

COPY

DATA PACKAGE
SWENSON PROCESS EQUIPMENT INC
6'-4" OD HORIZONTAL COOLER
PO #SL-6814
TRC JOB #98019S

9/10/98

U W RT-4	NATIONAL BOARD NO.		286	
	CERTIFIED BY THE ROBERTS CO.			
	SHEET MAWF	40/FV	PSIG AT 200/100	
	TUBES IDE MAWF	30/FV	PSIG AT 225/100	
	MOIMT	-20	PSIG AT 40/FV	
JOB/SER. NO.		98019S	YEAR BUILT	1998
THE Roberts COMPANY		WINTERVILLE NORTH CAROLINA 28159-00		

THE

Robert's

COMPANY

WINTERVILLE

NORTH CAROLINA,

28590

MAWP XXXXXXXX PSIG AT XXXXXXXX OF

JOB NO. 980195 YEAR BUILT 1998

CUSTOMER PO NO 01-90867

EQUIPMENT NO F-619

CONTRACT NO 97019-05

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS

As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

Swenson cooler

1. Manufactured and certified by THE ROBERTS COMPANY, HIGHWAY 11 SOUTH & STATE ROUTE 1129, WINTERVILLE, NORTH CAROLINA 28590

(Name and address of Manufacturer)

2. Manufactured for Swenson Process Equipment, Inc. 15700 Lathrop Avenue, Harvey, IL 60426

(Name and address of Purchaser)

3. Location of Installation Vicksburg Chemical Company, 4280 Rifle Range Rd., Vicksburg, MS 39180

(Name and address)

4. Type: Horizontal heat exchanger 98019s SD-100073-1 286 1998

(Horiz., vert., or sphere) (Tank separator, jkt. vessel, heat exh., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 Edition 1995, Addenda 1996

Edition and Addenda (date)

Code Case No.

Special Service per UG-120(d)

Items 6 - 11 Incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 2 (b) Overall length (ft & in.): 19'-11 5/8"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
2	6'-4" OD	9'-10 1/2"	SA-516 Gr 70		1/2	0	1	Spot	.85	1	Spot	.85	-	-

7. Heads: (a)												(b)			
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp												(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp			
Location (Top, Bottom, Ends)		Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A			
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.	
(a)															
(b)															

If removable, bolts used (describe other fastening)

8. Type of jacket Jacket closure

(Mat'l Spec. No., Grade, Size, No.)

If bar, give dimensions (Describe as ogee & weld, bar, etc.)

If bolted, describe or sketch.

9. MAWP 40 15 psi at max. temp. 200 100 ° F Min. design metal temp. -20 ° F at 40 / 15 psi.

(internal) (external) (internal) (external)

10. Impact test exempt per UG-20f.

11. Hydro., pneu., or other test press 60 Proof test

(indicate yes or no and the component(s) impact tested)

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA-240 Ty 304L 6'-3" 1-1/4" 0 welded

Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)

13. Tubes: SA-249 Ty TP304 1-1/2" 16 BWG 1044 straight

Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

Mat'l Spec. No., Grade or Type O. D., in. Nom. thk., in. or gauge Number Type (Straight or U)

Items 14 - 18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): 2 (b) Overall length (ft & in.): 3'-8"

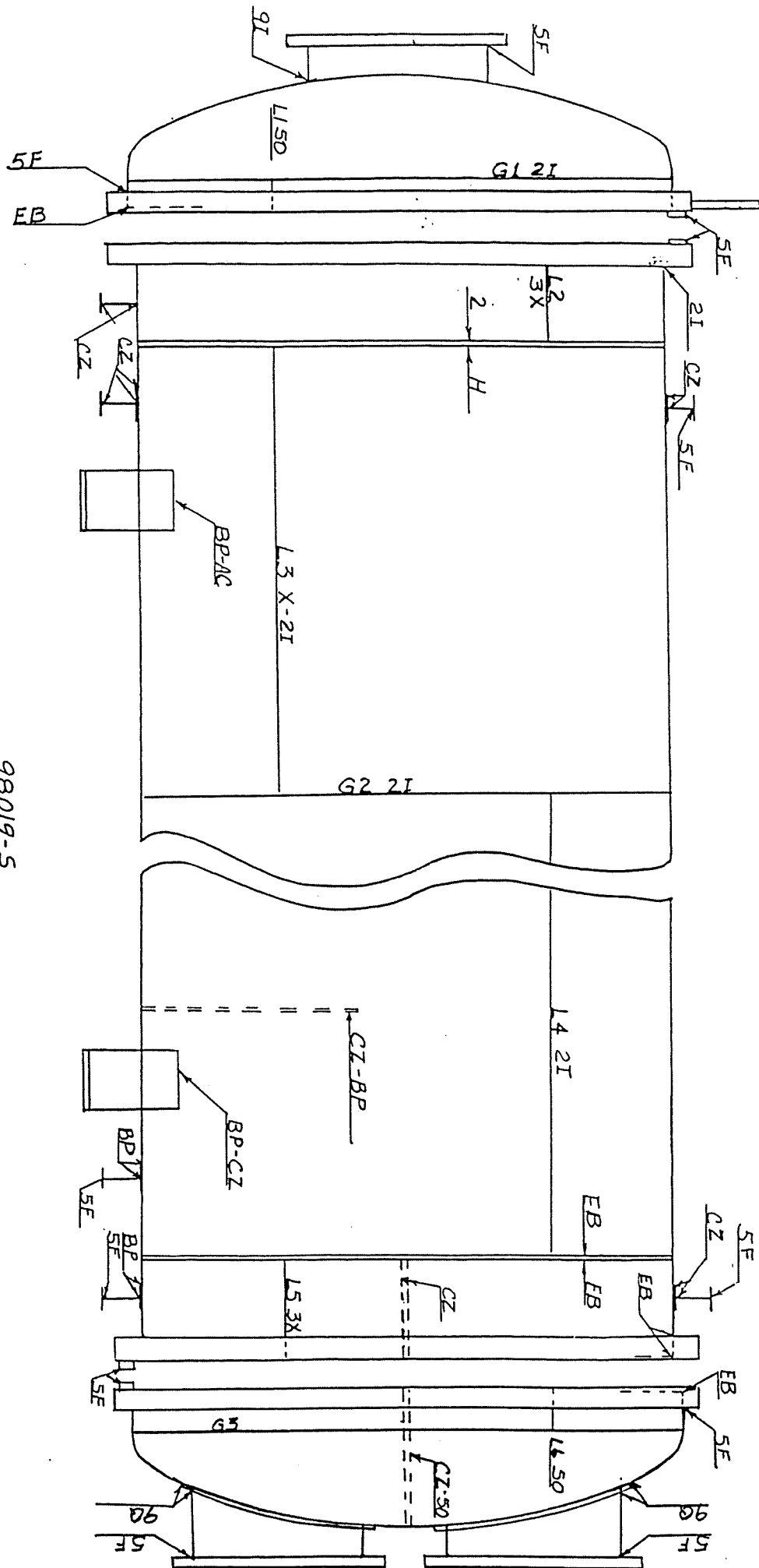
Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	6'-4" OD	3'-8"	SA-240 Ty 304L		5/16"	0	1	Spot	.85	1	None	1.0	-	-
2	6'-4" OD	1'-8 1/2"	SA-240 Ty 304L		5/16"	0	1	Spot	.85	1	None	1.0	-	-

15 Heads: (a)												(b)			
SA-240 Ty 304L none												SA-240 Ty 304L none			
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp.												(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp.			
Location (Top, Bottom, Ends)		Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A			
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.	
(a)	End	.182	0	76"	5"						xx	1	Full	1.0	
(b)	End	.182	0	76"	5"						xx	1	Full	1.0	

If removable, bolts used (describe other fastening)

bolts not supplied by vessel manufacturer

(Mat'l Spec. No., Grade, Size, No.)



98019-5

THE ROBERTS COMPANY
TRAVELER

"U" STAMP REQUIRED

Approved for Fabrication:

Q.C. Manager / Date

Reviewed:

Q.C. Inspector / Date

Reviewed:

Authorized Inspector / Date

Job 98019s Swenson cooler

*Indicates Q.C. Hold Points

H* Indicates A.I. Hold Points

SEQ NO.	OPERATION	PROCEDURE NUMB./REV.	HOLD POINTS INITIAL/DATE			ADDITIONAL INFORMATION
			SPRVSR	Q.C.	A.I.	
21	weld out shell nozzles	M-101-PL ER70s-x	N/A	*JP 3/13/98		
22	install right tubesheet to P7B	M-114-PL ER309L		JP 3/3/98	H* HGT 3/3/98	internal
23	Verify size, Length, And Material Of Tubes		N/A	*RS 3/4/98		
24	fit shell P7A to P7B		*	*JP 2/17/98	H*	
25	weld shell P7A to P7B	M-101-PL ER70s-x	*	*JP 2/19/98		
26	Install tubes		*	*JP 3/5/98	H*	internal before installing tubes
27	roll in tubes on left tubesheet		*	*RS 3/10/98		record wall reduction
28	roll in tubes on right tubesheet		*	*RS 3/11/98		record wall reduction
29	hydrotest shell side		*	*JP 3/17/98		60 psig 60 min
30	install flange A3 to channel shell P1	FC-301-PL E309LTx-1	N/A	*JP 2/18/98		E309LMoT1-1 is acceptable
31	install partition plate P3 to P1	M-102-PL ER308L	*	*JP 2/24/98		verify orientation
32	machine face of A3 and P3		*	*JP 3/5/98		PT gasket surface
33	install channel P1 onto right tubesheet		N/A	*JP 3/7/98		
34	weld P1 to tubesheet	M-102-PL ER308L	*	*JP 3/9/98		PT
35	install nozzle P4 onto P1		*	*JP 2/21/98		check layout
36	install nozzle P5 onto P1		*	*JP 2/23/98		
37	weld out nozzles P4 & P5	M-102-PL ER308L	*	N/A JP 3/16/98		
38	install repads P16	M-114-PL ER309L	*	N/A JP 3/16/98		
39	install flange A3 to channel shell P2	FC-301-PL E309LTx-1	N/A	*JP 2/24/98		E309LMoT1-1 is acceptable
40	machine face of A3 and P3		*	*JP 3/5/98		PT gasket surface

