2.2							
CAF	C-5,I-1	Button #1	*	0.3	2.3	18.3	13.4	2.4	*	0.029	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-3	Button #1	0.05	0.4	2.2	17.9	13.4	2.5	0.24	0.033	0.012	
CAF	C-5,I-3	Button #2	0.05	0.4	2.2	17.9	13.2	2.4	0.24	0.033	0.012	
WC	C-5,I-3	Button #2	0.05	0.4	1.8	18.2	13.4	2.5	0.23	0.034	0.018	
STL Wet	C-5,I-3	Button #1			1.8							
CAF	C-5,I-3	Button #1	*	0.4	1.8	18.3	13.3	2.5	*	0.034	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-5,I-6	Button #1	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.030	0.012	
CAF	C-5,I-6	Button #2	0.05	0.3	2.4	18.1	13.2	2.4	0.25	0.029	0.011	
WC	C-5,I-6	Button #2	0.04	0.3	2	18.3	13.3	2.4	0.24	0.031	0.018	
STL Wet	C-5,I-6	Button #1			1.9							
CAF	C-5,I-6	Button #1	*	0.3	2.0	18.4	13.3	2.4	*	0.033	0.012	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	A-1	Reported	0.04	0.4	2.4	18.2	13.3	2.4	0.26	*	*	
CAF	A-1	Cast on sample	*	0.5	2.1	18.0	13.4	2.4	*	0.034	0.009	
WC	A-1	Cast on sample	0.06	0.6	1.6	18.1	13.7	2.4	0.25	0.027	0.009	
CAF	A-1	Cast on sample	*	0.6	1.6	18.2	13.5	2.4	*	0.028	0.009	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-4	Reported	0.04	0.4	2.5	18.2	13.2	2.2	0.26	0.030**	0.014**	
CAF	C-4	Cast on sample	*	0.6	1.9	17.9	13.5	2.3	*	0.037	0.013	
WC	C-4	Cast on sample	0.04	0.6	1.5	17.8	13.6	2.4	0.25	0.030	0.012	
CAF	C-4	Cast on sample	*	0.6	1.4	18.2	13.6	2.4	*	0.031	0.009	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-1	Reported	0.06	0.5	2.7	18.1	13.1	2.2	0.27	0.013**	0.014**	
CAF	C-1	Cast on sample	*	0.7	2.2	18.1	13.1	2.2	*	0.021	0.010	
WC	C-1	Cast on sample	0.06	0.7	1.8	18.3	13.4	2.4	0.24	0.021	0.014	
CAF	C-1	Cast on sample	*	0.7	1.9	18.3	13.2	2.4	*	0.024	0.013	re-run after PM
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-2	Reported	0.06	0.5	2.8	18.0	13.2	2.3	0.26	0.023**	0.018**	
CAF	C-2	Cast on sample	*	0.8	2.2	18.1	13.4	2.2	*	0.030	0.012	
WC	C-2	Cast on sample	0.07	0.9	1.6	18.2	13.7	2.2	0.23	0.023	0.014	
CAF	C-2	Cast on sample	*	0.8	1.6	18.2	13.5	2.3	*	0.024	0.012	re-run after PM

Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	C-3	Reported	0.04	0.4	2.5	18.2	13.3	2.3	0.25	0.023**	0.013**	
CAF	C-3	Cast on sample	*	0.6	1.9	18.0	13.3	2.4	*	0.027	0.010	
WC	C-3	Cast on sample	0.06	0.6	1.6	18.3	13.7	2.4	0.24	0.023	0.009	
CAF	C-3	Cast on sample	*	0.6	1.6	18.1	13.5	2.4	*	0.023	0.011	re-run after PM
Test Heat poured 1/14/04												
Lab	I.D.	Sample	C	Si	Mn	Cr	Ni	Mo	N	P	S	
CAF	24424	Reported	0.054	0.4	2.8	18.1	12.94	2.21	0.27	0.023	0.010	
CAF	24424	Keel bar	*	0.4	2.2	18.2	13.2	2.2	*	0.013	0.010	re-run after PM
* not analyzed by spectrometer.												
** analyzed by wet chemistry.												
For C-5 and C-6 - C and N were analyzed at CAF and at WC by Leco Analyzer, P+S analyzed on spectrometer.												