THE ROBERTS COMPANY
TRAVELER

"U" STAMP REQUIRED

Approved for Fabrication:

David Saluk 1-15-98
Q.C. Manager / Date

Reviewed:

Ron Snyder 1/15/98
Q.C. Inspector / Date

Reviewed: Harold G. Tyndall 1-19-98

Authorized Inspector / Date

Job # 98019s Swenson cooler

*Indicates Q.C. Hold Points

H* Indicates A.I. Hold Points

SEQ NO.	OPERATION	PROCEDURE	HOLD POINTS			ADDITIONAL INFORMATION
			INITIAL /DATE			
		NUMB./REV	SPRVSR	Q.C.	A.I.	
41	install P2 onto left tubesheet	M-102-PL ER308L	*	*JP 3/12/98		
42	install nozzle PE4 onto P2		*	*JP 3/4/98		
43	weld out nozzle PE4	T-107-PI ER308L	*	n/a JP 3/12/98		
44	layout saddles		*	*RS 3/3/98		
45	fit saddles		*	*RS 3/3/98		
46	weld out saddles	M-101-PL ER70s-x	*	n/a JP 3/12/98		
47	specials			N/A		
48	specials			*JP 3/20/98	H	external inspection
49	NDE		n/a	* THH 3/17/98	H*	RT-3
50	internal inspection		*	*JP 3/5/98		before installing baffles & tubes
51	hydrotesting shell side	turn unit upside down	*	*JP 8/17/98	H* HGT 3/17/98	60 psig Gauge 60 min. EXP 7-31-98
52	hydrotesting tube side		*	*JP 3/20/98	H* HGT 3/20/98	47 psig Gauge 60 min. EXP 7-31-98
53	tagging		n/a	* TC 3/20/98	H* HGT 3/20/98	NBT# 286
54	data report		n/a	* PB 3-20-98	H*	
55	painting		*	*		see drawing
56	prepare for shipping		*	n/a		
57						
58						
59						
60						

THE ROBERTS COMPANY
TRAVELER

"U" STAMP REQUIRED

Approved for Fabrication:

Paul Schuch
Q.C. Manager / Date

2-10-98

Reviewed:

John Palmer
Q.C. Inspector / Date

2-10-98

Reviewed:

Harold Tyndall
Authorized Inspector / Date

2/29/98

Job # 98019s Swenson cooler

*Indicates Q.C. Hold Points

H* Indicates A.I. Hold Points

Boffle and

SEQ NO.	OPERATION	PROCEDURE	HOLD POINTS			ADDITIONAL INFORMATION
			INITIAL./DATE			
		NUMB./REV.	SPRVSR	Q.C.	A.I.	
1	verify head material		*	TC		partial data reports?
2	prep and form shell neck		*	*JP 2/24/98		
3	verify flange ID, OD, bolt holes, thickness		*	n/a JP 2/24/98		
4	fit flange to shell	M-102-PL ER308L	*	*JP 2/24/98		OL-102-PL ER309LT1-1
5	machine flange face	M-102-PL ER308L	*	*JP 3/13/98		
6	fit shell to head	M-102-PL ER308L	*	*JP 2/24/98	H* HGT 2/24/98	
7	specials			NA		
8	layout P3A onto head		*	n/a JP 2/26/98		
9	layout P3B onto head			JP 2/26/98		
10	fit P3A			JP 2/27/98		
11	fit P3B		n/a	*JP 2/27/98	H* HGT 3/19/98	RT-3 reviewed by [signature]
12	weld out complete	M-102-PL ER308L	*	*JP 3/15/98		
13	air test repads		*	*JP 3/11/98	H* NA	
14	spot RT shell to head				H*	
15						
16						
17						
18						
19						
20						

THE ROBERTS COMPANY
TRAVELER

"U" Stamp Required

Approved for Fabrication:

Samuel B. Buhl 1-19-98
Q.C. Manager / Date

Reviewed:

Ron Snyder 1/19/98
Q.C. Inspector / Date

Reviewed:

Harold H. Tyndall 1-19-98
Authorized Inspector / Date

Job No: 98019s Swenson cooler

*Indicates Q.C. Hold Points
H* Indicates A.I. Hold Points

SEQ. NO.	OPERATION	PROCEDURE NUMB./REV.	HOLD POINTS INITIAL/DATE			ADDITIONAL INFORMATION
			SPRVSR	Q.C.	A.I.	
1	Initial material verification		*	* TC 2/6/98		
2	in-progress material verification		*	* TC		
3	final material verification		*	* 3/17/98	HST 3/19/98	include mtr's
4	verify weld material of main shells		*	*		
5	prep and form shells P7a and P7b		*	* JP 2/8/98		
6	prep and form shells P1 and P2		*	* JP 2/11/98		
7	specials		*	* N/A		
8			*	*		
9			*	*		
10			*	*		
11			*	*		
12	verify mat'l, dia., hole size sizes, # holes, in left T.S.		*	* JP 2/6/98		
13	repeat for right tubesheet		*	* JP 2/6/98		
14	verify tubesheet to shell weld material	M-114-PL ER309L	*	* JP 3/3/98		
15	fit left tubesheet to shell		*	* JP 3/3/98	H*HST 3/3/98	
16	weld left tubesheet to shell	M-114-PL ER309L	*	n/a JP 3/5/98		PT
17	install baffles	M-101-PL ER70s-x	*	* JP 2/17/98	H* HST 2/23/98	internal before installation
18	install nozzle PE2		*	* RS 2/26/98		check layout
19	install nozzle PE3		*	* RS 2/26/98		check layout
20	install nozzle PE1		*	* RS 2/26/98		check layout

internal sh
under baffle
only
JP 2/17/98
HST 2/17/98

98019s HST 2/26/98

THE ROBERTS COMPANY
TRAVELER

"U" STAMP REQUIRED

Approved for Fabrication:

Q.C. Manager / Date

2-10-98

Reviewed:

Q.C. Inspector / Date

2-10-98

Reviewed:

Authorized Inspector / Date

2/24/98

Job # 98019s Swenson cooler

*Indicates Q.C. Hold Points

H* Indicates A.I. Hold Points

SEQ NO.	OPERATION	PROCEDURE	HOLD POINTS			ADDITIONAL INFORMATION
			INITIAL/DATE			
		NUMB./REV.	SPRVSR	Q.C.	A.I.	
1	verify head material		*	* TC		partial data reports?
2	prep and form shell neck		*	*JP 2/15/98		
3	verify flange ID, OD, bolt holes, thickness		*	n/aJP 2/16/98		
4	fit flange to shell	M-102-PL ER308L	*	*JP 2/16/98		OL-102-PL ER309LT1-1
5	machine flange face	M-102-PL ER308L	*	*JP 2/24/98		
6	fit shell to head	M-102-PL ER308L	*X	*JP 2/24/97	H* HGT 2/24/98	
7	specials			N/A		
8	layout P3A onto head		*	n/aJP 2/15/98		
9	layout P3B onto head			N/A		
10	fit P3A			JP 2/15/98		
11	fit P3B		n/a	* N/A	H*	RT-3 N/A
12	weld out complete	M-102-PL ER308L	*	*JP 3/6/98		
13	air test repads		*	*JP 3/17/98	H* N/A	
14	spot RT shell to head			3/19/98 DK	H* HGT 3/19/98	
15						
16						
17						
18						
19						
20						

ROLLING DATA

Revision No.: 0

Customer SWENSON Job No. 98019-S
 Vessel 6'4" HORIZONTAL COOLER Manufactured @ ROBERTS Co.
 Type of Roller 3 ROLL Pressure Setting 42 V-40 250 RPM
 Tube Wall Thickness 1/16"
 Depth of Rolled Section from Tubesheet Surface 1 3/16"

Tube sheet Hole ID	Tube OD	Before	Tube ID After
1.512	1.498	1.376	1.393
1.512	1.497	1.374	1.390
1.513	1.501	1.380	1.397
1.514	1.498	1.378	1.398
1.513	1.498	1.377	1.394
1.513	1.499	1.376	1.397
1.512	1.496	1.372	1.393
1.511	1.497	1.373	1.396
1.513	1.499	1.375	1.394
1.513	1.498	1.374	1.394
1.514	1.497	1.373	1.394
1.513	1.498	1.373	1.397
1.514	1.500	1.375	1.394
1.514	1.499	1.375	1.397
1.513	1.496	1.372	1.396
22.694	22.471	20.623	20.924
Average 1.513	Average 1.498	Average 1.375	Average 1.3949

Notes ROLL TUBE I.D. FOR 4 TO 5% WALL
REDUCTION 1.395 / 1.396 Ron Smyler 3/14/98

Inspector Ron Smyler Date 3/11/98
 Customer _____ Date _____

PRESSURE TEST

DATE 3/20/98

AREA TUBE SIDE SYSTEM HEAT EXCHANGER

TYPE TEST - PNEUMATIC _____

STATIC _____

HYDROSTATIC ✓

DRAWING NUMBER ATTACHED _____

TEST DESCRIPTION _____

OPERATING PRESSURE 30 PSI TEST PRESSURE 47 PSI

TIME START 7:00 TIME FINISH 8:00

LEAK RATE 0 TEMP START 65 TEMP FINISH 65

FINAL TEST PRESSURE 47 PSI

COMMENTS _____

PERFORMED BY Jack Palmer GAUGE NO. 100-5

WITNESSED/ACCEPTED FOR OWNER _____

DATE _____

Harold D. Tyndall NC#1220
3/20/98

PRESSURE TEST

DATE 3/17/98

AREA SHELL SIDE

SYSTEM HEAT EXCHANGER

TYPE TEST - PNEUMATIC _____

STATIC _____

HYDROSTATIC ✓

DRAWING NUMBER ATTACHED _____

TEST DESCRIPTION _____

OPERATING PRESSURE 40 PSI

TEST PRESSURE 60 PSI

TIME START 8:00

TIME FINISH 9:00

LEAK RATE 0

TEMP START 60 TEMP FINISH 60

FINAL TEST PRESSURE 60 PSI

COMMENTS _____

PERFORMED BY Jack Palmer

GAUGE NO. 100-5

WITNESSED/ACCEPTED FOR OWNER _____

DATE _____

Hawley S. Emall NCH 1020
3/20/98



SWENSON

15700 Lathrop Avenue
Harvey, Illinois 60426-5198
Telephone 708 • 331-5500
Fax 708 • 331-5559

NOZZLE "NDE" REQUIREMENTS Horizontal Cooler&Covers

NDE Shall be performed in
Compliance with the appropriate
article of Sec.V of ASME

Date: 1/12/98
Contract: 97019-05

P.O.#: SL-6814
Page 1 of 2

Nozzle Identification (by No., Location, size)	Liquid Penetrant Date of Acceptance Insp. By / or: N/A	Air, soap to 25psig: Date of Acceptance Insp. By / or: N/A	Flange Surface Finish	Other as Required Date of Acceptance Insp. By / or: N/A
SD-100073-1 Conn.#19: 34" DIA.	MPL 3/12/98	JP 3/17/98	250T +/-25 JP 3/16/98	N/A
SD-100073-1 Conn.#20 34" DIA.	MPL 3/12/98	JP 3/17/98	250T +/-25 JP 3/16/98	N/A
SD-100073-1 Conn.#21 16" O.D.	N/A	JP 3/11/98	250T +/-25 JP 2/26/98	N/A
SD-100073-1 Conn.#22 16" O.D.	N/A	JP 3/11/98	250T +/-25 JP 2/26/98	N/A
SD-100073-1 Turn-End 76" FLG.	JP 2/26/98	N/A	250T +/-25 JP 2/26/98	N/A
SD-100073-1 Partition-End 76" FLG.	JP 3/5/98	N/A	FLG 250T +/-25 Partition 63M 3/5/98	N/A
SC-98959-1 Cover FLG.&Partition 76"/FLG. DIA.	DK 3-10-98	N/A	FLG. 250T +/-25 Partition 63M	JP 3/13/98 N/A

SC-98959-1 Cover Top Man Hole #12A 24"DIA.	MAC 3-17	JP 3/17/98	250T +/-25 JP 3/16/98	N/A
SC-98959-1 Cover Bott' M' Hole #12B 24" DIA	JP 3/16/98	JP 3/17/98	250T +/-25 JP 3/16/98	N/A
SC-98958-1 Cover FLG. 76" DIA	JP 2/24/98	N/A	250T +/-25 JP 2/24/98	N/A
SC-98958-1 Cover M' Hole #13 24" DIA	JP 3/16/98	N/A	250T +/-25 JP 3/16/98	N/A

Roberts

The Roberts Company

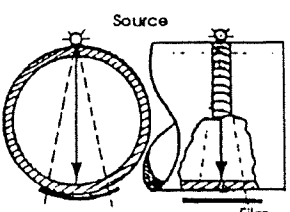
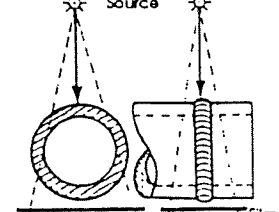
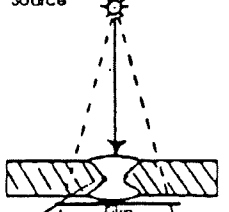
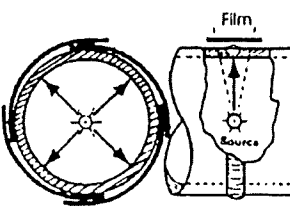
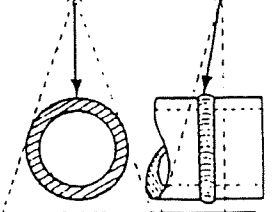
Hwy. 11 South P.O. Box 1109
Winterville, NC 28590

(919) 355-9353

Fax (919) 756-7018

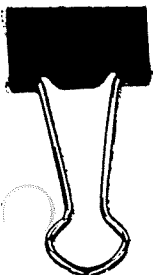
RADIOGRAPHIC EXAMINATION REPORT

Page _____ of _____

Job No. 98019		Customer Name Swenson		RT Location TRC, Winterville NC		Date 2-25-98	
Drawing No. 98019		Weld Process GMAW		Status F ☐ Pipe ☒ Plate		Material SA 240/304	
Radiation Source ☐ X-ray ☒ Isotope		Type / Model # 192		Curies / KV / MA 68 Ci		Nominal "I" Reinforcement .375" O80"	
SFD 18"		Exp. Time 2 min 30 sec		Focal Spot Size .158		Nominal Pipe Size NA	
Acceptance Std. ASME III Div 1				Sensitivity .013" W.I.C.			
Technique Std. ASME II		Procedure No. TRC-ASME-RT11002		Shim NA		Technique No. 3	
Film Mfg. AGFA		Type D-3		ASTM Class 1		Technique Sketch	
Exp. Technique ☐ Double Wall Viewing ☒ Single Wall Viewing				 ☐ Exposure Arrangement - 1			
Type Screens Pb		Front .010"		Back .010"		 ☐ Exposure Arrangement - 2	
Lead Backing Used ☒ Yes ☐ No		Lead "B" Used ☒ Yes ☐ No		 ☐ Exposure Arrangement - 3			
Joint Design Butt		Viewing Technique ☒ Single ☐ Composite		 ☐ Exposure Arrangement - 4		 ☐ Exposure Arrangement - 5	
Penetrant ☐ Source Side ☐ Film Side				Comments		Film Processing Manual ☐ Automatic ☒ Developer Temp.: 30°C	
Asst. Radiographer / Level M. Furch / Trainee							
Radiographer / Level D. Williams / II							

Joint No.	Location Mark	Accept	Reject	Root Concavity	Root Convexity	Crater Pit	Root Undercut	Cracks	Porosity	Elongated Indication	Tungsten Inclusion	Incomplete Penet	Incomplete Fusion	Undercut	Surface Indications	Film Artifact	Other Indications	Weld	Density	Welder ID	Remarks
L1	A-B	✓																326	320	DT	
L5	A-B	✓																283	293	3X	
24" NO2	A-B	✓																3.31	3.25	2	
30" NO2	A-B	✓																2.75	2.76	2I	

Disposition Accepted		Interpreter / Level Daniel W. Williams / II		Date 2-25-98	
Comments Film OK		Interpreter / Level Daniel W. Williams / II		Date 2/25/98	
		ASNT # KM-1539			



The Roberts Company

Customer: Swenson Process Equipment, Incorporated
Harvey, IL

Design Calculations for
6'-4" DIA. HORIZONTAL COOLER

Job Number: 98019s

Nameplate Information

SHELL SIDE:

DP: 40 PSIG/15 PSIG Vacuum at 200/100 degrees Fahrenheit
MAWP: 40 PSIG/15 PSIG Vacuum at 200/100 degrees Fahrenheit
MDMT: -20 degrees Fahrenheit at 40 PSIG/15 PSIG Vacuum

TUBE SIDE:

DP: 30 PSIG/15 PSIG Vacuum at 225/100 degrees Fahrenheit
MAWP: 30 PSIG/15 PSIG Vacuum at 225/100 degrees Fahrenheit
MDMT: -20 degrees Fahrenheit at 30 PSIG /15 PSIG Vacuum

Serial Number: 98019S

National Board Number: _____

Year Built: 1998

Designed to ASME Sec. VIII Div I, 1995 ed. 1996 addenda

Radiography: RT4

Postweld Heat Treatment: None

Calculated By SWENSON Date: 1/6/98

Engineering Manager [Signature] Date: 1/29/98

Q.C. Manager [Signature] N.C. Date: 2-4-98

Authorized Inspector [Signature] Date: 2/9/98



TEST CERTIFICATE

CUSTOMER P.O.: 721527

DESCRIPTION:

FILE NO: 7256-01-02

DATE: 01/19/98

MILL ORDER NO: 64773-001

REFERENCE 3125 -Y- 94 -Y- 242

SOLD TO:

THYPIN STEEL
P.O. BOX 7808

SEND TO:

TEST REPORT WITH SHIPMENT

FOR BOL & 97404

SHIP TO:

THYPIN STEEL
CHARLOTTE PRIMARY WAREHOUSE
12825 SAN NEELY ROAD

CHARLOTTE

NC 28217

CHARLOTTE

NC 28217

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATIONS

THYPI TS001-T304L REV 2 YR 91 TYPE-304L
95 ED TYPE 304/304L, ASTM A480-94B, ASTM A167-93
(NATIVE CLM), AMS 5513F (NATIVE CLM), STL-6-40438ASTM A240-94A TYPE 304/304L, ASME SA240/SA480
TYPE 304/304L, Q35-766D COND. A, AMS 5511F
(NATIVE CLM), ASTM A262-92A PRACT. E

MELT/SLAB	CHEMICAL ANALYSIS														PRACTICES
	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	B	N		
B21815 /1AA															
B2181	.015	1.71	.028	.003	.28	.42	8.70	18.61	.33				.0660		
PROD ANALYSIS	.014	1.70	.027	.003	.28	.41	8.68	18.62	.33				.0630		

TENSILES				CHARPY V IMPACTS				OTHER TESTS PERFORMED			
TYPE	YLD (PST) X 100	TENS X 100	% ELONG 2"	% RA	TYPE	TEMP	MILS LATERAL EXPANSION	% SHEAR	BEND TEST - LOC/DIR BX - PASS	BRINELL - 156	TEST LOC-B
BX	41.7	93.6	72.0	59.0					CORROSION A262E	SATISFACTORY	
									mc. p2		2/16/98

INFORMATION

WEIGHT PER PIECE = 2218 LBS. 1000 KG.
MERCURY OR MERCURY COMPOUNDS ARE NOT USED IN THE
MANUFACTURE OF LUKENS/WASHINGTON'S PRODUCTS.
** CORROSION TEST PER ASTM A262 PRACTICE A & B
** SIZE = .3125" NOM X .94.0000" NOM X .241.0000" DIA

HEAT TREAT CYCLES - MATL. OR TESTS - DEG FAHR.

MATL	TEST	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	COOL METHOD	END TEMP
Y	A	1950			3012	WQ	

HEAT TREAT CYCLES - TESTS ONLY - DEG FAHR.