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

RES/nmc





Corrective Action 1379  
Carondelet Division - CA / PA / RGA Database  
Corrective Action Type NCR  
Date 8/31/2005  
CA Originator C. Ruud  
Applies to: Weld Material Lincoln 3018926-78309

**Description of Defect / Non-Conformance**

Material failed elongation and one of three Charpy impact tests at -320 F. The average of the specimens exceeds the minimum. See S8 of ASTM A 703/A 703M.

**Root Cause**

The sample of the weld contained defects not detected.

**Corrective Action**

Retest material already at Lab.  
If needed, make a new weld plate after reviewing process with welder and weld another sample.

**Verification of Corrective Action**

Retest results. If new plates are needed, the new plate will be x-rayed prior to testing.

**Estimated Completion Date**

9-2-05

**Actual Completion Date TBD**

Signed: C. Ruud

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

CC: R. Suria, Barry Craig, Joe Edwards, E.J. Kubick

**Nonconformance Report: CA1379**

**Project Disposition:**

Since the re-test meets requirements, this NCR can now be considered closed.


**Approvals:**

Phil  
Heitzenroeder

Digitally signed by Phil Heitzenroeder  
DN: CN = Phil Heitzenroeder, C = US,  
O = PPPL, OU = Mech. Eng. Division  
Reason: I am approving this document  
Date: 2005.11.07 10:09:53 -0500

---

Procurement Technical Representative

 11/7/05

---

Responsible Line Manager:



Corrective Action 1403  
Carondelet Division - CA / PA / RGA Database  
Corrective Action Type NCR  
Date 9-30-05  
CA Originator C. Ruud  
Applies to: C-3 Coil

**Description of Defect / Non-Conformance**

Lack of fusion and porosity in weld repairs were observed during radiography of the R-2 through R-7 x-ray confirmation shots.

**Root Cause**

Porosity and lack of fusion was caused by leaks in the lines feeding gas to the welding booths and leaks from the leads on one welding machine. Some repair loops resulted from the original defects not fully being removed during excavation.

**Corrective Action**

Took all welders off the main lines and supplied with bottled gas. Inspect all lines from the bulk tanks to the weld booth. Replaced defective lead. Reviewed proper excavation techniques with the welders. The start up procedure for welders has been revised to include a flow check. If flow is not adequate, welding will not be performed until repairs are complete and re test indicate proper flow.

**Verification of Corrective Action**

Re x-ray the defective welds.

**Estimated Completion Date**

9/16/05 for repairs, other actions 10/21/05.

**Actual Completion Date**

9/16/05 for bottle gas, repairs and RT. 10/4/05 for leads.

Signed: C. Ruud

A handwritten signature in black ink, appearing to be "C. Ruud", written over a horizontal line.

CC: R Suria, B. Craig, J. Edwards, E.J. Kubick





### Carondelet Division

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

### Final Inspection Report

Customer Name: ENERGY INDUSTRIES OF OHIO

Pattern: MCWF-C 3 COIL

Order Number: PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 9/20/2005

Type Description	Cert Number	Procedure	Acceptance Criteria	Actual
Liquid Penetrant	S75920-2	CQP - 300 Rev 9	SEE NOTE	Acceptable
<b>Notes</b> Acceptance per ASTM A903. Acceptance criteria - level 1 for high stressed areas, level 2 for all other areas.				
Mag Perm	S75920-2	SOP Mag Perm 100 Rev 1	<1.02	Acceptable
Radiographic	S75920-2	Technique # 12726	MSS SP 54	Acceptable
Visual	S75920-2	CQP - 500 REV 4	ASTM A802 LEVEL 2	Acceptable

Liquid Penetrant  
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

### Final Inspection Report

Customer ENERGY INDUSTRIES OF OHIO  
Pattern: SE-141-033 COIL C SHIM S/N 4

Order PPPL-FP-LTS-2

ASTM Metal CF8MNMN MOD

Date 9/13/2005

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

#### Visual

Technician: Kevin Anderson  
ASNT Level II

#### Liquid Penetrant

Technician: Jason Rees  
ASNT Level II

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

www.MetalTekInt.Com



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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 C SHIM	S/N 4
ASTM	CF8MNMN MOD	Date 9/13/2005
Cert Number	S76220-1	

C shim for C-3 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.

Respectfully Submitted,  
Charles A. Ruud  
Quality Assurance Manager

**Superior Quality Engineered Metal Products**

[www.MetalTekInt.Com](http://www.MetalTekInt.Com)