START END TEMP	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	HEAT RATE MAX	COOL RATE MAX

CLINDRE ZAPLITNY

SUPERVISOR - TEST REPORTING

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT
FORM NO.2221T (R 5/96)Quality Assurance Laboratory
Coatesville, PA 19320

3 x 216 DOME

285014-01

TEK-TUBE

P.O. Box 55710 • Houston, TX 77258-5710
(713) 889-4251

Certificate of Tests

8/19/97

Sold to:

TEXAS PIPE & SUPPLY 88851
2330 HOLMES ROAD
HOUSTON TX 77051

Ship to:

TEXAS PIPE & SUPPLY
2330 HOLMES RD.
HOUSTON TX 77051

S/O 10391

Sales Dist.	Customer Order	Date	Shipping Instructions	Order
881	8850	8/18/97		285014-01

Chemical Analysis

Mechanical Properties

Yield Tensile T Weld Elong.
Strength Strength Strength % in 2" RB

ERW API LN PIPE X42 LACQUER PEB
3 1/2" O.D. X 216" WL DRL

7.5800 #/ft.

Part-10794

Heat No. D80544

I. C -.070 MN-.100 P -.012 S -.003
AL-.047 AS-.002 B -.000 CA-.000
CB-.019 CR-.030 CU-.010 MO-.000
N -.004 NI-.000 SI-.010 SN-.000

76,500 83,200 24 87

C C -.076 MN-.970 P -.011 S -.000
NI-.005 CR-.036 CU-.014 MO-.007
SI-.006 AL-.044 V -.000 NB-.016
C C -.075 MN-.104 P -.011 S -.009
NI-.006 CR-.037 CU-.014 MO-.007
SI-.007 AL-.047 V -.000 NB-.018

Heat No. D80546

C C -.070 MN-.940 P -.011 S -.006
AL-.045 AS-.002 B -.000 CA-.000
CB-.016 CR-.030 CU-.010 MO-.000
N -.002 NI-.000 SI-.010 SN-.000
C C -.075 MN-.940 P -.012 S -.011
NI-.006 CR-.033 CU-.014 MO-.007
SI-.008 AL-.045 V -.002 NB-.015
C C -.074 MN-.990 P -.012 S -.011
NI-.007 CR-.035 CU-.015 MO-.008
SI-.006 AL-.048 V -.000 NB-.016

75,000 81,200 28 82

3/4" STRIP SPECIMEN.
TRIPLE CERTIFICATION - THIS MATERIAL MEETS ASTM A53-96
AND API 5L-B SPEC.

FLATTENING TEST OK

This material manufactured in Houston, Texas, 8/97,

Meets Requirements
of ASME SA-53B

2/16/98

品質證明書

MILL INSPECTION CERTIFICATE



長銘實業股份有限公司
CHANG MIN INDUSTRIES CO., LTD.

中華民國高雄市小港區大業南路 28 號
NO. 28 DA YEH S RD HSIAO KANG KAOHSIUNG TAIWAN, R.O.C.
TEL: (07) 8716136 FAX: (07) 8716850

客戶名稱 Customer		NORCA CORPORATION		客戶編號 Customer No.				訂單號碼 Order No.		173409		信用狀編號 L/C No.			
產品名稱 Product		STAINLESS STEEL WELDED PIPE		製造商 Mfg. Prop. Co.				證明書號碼 Certificate No.		P73030					
規格 - 鋼種 Spec. - Type		ASTM A 312 TP 304L		發票號碼 Invoice No.		CCIT248/87		證明書日期 Date							

項目 No	鋼品號碼 Steel No.	批號 / 爐號 Heat No.	表面 Fin- ished	厚度 Gauge SCH	外徑 O.D. Inch	長度 Length Ft	重量 Mass Kg	數量 Quantity PCS	化學成份 (%) Chemical Composition										抗拉 T.S. N/mm ²	降伏 Y.S. (0.2%) N/mm ²	伸長 EL. %	硬質 Hard. Test HRB	彎曲 Bend Test	水壓 Hydro Test MPa	壓扁 Flat- ten Test	酸蝕 Corro. Test	裝箱 C/NO
									C	Si	Mn	P	S	Cr	Ni	Mo											
01	Y64004		40S	3/4	20	41	2.0	48	143	25	15	1828	821			532	217	57			8000	5000		12			
02	A81625		40S	3/4	20	4	1.8	56	141	32	2	1828	847			522	223	88		8000	5000		12				
03	A81602		40S	3/4	20	5	1.8	56	141	32	2	1828	847			534	252	88		8000	5000		12				
04	A82910		40S		20	50	2.2	51	128	35	5	1804	835			543	242	57		8000	5000		13				
05	Y66332		40S		20	50	1.8	81	145	30	7	1838	802			657	251	53		8000	5000		14				
06	Y66643		40S		20	50	1.8	42	123	27	9	1831	812			530	220	52		8000	5000		15				
07	Y66643		40S		20	50	1.8	42	123	27	8	1831	812			530	220	52		8000	5000		16				
08	Y66332		40S		20	50	1.8	51	145	30	7	1838	802			657	251	53		8000	5000		17				
09	A82911		40S	1-1/2	20	50	1.8	51	137	38	2	1825	837			558	218	53		6000	5000		18				
10	A82912		40S	1-1/2	20	50	1.8	49	137	29	5	1833	831			527	230	59		6000	5000		19				

備註 Remark	品質管理部門 Quality Management Department	
	技 准 Confirmed by	簽 核 Witnessed by

茲證明上述各項鋼品的資料為正確。
We hereby certify that the above material descriptions are correct and true in every item.

D52-037

mk. pe5

Meets Requirements
of ASME SA-312/304L

2/16/98

D52-037

JAN -30 98 (FRI) 13:53

FERRO UNION

TEL: 770 751-1273

P. 005

Gulf States Steel, Inc.

DADSDEN, AL 36004-1434

CERTIFICATE
OF TESTS

ACCOUNT NUMBER 26000201	INVOICE NO. 1	INVOICE NUMBER 7412-00730
DATE SHIPPED 12 22 97	ROUTE/VEHICLE/NEWSPERIODIC 0800RN TRMP	

WE HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS FURNISHED IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE TO THE SPECIFICATIONS.

C. F. HEARDEN, JR.
HCR: TECHNOLOGY AND
QUALITY - PLATE PRODUCTS

FERRO UNION SOUTHEAST INC
2005 GRASSLAND PARKWAY
ALPHARETTA GA 30201

FERRO UNION SOUTHEAST INC
2005 GRASSLAND PARK
ALPHARETTA GA 30201

MATERIAL DESCRIPTION

PLATE CARBON ASME SA-516 DATED 07/01/93 GRD 70 ASTM A-516-90 GRD 70 PU0

QUANTITY SHIPPED

1.2500 X 96.0000 GAS CUT EDGE X 445.0000 IN
HT 7461930 T 2061701 1 PCS
HT 7461930 T 2061702 1 PCS
HT 7461930 T 2061703 1 PCS

45432

CH C 28HX MM 05/1.20 P 035HX S 035HX SI 15/40 CH 40HX HT 40HX CH 30HX NO 12HX CG 020HX U 03HX
AL 020HX

MR YLB 30000 HIN 1EN 70/90000 VELONG HIN 2 IN 21 OR 0 IN 17

Y1 1 IN W/SHIPMENT

TOTAL HT. 45,432 PCS 3

Item P14

2/6/98

ITEM NO.	QTY	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Co	V	Al	Fe	O	Co	TI	OR
990		.23	1.01	.010	.015	.240	0.02	0.00	0.03	.02	.002	.001	.012					
ITEM NO.	QTY	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	REDUCED SECTION	CHARPY	IMPACT	TEMP	YIELD RATIO	WELDED AREA	WELD COATING	WELD INSULATION	WELD PROTECT	WELD TYP	WELD DIA	WELD LENGTH	WELD WEIGHT	WELD TOTAL
161930	2061701	42.0	76.0			77			RR	.55								721
161930	2061702	44.0	75.0			77			RR	.50								
161930	2061703	44.0	73.0			77			RR	.50								
ITEM NO.	QTY	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	REDUCED SECTION	CHARPY	IMPACT	TEMP	YIELD RATIO	WELDED AREA	WELD COATING	WELD INSULATION	WELD PROTECT	WELD TYP	WELD DIA	WELD LENGTH	WELD WEIGHT	WELD TOTAL
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

LAST PAGE

Gulf States Steel, Inc.

GADSDEN, AL 36004-1033

GSA ORDER NO.		PURCHASE ORDER DATE	
DIST	NUMBER	ITEM	QTY
G	51298	00	42
PURCHASE ORDER NO.		SHIPPED FROM	
4231		ALA CITY	

CERTIFICATE
OF TESTS

ACCOUNT NUMBER	PAGE NO.	INVOICE NUMBER
26000201	1	742-72572
DATE SHIPPED	ROUTE/VEHICLE IDENTIFICATION	
08 16 97	OSBORN TRHP	

HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE TO THE SPECIFICATIONS.

C.F. BEARDEN, JR.
MGR, TECHNOLOGY AND
QUALITY - PLATE PRODUCTS

(NAME IS SUBJECT TO CHANGE WITHOUT NOTICE)

FERRO UNION SOUTHEAST INC
2005 GRASSLAND PARKWAY
ALPHARETTA GA 30201

FERRO UNION SOUTHEAST INC
2005 GRASSLAND PARK
ALPHARETTA GA 30201

MATERIAL DESCRIPTION

PLATE CARBON ASME SA-516 DATED 07/01/95 GRD 70 ASTM A-516-90 GRD 70 PUR

QUANTITY SHIPPED

1.0000 X 96.0000 SHEARED EDGE X 480.0000 IN
HT 7460966 T U224303 1 PCS
HT 7460966 T U224304 1 PCS
HT 7460966 T U224305 1 PCS

39204

CH C 200X HH 85/1.20 P 035HX S 035HX SI 15/40 CU 46HX HI 40HX CR 30HX NO 12HX CG 62HX U 03HX
AL 020XII

HR YIN 38000 KIN TEN 70/20000 XELONG KIN 7 IN 21 OR 6 IN 17

TI 1 TR N/SHIPMENT

TOTAL HT. 39,204H PCS 3

Items 710,11,12,13,15

ITEM NUMBER	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Cl	V	Al	N	O	Ca	Ti	C
7460966	.24	1.19	.009	.016	.230	0.02	0.01	0.02	.02	.009	.002	.030					

HEAT NUMBER	TEST ON PIECE IDENTITY NO.	YIELD KSI	TENSILE KSI	% ELONG		HARDNESS	BEND TEST	HEAT TREAT	YS/TS RATIO	% RED. AREA	GALV COATING	DROP WEIGHT TEAR TESTS					
				2"	8"							DJR	TEMP °F	1	2	AV	
7460966	U224303	53.0	81.0		18			NR	.65								
7460966	U224304	53.0	81.0		18			NR	.65								
7460966	U224305	55.0	84.0		18			NR	.65								

HEAT NUMBER	TEST ON PIECE IDENTITY NO.	HEAT TREAT	SIZE	DJR	TEMP °F	ENERGY				% SHEAR				MILS LATERAL EXPANSION			
						1	2	3	AVG	1	2	3	AVG	1	2	3	AV

ENTERED AUG 21 1997

ENTERED AUG 21 1997



Steel Tubular Products Company

SHIPPER'S NUMBER

8101-27037

CERTIFICATE OF TESTS

SALES ORDER NO

213355 00

BILL OF LADING NUMBER

8101-27037

PUR. ORD. DATE

4/20/98

PURCHASE ORDER NO

244925

MMB
MMB

FRISCHKORN, INC.
CORPORATE INVTY
1200 VETERANS ROAD

FRISCHKORN, INC.
CORPORATE INVTY
1200 VETERANS ROAD

CON
SIGNED

COLUMBIA

SC 29209

COLUMBIA

SC 29209

SHIP
DATE

FROM

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE TO THE SPECIFICATIONS.

J. J. Pugh
Product Process Metallurgist

ITEM	ITEM DESCRIPTION / SPECIFICATION	QTY SHIPPED
03	ERW STANDARD PIPE 16.000 OD .375W SRL PE BEV REG MILL COAT Item-003 P/N: 001104 Cus L P/N: 16ERW ASTM A53-95 GRADE B	1 PC 86.6 FT 5419 LB
Meets ASME SA-S3B Requirements		
MK. PE1, PE2		
2/26/98		

HEAT NO.	C	MN	P	S	SI	CU	NI	CR	MO	V	AL	CB	CA	SN	B	CO	N	II
0950430	.100	1.06	0.11	0.09	.177	.04	.01	.030	.010	.004	.010	.	.001	.006	.007	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

HEAT NO.	LOT NO.	YIELD STN PSI	TENSILE STN PSI	WELD UTS PSI	TENSILE SAMPLE SZ (IN)	ELONG % IN 2"	HARDNESS	HYDRO PSI
0950430		47090	66830	74050	1.50	19.0		6.000 Hydro
Flatten Test OK								



P.O. BOX 815 • 85 BENNETT ST.
AUBURNDALE, FL 33823
813-967-8818 • FAX 813-967-6832

CERTIFICATE OF QUALITY CONTROL

SIZE: 3" SCH 40

TYPE: 304/304L

HEAT: 217727

SPECIFICATION: ASTM A312-92A ASME SA312-92A

K
2/26/98

MK. PE4

CHEMICAL ANALYSIS %

C	Mn	P	S	Si	Ni	Cr	Mo
.019	1.73	.036	.003	.40	9.59	18.27	

MECHANICAL PROPERTIES

HARDNESS, RB	YIELD STRENGTH, PSI	ULTIMATE STRENGTH, PSI	%ELONG
81	35813	86270	56

TESTS

HYDRO, PSI	FLATTEN	REV. FLATTEN	FLARE	FLANGE	EDDY CURRENT
1900	ok	ok	ok	ok	ok

1. NO WELD REPAIR
2. ANNEALED TO 1960F THEN WATER QUENCHED
3. ALL MATERIAL IS FREE FROM MERCURY CONTAMINATION.

K
10-22-96

DATE MAR 30 1995

SIGNED

George B. Palmer



Certification Date

9 JAN 1998

CUSTOMER ORDER NUMBER

07-279JLB

1900 MITCHELL BLVD.
SCHAUMBURG IL 60193

Invoice Number

T964871

CUSTOMER PART NUMBER

505098

Ship# T132186

SHIP TO: PETERS MACHINE CO

3765 N WESTLAWN
DECATUR IL 62526

SHIP TO: PETERS MACHINE CO

3765 N WESTLAWN
DECATUR IL 62526

Description: PRESSURE VESSEL QUALITY PLATE AS FOLDED ASTM A516 GR 70
72 1/2 74 3/4" DIA 1/8-0 Line total: 5303 LB
HAI: 813Y67710 ITEM: 505098

Specifications:
ASTM A516 GR 70

ASME SA516 GR 70

CHEMICAL ANALYSIS

C	HI	P	S	SI	CU	NI	CR
0.24	1.09	0.02	0.007	0.279	0.041	0.01	0.04
NO	V	AL	CB	mk. P8, P9			
0.007	0.004	0.039	0.002				

CPI: E 1291

MFG: BETHLEHEM STEEL CORP (BETH D) COUNTRY OF ORIGIN: DOMESTIC

MECHANICAL PROPERTIES

DESCRIPTION	YTD STR	UTS TEN	%ELONG	%RED	HARDNESS
	PSI	PSI	IN 08 IN	IN AREA	
	53000.0	83500.0	20.0		

GRAIN SIZE : 7

COMMENTS

ASTM A516-86 GR 70 PVQ, ASTM A515-82 GR 70
MOD PER PARA 4.1 FINE AUSTENITIC GRAIN SIZE PRAC, ASME
SA516 GR 70 PVQ 1992 EDITION, ASME SA515 GR 70 PVQ 1992
EDITION

2/26/98

The above data were transcribed from the manufacturer's Certificate of Test after verification for completeness and specification requirements of the information on the certificate. All test results remain on file subject to examination.

We hereby certify that the material covered by this report will meet the applicable requirements described herein, including any specification forming a part of the description.

The willful recording of false, fictitious, or fraudulent statements in connection with test results may be punishable as a felony under federal statutes.

Material did not come in contact with mercury while in our possession.

JUDITH GIBBONS

Sheffield

Certificate of Analysis

ORDER 100415 - 04
HEAT & PIECE 81761-2C 10/03/97
SOLD TO: REYNOLDS ALUMINUM SUPPLY CO
ACCOUNTS PAYABLE
P. O. BOX 26885
RICHMOND VA 23261
SHIP TO: REYNOLDS ALUMINUM SUPPLY CO
366 CIRCLE FREEWAY DRIVE
513-874-7744
CINCINNATI OH 45246
764001-15

YOUR ORDER & DATE
094VCAD09 9/30/97 TAG# 02656965

ITEM DESCRIPTION
HEAT & PIECE 81761 - 2C
WEIGHT 1890
FINISH 1
GRADE 304L UNS-S30403
DIMENSIONS .250 X 96.000 X 254.000 EXACT

SPECIFICATIONS
THE PRODUCTS LISTED ON THIS MILL TEST REPORT SATISFY PREFERENCE CRITERION B AS DEFINED IN ARTICLE 401 OF THE NORTH AMERICAN FREE TRADE AGREEMENT. COUNTRY OF ORIGIN IS USA
RASCO SPECS T-304L
NO GRIP MARKS-NO WELD REPAIR
ASTM A480-96, ASMESA480-96AD
QQ-S-766D AMENDIII EX.P4.5.2
ASTM A262-93A PRAC A
AMS 5511F EXCEPT LINE MARK
ASTM A240-96A ASMESA240-96AD
ASTM A167-93, ASME SA167-92
MIL-S-5059D WITH EXCEPTIONS
ASTM A262-93A PRAC E

CONDITIONS & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
IN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS
HARDNESS RB 81
GRAIN SIZE 4
YIELD STRENGTH (PSI) 44520
TENSILE STRENGTH (PSI) 84892
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION 2 IN 2" 55.5
REDUCTION OF AREA % 69.9
MK. P4, P5 2/26/98

CHEMICAL COMPOSITION
CARBON (C) .013
MANGANESE (MN) 1.51
PHOSPHORUS (P) .035
SULFUR (S) .001
SILICON (SI) .32
CHROMIUM (CR) 18.26
NICKEL (NI) 8.69
COBALT (CO) .11
COPPER (CU) .50
MOLY (MO) .51
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM, OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

MARK A BOWER, LAB TESTING MANAGER

Avesha Sheffield Plate Inc.
P.O. Box 370
Law Castle, Indiana 47362

81761-2C
304L
1/4

Sheffield

Certificate of Analysis

ORDER 100415 - 04
HEAT & PIECE 81761-2C 10/03/97
SOLD TO: REYNOLDS ALUMINUM SUPPLY CO
ACCOUNTS PAYABLE
P. O. BOX 26885
RICHMOND VA 23261
SHIP TO: REYNOLDS ALUMINUM SUPPLY CO
366 CIRCLE FREEWAY DRIVE
513-874-7744
CINCINNATI OH 45246
764001-15

YOUR ORDER & DATE
094VCAD09 9/30/97 TAG# 02656965

ITEM DESCRIPTION
HEAT & PIECE 81761 - 2C
WEIGHT 1890
FINISH 1
GRADE 304L UNS-S30403
DIMENSIONS .250 X 96.000 X 254.000 EXACT

SPECIFICATIONS
THE PRODUCTS LISTED ON THIS MILL TEST REPORT SATISFY PREFERENCE CRITERION B AS DEFINED IN ARTICLE 401 OF THE NORTH AMERICAN FREE TRADE AGREEMENT. COUNTRY OF ORIGIN IS USA
RASCO SPECS T-304L
NO GRIP MARKS-NO WELD REPAIR
ASTM A480-96, ASMESA480-96AD
QQ-S-766D AMENDIII EX.P4.5.2
ASTM A262-93A PRAC A
AMS 5511F EXCEPT LINE MARK
ASTM A240-96A ASMESA240-96AD
ASTM A167-93, ASME SA167-92
MIL-S-5059D WITH EXCEPTIONS
ASTM A262-93A PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
IN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS
HARDNESS RB 81
GRAIN SIZE 4
YIELD STRENGTH (PSI) 44520
TENSILE STRENGTH (PSI) 84892
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 55.5
REDUCTION OF AREA % 69.9
mk. P4, P5 2/26/98

CHEMICAL COMPOSITION
CARBON (C) .013
MANGANESE (MN) 1.51
PHOSPHORUS (P) .035
SULFUR (S) .001
SILICON (SI) .32
CHROMIUM (CR) 18.26
NICKEL (NI) 8.69
COBALT (CO) .11
COPPER (CU) .50
MOLY (MO) .51
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM, OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

MARK A BOWER, LAB TESTING MANAGER

Avesta Sheffield Plate Inc.
P.O. Box 370
Low Castle, Indiana 47362

81761-2C
304L
1/4



"СКОПЈЕ" - СКОПЈЕ
MINES AND IRON & STEELWORKS
"СКОПЈЕ" - СКОПЈЕ

MILL'S TEST CERTIFICATE No. 70444

Date: 02-02-98
Скопје
Скопје

ACC. TO DIN 50049/3.1B

Производител:
(for Department)
Нарачател: SECO STEEL INC - NEW YORK
Поручател:
Услови на испораката:
Terms of Delivery:
Испораката - вагон/камион бр.:
Delivery - wagon / truck No.:

Нарачка бр.:
Order No.:
Испратница бр.:
Dispatch Note:
Состојба на испораката: 1)
Condition of Delivery: 1) N
Вид на производот:
Product:
HOT ROLLED STEEL PLATE

Број на шаржа Heat No.	Квалитет Quality	Парче Piece	Димензии Dimensions mm	Тежина Weight kg.	ХЕМИСКИ СОСТАВ / CHEM. COMPOS.									
					10 ⁻² C	10 ⁻² Si	10 ⁻² Mn	10 ⁻³ P	10 ⁻³ S	10 ⁻³ Al	10 ⁻³ Nb	10 ⁻³ Cr	10 ⁻³ Cu	
2603935	ASTM A516-70 1990 ASME SA516-70	1	2x96x240	5926	17	20	100	13	9	42	-	2	3	
1604418	1995 ASTM A20	1	"	5926	17	22	99	13	6	38	-	1	2	
	1995 ASME SA20	2	МК. РС	11852			N1 2	Mo -	V -					
	1995		КС 2/26/98				N1	Mo	V					

Број на шаржа Heat No.	Број на лист/котур Plate/coil No.	Измер на деформација % N/mm ²	Гранична на разтегање Yield stress Rel. N/mm ²	Гранична на киселост Tensile strength Ten. N/mm ²	Издол- жување Elongation A %	ЕНЕРГИЈА НА УДАР / IMPACT ENERGY						
						Нормална Хемиски состав на пробити N/mm ²	Тип на пробити Type	Посредствени резултати Individual values			Вредност на пробити N/mm ²	
								1	2	3		
2603935	19613	T	337	498	27,3	L	ISO-V	56	62	58	59	-40
1604418	21268	T	330	492	27,0			58	56	51	55	"

Свиткување
Bending test

Се потврдува дека материјалот е соодветен
на условите според договорот.
We hereby certify, that the delivered material
complies with the terms of the contract.

"Состојба на испораката: R-валана; N-нормализирана
Condition of Delivery: R-as rolled; N-normalized;

"Насока на земање на пробити: L-надолжна; T-напречна
Pos of sample: L-longitudinal; T-transverse

PRODUCED FROM CONTICAST
SLAB FULLY KILLED

Рудник "СКОПЈЕ" - СКОПЈЕ
Mines and Iron & Steelworks "SKOPJE" - SKOPJE

P.O. 28175-98018

TOTAL P.03

Украина
Ukraine



МЕТАЛЛУРГИЧЕСКИЙ КОМБИНАТ - АЗОВСТАЛЬ
AZOVSTAL IRON AND STEEL WORKS

341000, г. Маркино, ул. Левороско, 1, Телетс 115123 ВОЛНА

1, Leporsky st., Mariupol, 341000 Telex 115123 VOLNA

ЗАВОДСКОЙ СЕРТИФИКАТ КАЧЕСТВА № 4312
MILL'S QUALITY CERTIFICATE No

от 8.05.96 Лист 1 из 1 Листов
Date Sheet of Sheets

Свидетельство о приемочных испытаниях
Inspection certificate

DIN 50049 - 3.1 B

Контракт №
Contract No 103961/11- 10 IOT 1
Reference No 67250

Заводской заказ №
Manufacturer's
production order No 400706-0303

Заказчик
Customer ФИРМА ДУФЕРКО
DUFERCO company

nk. pK, p18 on shell side drawing
and p4 on Head Ass. (w 2 nos. in
Head).

Варов № 5477/670
RW - Car No 5477/670

Количество листов 18
No of plates

Наименование товара Прокат толстолистовой
Description of goods Heavy plates

Стандарт
Standards ASTM A516:1990
ASTM A20:1994

Марка стали
Grade of Steel A516-70

Состояние поставки Горячекатаный
Delivery condition Hot rolled

№ листа Sheet No	Номера плат Car No	Номера партий Lot No	Размеры, дюймы Dimensions, inch			Количество товара, шт. Quantity, pcs	Вес, т Weight, t
			толщина Thickness	ширина width	длина length		
1	7065	2329	3/8	120	480	1	
	"	2330	"	"	"	1	
	"	2331	"	"	"	1	
	"	2332	"	"	"	1	
	"	2333	"	"	"	1	
	"	2334	"	"	"	1	
	"	2335	"	"	"	1	
	"	2336	"	"	"	1	
	"	2337	"	"	"	1	
	"	2338	"	"	"	1	
	"	2339	"	"	"	1	
	"	2340	"	"	"	1	
	6886	2341	"	"	"	1	
	"	2342	"	"	"	1	
	7095	2343	"	"	"	1	
	"	2344	"	"	"	1	
	7096	2345	"	"	"	1	
	"	2346	"	"	"	1	
						18	50.0

Meets Requirements of ASME SA-516-70

5/3/98

Результаты испытаний

Test results

№ пробы Test No	Испытание на растяжение и ударный изгиб										Tensile and impact test					Испытание на изгиб Bend
	Размеры образца Dim. of specimen		Отбор образца Specimen -			Температура испытания Test temperature °F	Предел текучести Yield point KSI	Предел прочности Tensile strength KSI	Относительное удлинение Elongation %	Снижение сечения Reduction of area %	1 = (U) Энергия удара Impact energy					
	Толщина Thickness, Inch	Ширина Width, Inch	Место Location	Направление Direction	Положение Position						2 = (J/cm ²) Ударная вязкость Impact strength	3 = (%) Кристаллическое состояние Crystalline state	4 = Скорость Твердость Hardness			
Значения Values		1	2	3	Σ n											
23300					468	52.00	72.00	22.00								
23301						468	52.00	72.00	22.00							
23302						468	52.00	72.00	22.00							
23303						468	52.00	72.00	22.00							
23304						468	52.00	72.00	22.00							
23305						468	52.00	72.00	22.00							
23306						468	52.00	72.00	22.00							
23307						468	52.00	72.00	22.00							
23308						468	52.00	72.00	22.00							
23309						468	52.00	72.00	22.00							
2340						468	52.00	72.00	22.00							
2341						468	52.00	72.00	22.00							
2342						468	52.00	72.00	22.00							
2343						468	52.00	72.00	22.00							
2344						468	52.00	72.00	22.00							
2345						468	52.00	72.00	22.00							
2346						468	52.00	72.00	22.00							

Выплавка:

Компьютерный способ производства

Steelmaking process:

Made by the BOS Process

Номера плавов Cast No	Химический состав, %									Chemical composition, %						
	C	Mn	Si	S	P	Cr	Ni	Cu	Al	sol. Al	Nb	N	V	Mo	Ti	
	x 100			x 1000			x 100			x 1000						
7065	18	106	24	11	12	3	3	4	5	20	10	10	5	10	2	
6806	20	92	23	29	12	3	2	2	5	33	10	8	5	10	2	
7095	21	113	26	6	14	4	2	4	5	36	10	8	5	10	2	
7096	21	113	26	6	14	4	2	4	5	36	10	8	5	10	2	

Маркировка
Marking

P.O. 67250, CAST No, TEST No, A516-70, 2979, 7018/04,
DIMENSIONS INCHES, NOLA, MADE IN UKRAINE.

ONE WHITE STRIPE.

Подтверждаем, что продукция, указанная в настоящем сертификате, испытана и
соответствует условиям контракта.

It is hereby certified that products listed in this certificate tested and comply with contract's
terms.

Подпись
Signature

Штамп инспектора
Inspector's stamp

ПМШ МК «Азовсталь», ул. № 166 Б, г.р. 1000, 17.07.9.

Sheffield

Certificate of Analysis

OUR ORDER 94622 - 01

HEAT/COIL 9863703 4/16/97

SOLD TO: REYNOLDS ALUMINUM SUPPLY CO
ACCOUNTS PAYABLE
P. O. BOX 26885
RICHMOND VA 23261

SHIP TO: REYNOLDS ALUMINUM SUPPLY CO.
366 CIRCLE FREEWAY DRIVE
513-874-7744
CINCINNATI OH 45246
764001-15

----- YOUR ORDER & DATE -----

900VAP074

0/00/00

----- ITEM DESCRIPTION -----

HEAT/COIL 9863703
TOTAL WEIGHT 3105
PIECES 2
FINISH 1
GRADE 304L UNS-S30403
DIMENSIONS .312 X 72.000* X 240.000 EXACT

----- SPECIFICATIONS -----

*** MFG IN BALTIMORE, MD.
ASTM A240-95B, ASME SA240-95
ASTM A262-93 PRAC A

FROM MATERIAL IMPORTED FROM SWEDEN
ASTM A480-94B, ASME SA480-95
ASTM A262-93 PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

----- MECHANICAL & OTHER TESTS -----

HARDNESS RB 84/82
GRAIN SIZE 5
YIELD STRENGTH (PSI) 41100
TENSILE STRENGTH (PSI) 88500
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 53.0
REDUCTION OF AREA % 67.0

mk. P1 on heater, and P2

2/16/98

----- CHEMICAL COMPOSITION -----

CARBON (C) .012
MANGANESE (MN) 1.53
PHOSPHORUS (P) .029
SULFUR (S) .001
SILICON (SI) .34
CHROMIUM (CR) 18.35
NICKEL (NI) 8.58
COBALT (CO) .13
COPPER (CU) .26
MOLY (MO) .29
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM,
OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS
HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

J. BONGARDT, LAB MANAGER

P.O. BOX 1975
Baltimore, Maryland 21203
Telephone: (410) 522-6200
FAX # 410-522-6247

9863703
304L 5/16

MUELLER

P.O. BOX 828, SPRINGFIELD, MISSOURI 65801-0828, USA
TELEPHONE: (417) 831-3000 FACSIMILE: (417) 831-3528
1-800-MUELLER

Date: FEB. 24, 1998

Customer: SWENSON PROCESS EQUIPMENT INC
15700 LATHROP AVENUE
HARVEY IL 60426-5198

THIS DOCUMENTATION PACKAGE TO
BE FORWARDED TO:

QUALITY ASSURANCE DEPARTMENT
THROUGH PURCHASING DEPARTMENT

Reference: Your Order Number SS-7213
Our Order Number 207284

MATERIAL HEAT CODE RECORD AND CERTIFICATE OF COMPLIANCE

ITEM	QUANTITY	DESCRIPTION	HEAT NO.	HEAT CODE
101	2	76" O/D ASME F&D HEADS	811731B	DQRH
			817521A	DQYO
102	1	132" O/D ASME F&D HEAD	243221B	DQRG

Paul Mueller Company hereby certifies that all heads listed above were fabricated in accordance with industry standards.

All welding was performed by qualified welders.

Yours very truly,

Bill Roberts

Paul Mueller Company
Quality Assurance Inspector

P.O. Box 828 Springfield, MO 65801-0828
Phone: 800 683-5537 FAX: 417 864-4201

DATE: 11/25/97
SOLD TO: SWENSON PROCESS
SPECIFICATION NUMBER: 207284.1

EQUIPMENT SPECIFICATIONS

QUANTITY: 2
DIAMETER: 76" Outside Diameter
HEAD TYPE: ASME F & D
MATERIAL TYPE: 304L S/S
MATERIAL THICKNESS: 1/2 in. / 0.4375
(/min - if applicable)
DISH RADIUS: 76
INSIDE CORNER RADIUS: 4.56
STRAIGHT FLANGE: 0.5
VESSEL TO BE ASME: Yes
PARTIAL DATA PAPERS: As Required
MILL TEST REPORTS: Yes
EDGE MACHINING: Bevel to Inside 37.5°
X-RAY: No X-Ray
POLISH TYPE: N/A
MATERIAL FINISH - I.D./O.D.: HR Mill / HR Mill
PROTECTIVE PAPER: N/A
WELD FINISH - I.D./O.D.: N/A / N/A
CENTER HOLE: Unplugged
SPECIAL NOTES:

PAUL MUELLER COMPANY IS NOT RESPONSIBLE FOR CORROSION OR SUITABILITY FOR USE OF ANY MATERIAL IN ANY PARTICULAR APPLICATION. THE CORROSION RESISTANCE AND SUITABILITY FOR USE OF A MATERIAL IS DEPENDENT ON OPERATING ENVIRONMENT AND CONDITIONS, CLEANING PRACTICES, AND MANY OTHER FACTORS BEYOND THE CONTROL OF THE EQUIPMENT FABRICATOR. THE USER OF THE EQUIPMENT BEARS TOTAL RESPONSIBILITY FOR CORROSION OR SUITABILITY FOR USE OF ALL MATERIALS IN THEIR PARTICULAR APPLICATION.

All dimensions in inches unless stated otherwise.

All decimals will be converted to fractions.

~ Approximate dimensions - subject to forming tolerances and ASME code restrictions

~~ To be verified by Paul Mueller Company Engineering

Certificate of Analysis and Tests

ORDER 97442 - 05

HEAT & PIECE 81752-1A 8/29/97

SOLD TO: PAUL MUELLER COMPANY
1600 WEST PHELPS
P. O. BOX 828
SPRINGFIELD

MO 65801

SHIP TO: PAUL MUELLER CO
ADVISE LAURIE HODGES WHEN READ
(417) 831-3000
CPU MO 65801
673001-01

YOUR ORDER & DATE

46686

7/01/97

TAG# PART #1002094

ITEM DESCRIPTION

HEAT & PIECE 81752 - 1A
WEIGHT 3466
FINISH 1
GRADE 304L / 304
DIMENSIONS .500 X 96.000 X 240.000 EXACT
UNS-S30403 / UNS-S30400

DQYO

SPECIFICATIONS

THE PRODUCTS LISTED ON THIS MILL TEST REPORT SATISFY PREFERENCE CRITERION B AS DEFINED IN ARTICLE 401 OF THE NORTH AMERICAN FREE TRADE AGREEMENT. COUNTRY OF ORIGIN IS USA

ASTM A240-96A ASMESA240-96AD
NO WELD REPAIR ON MATERIAL
ASTM A262-93A PRAC A

ASTM A480-96A ASMESA480-96AD

ASTM A262-93A PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS

HARDNESS RB 83
GRAIN SIZE 4
YIELD STRENGTH (PSI) 42089
TENSILE STRENGTH (PSI) 83891
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 60.3
REDUCTION OF AREA % 68.2

ISO 9002-1994

1MI Cert. #

001881

MK P1 (Head w/ (2) nozzles)

CHEMICAL COMPOSITION

CARBON (C) .015
MANGANESE (MN) 1.45
PHOSPHORUS (P) .030
SULFUR (S) .002
SILICON (SI) .33
CHROMIUM (CR) 18.23
NICKEL (NI) 8.66
COBALT (CO) .09
COPPER (CU) .28
MOLY (MO) .37
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM, OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

K. JOHNSON, LAB TESTING MANAGER

Sheffield Plate Inc.

Box 370
Castle, Indiana 47362

Certificate of Analysis and Test Results

ORDER# 98362-03 HEAT & PIECE 81173-1B 8/18/97

SOLD TO: PAUL MUELLER COMPANY
1600 WEST PHELPS
P. O. BOX 828
SPRINGFIELD, MO 65801

SHIP TO: PAUL MUELLER CO
ADVISE LAURIE HODGES WHEN READ
(417) 831-3000
CPU MO 65801
673001-01

YOUR ORDER & DATE

47954

7/28/97

TAG# PART #1002094

ITEM DESCRIPTION

HEAT & PIECE 81173 - 1B
WEIGHT 3567
FINISH 1
GRADE 304L / 304
DIMENSIONS .500 X 96.000 X 247.000 EXACT
UNS-S30403 / UNS-S30400

DQRH

SPECIFICATIONS

THE PRODUCTS LISTED ON THIS MILL TEST REPORT SATISFY PREFERENCE CRITERION B AS DEFINED IN ARTICLE 401 OF THE NORTH AMERICAN FREE TRADE AGREEMENT. COUNTRY OF ORIGIN IS USA

ASTM A240-96A ASMESA240-96AD
NO WELD REPAIR ON MATERIAL
ASTM A262-93A PRAC A

ASTM A480-96 ASMESA480-96AD

ASTM A262-93A PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS

HARDNESS RB 81
GRAIN SIZE 5
YIELD STRENGTH (PSI) 38975
TENSILE STRENGTH (PSI) 83100
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 57.1
REDUCTION OF AREA % 70.0

ISO 9002:1994
QMS CON. #
003051

mk. PI (Head w/1 noz.)

CHEMICAL COMPOSITION

CARBON (C) .012
MANGANESE (MN) 1.46
PHOSPHORUS (P) .029
SULFUR (S) .001
SILICON (SI) .32
CHROMIUM (CR) 18.37
NICKEL (NI) 8.65
COBALT (CO) .09
COPPER (CU) .44
MOLY (MO) .57
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM, OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

K. JOHNSON, LAB TESTING MANAGER

JAN -30' 98 (FRI) 13:52

FERRO UNION

TEL: 770 751 1273

P. 004

Gulf States Steel, Inc.

GADSDEN, AL 35901-1076

PURCHASE ORDER DATE 02 11 92				CERTIFICATE OF TESTS		ACCOUNT NUMBER 26000201	PAGE NO. 1	INVOICE NUMBER 742-784.44
DATE SHIPPED 11 10 92				ORDER/INVOICE IDENTIFICATION BGDORN TRNP		I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE TO THE SPECIFICATIONS		
C.F. DEARDEN, JR. MGR. TECHNOLOGY AND QUALITY - PLATE PRODUCTS								

 FERRO UNION SOUTHEAST INC
 2005 GADSDEN PARKWAY
 ALPHARETTA GA 30201

 FERRO UNION SOUTHEAST INC
 2005 GADSDEN PARK
 ALPHARETTA GA 30201

 15
 1
 0

MATERIAL DESCRIPTION PLATE CARBON ASME SA-516 DATED 02/01/93 GRD 20 ASTM A-516-90 GRD 20 1000		QUANTITY SHIPPED 44106
1.5000 X .96.0000 GAS CUT EDGE X 360.0000 IN 2455696 1 Y022301 1 PCS 2455696 1 Y022302 1 PCS 2455696 1 Y022303 1 PCS CO C 20015 IN 02/1.20 P 022015 S 022015 SI 19740 CO 40015 NI 40015 CR 30015 IN 121015 CO 02015 U 02015 IN YLD 30000 MIN TEN 70200000 XELONG MIN 2 IN 21 OR 0 IN 12 TI 1 TR W/SHIPMENT TOTAL WT. 44,106 PCS 3		

MK. Al on Head Assemblies

2/26/98

HEAT NUMBER	As	C	Mn	P	S	Si	Cu	Ni	Cr	Mn	Cu	V	Al	N	n	Cn	TI	C.B
7455696		.27	1.07	.008	.009	.224	0.02	0.01	0.14	.05	.001	.001	.026					

HEAT NUMBER	TEST ON PIECE IDENTITY NO	YIELD KSI	TENSILE KSI	5 ELONG		HARDNESS	BEND TEST	HEAT TREAT	YS/TS RATIO	% RED. AREA	GALV COATING	DROW WEIGHT TEST LIST						
				2	5							DIL	TEMP °F	1	2	3	AVG.	
7455696	Y029301	53.0	85.0		25			AR	.62									
7455696	Y029302	52.0	83.0		27			AR	.62									
7455696	Y029303	52.0	86.0		23			AR	.60									

HEAT NUMBER	TEST ON PIECE IDENTITY NO	HEAT TREAT	SIZE	ON	TEMP °F	5 ELONG				5 BIFRAI			MILIT LATERAL EXPANSION					
						1	2	3	AVG	1	2	3	AVG	1	2	3	AVG	

LAST PAGE

9711814230

6870 Highway 92 East
Ghent, KY 41045-9615
(502) 347-8000

METALLURGICAL TEST REPORT

IAS NORTH AMERICAN
STAINLESS

Certificate: 042144 01
Customer: 0090 009
IS Order: AN 31056 02
Our Order: 604051

Mail to:
THYPIN STEEL COMPANY INC.
TEST REPORTS DEPARTMENT
49-49 30TH STREET
LONG ISLAND, NY 11101-3439

Ship to:
THYPIN STEEL COMPANY INC.
C/O MARYLAND METALS
4425 A NORTH POINT BLVD
BALTIMORE, MD 21219

Date: 5/22/97

Page: 1

Steel: TP 304L

Finish: HRAP

Corrosion: ASTM A262/93a PRAC E

TOTAL P.02

REMARKS:

PRODUCT DESCRIPTION:

STAINLESS STEEL COIL, HOT ROLLED, ANNEALED AND PICKLED.
STMA240/95A, A480/95A, A666/94A-A, ASMESA240/95, SA480/95, SA666/95-A
25766D-A X MC PERM, AMS5511F X MRK, KIL4043B, AND 1 X CROWN MARKS

Product ID #	Coil #	Thickness	Width	Weight	Length	Mark	Pieces
1T338 A	11T338 A	.1675	48.0000	14,330 COIL	457.50		1

MK. P3A, P3B on Head Ass.

CHEMICAL ANALYSIS

	C	CO	CR	CU	MN	NO	N	NI	P	S	SI
1T338	.016	.066	18.754	.183	1.561	.180	.067	3.403	.022	.003	.364

MECHANICAL PROPERTIES

Product ID #	Coil #	1 d o i c r	UTS KSI	.2% YS KSI	ELONG % 2"	Hard RB	Hard Back	90 Bend 1"
11T338 A	11T338	FT	88.28	44.56	49.46	36.00	36.50	OK

7/ 8782

QC ENGINEER

5/27/97

P.02/02

502 347 8001

NORTH AMERICAN STAINLESS

MAY-27-1997 14:07



TRENT TUBE DIVISION
2015 ENERGY DRIVE
P.O. BOX 77
EAST TROY, WI 53120-0077

CUSTOMER ORDER NO.	CPO. DATE	RATING	ENTRY DATE	SHIP	MARKS	MILL ORDER NO.
						6N5-85689-7

SHIP TO

SPECIAL INSTRUCTIONS

F.O.B. S/P
TERMS: 30-1/2- 10

LB/FT SOURCE

FT
LBS
PCS
WANTED
PROMISED

QUANTITY
ORDERED

HEAT #	LOT #	TENSILE	YIELD	ELON	HARDNS.	ID	RMS	CORROSION
1575		90,702	37,610	56 % B	72/73		OD GRAIN	TEST VALUE

Mercury or mercury compounds are not used in the manufacture of tubing/pipe.

We Hereby Certify This Report To Be True and Correct

According To The Records in Possession of this Corporation

TRENT TUBE DIVISION - CRUCIBLE MATERIALS CORPORATION

1-21-98

Trent Tube

A Division of Crucible Materials Corp.

TRENT TUBE DIVISION
2015 ENERGY DRIVE
P.O. BOX 77
EAST TROY, WI 53120-0077

TEST REPORT

CUSTOMER ORDER NO. SS-7044	CPO. DATE	RATING G	ENTRY DATE 103097	SHIP	MARKS	MILL ORDER NO. A 6N5-85689-7
-------------------------------	-----------	-------------	----------------------	------	-------	---------------------------------

SWEHARA

THEWINA

SWENSON PROCESS EQUIPMENT INC
15700 LATHROP AVE

THE ROBERTS CO.

P.O. BOX 1109
HWY 11 SOUTH

HARVEY

IL 60426-5118

WINTERVILLE

NC 28590

SPECIAL INSTRUCTIONS

11

128.1

SHIPPING NOTICE

F.O.B. S/P
TERMS: 30-1/2-10

1500 065 E 200000 1 270 TS 1.006 LB/FT SOURCE
1.500 X .065 20FT CUT 21,080
FULL FINISHED ANNEALED & PICKLED
TRENTWELD HEAT EXCHANGER TUBING
ASME SA249 95 ED
TP304

10/28/97

1/12/98

QUANTITY ORDERED
WANTED
PROMISED

Feet 21,080.000
Net 21,206
Pcs 1,054
Gross 21,206
Bdls 21
Complete Shipment
B/L # N09576-01
Date 21-JAN-98
M/D-RANGER PPD

LGTH. +1/8" -.000" OD +/- .006"

TAG: PD 3L-6814

HEAT #	877729	U574	875695	876447	876998	U575
	3	563	63	65	48	313

REPORT OF TESTS

CHEMICAL ANALYSIS

HEAT #	C	MN	P	S	SI	NI	CR	MO	CU	N	CO
877729	.032	1.77	.0290	.0120	.47	8.30	18.32	.33	.36	.090	.15
U574	.023	1.60	.0300	.0190	.31	8.58	18.30	.18	.18	.052	
875695	.024	1.80	.0270	.0120	.40	8.29	18.41	.34	.38	.090	.14
876447	.027	1.87	.0260	.0110	.46	9.13	18.33	.37	.36	.090	.17
876998	.020	1.83	.0290	.0140	.44	9.18	18.31	.36	.37	.090	.16
U575	.026	1.60	.0390	.0170	.39	8.50	18.26	.14	.23	.054	

Mechanical and NDE Tests

HEAT #	ELG	ELT	FLR	RFLT	EBNS	ROTB	EBD	BND	ETC	UT	RT	LPT	HYDRO
877729	OK	OK			OK				OK				
U574	OK	OK			OK				OK				
875695	OK	OK			OK				OK				
876447	OK	OK			OK				OK				
876998	OK	OK			OK				OK				
U575	OK	OK			OK				OK				

HEAT #	LOT #	TENSILE	YIELD	ELON	HARDNS.	ID	RMS	CORROSION
							OD GRAIN	TEST VALUE
877729		89,775	40,490	59 %	B 74/74			
877729					B 72/74			
U574		93,866	40,892	53 %	B 73/74			
U574		90,322	43,010	54 %	B 76/79			
5695		90,022	43,680	59 %	B 76/76			
5695					B 76/78			
876447		87,500	40,304	58 %	B 68/69			
876447					B 68/72			
876998		84,830	38,922	57 %	B 66/70			
876998		83,589	35,641	54 %	B 68/69			
U575		91,715	42,406	52 %	B 74/74			

LAB FILE

JAN-22-1998 15:35

PHIL. STAINLESS

6097641943 P.03/03


**COLUMBUS
STAINLESS**

INSPECTION CERTIFICATE

3.1.8

 116399
 Date: 25 Jul 1997

To: EN 10204

LEVEL 2 PROCESS

MANUFACTURER'S MARK



EXCLU


 P.O. Box 172
 Modelburg
 South Africa
 Tel: (0712) 847-9111
 Fax: (0712) 847-9111

COLUMBUS STAINLESS

 Customer:
 GULF AND NORTHERN TRADING CORP
 1010 ROUTE 561, SUITE 401
 VORHEES, NJ 08043 USA
 VORHEES
 NEW JERSEY 08043
 UNITED STATES OF AMERICA

D/A No.

Unique Assembly No.

00043432

ITE in No.

Proc. No.

003

CUSTOMER ORDER NO.

Kubuswelding

CS540

INSPECT No.

Proc. No.

 PRODUCT
 Description: NO 11 Hot Worked, Heat Treated
 and Pickled.

HEAD No.

Subcontractor

306462

INFO No.

306462470

SPECIFICATIONS

Name

 ASTM A240 -96A
 ASME SA240-1995 (95A)
 DQ-S 7660 02.00
 AMS 5511-F, 01.01.90 (304L)
 MIL-S 5059.D/3 (6.4.90)
 AMS 5513-F, 01.10.92 (304)
 ASTM A480-95A
 ASME SA480/M-95

MATERIAL CODE

Type/Mark

304L

304L

304L

304L

304

304

mk. PS on Head Assembly

MEASUREMENTS

Dimensions

KONTROLLMÄSSIGKEIT

DIMENSIONS

Abmessungen

60 in x 0.625 in x 240.0)

QUANTITY

Stückzahl

2

WEIGHT

Gewicht

5170

lb

CHEMICAL ANALYSIS

Chemische Zusammensetzung

MECHANICAL PROPERTIES

Mechanische Werte

	REQUIREMENT		LIMITS	Tensile	Yield	Elongation	Reduction of Area	Hardness	Impact	Toughness	Z
	Min	Max									
HC		0.030	0.028	Min 9		25		70	40	0.50	201
CE		0.030	0.028								
CP		0.030	0.027	Min 9		25		70	40	0.50	201
CS		2.00	1.65	Min 9		25		70	40	0.50	201
SI		0.75	0.45	Min 9		25		70	40	0.50	201
NI	8.00	12.00	9.06	Min 9		25		70	40	0.50	201
CO	18.00	20.00	18.21	Min 9		25		70	40	0.50	201
CU			0.11	Min 9		25		70	40	0.50	201
PH				Min 9		25		70	40	0.50	201
PN				Min 9		25		70	40	0.50	201
CO		0.000	0.0437	Min 9		25		70	40	0.50	201
CU			0.0500	Min 9		25		70	40	0.50	201
			0.0800	Min 9		25		70	40	0.50	201

 These in verify both end quality have been tested.
 Manufacturer's marking marks are present.
 Visual and dimensional control, no inspection.
 Dimensional and mechanical control after processing.
 The delivery is in accordance with the order.
 Die Lieferung entspricht den Bestelldaten.

 This material is heat treated according to specification.
 The material is heat treated according to specification.
 The material is heat treated according to specification.

Prime Material

 COLUMBUS STAINLESS
 HENNING ROAD, MODELBURG
 IMPERIAL, SOUTH AFRICA

P. de Vos

WORKS EXPERT

TOTAL P.03

**Acciaierie
Valbruna s.r.l.**



TEST CERTIFICATE

N. 4906/97

9 8019

10/02/97

26100 Vicenza (Italia) - V.le della Scleren, 23

Telex (40090 VALV I) - Telegrammi: Acciaierie Valbruna - Fax (0444) 093036
Tel. (0444) 097111 (30 linee P.A.) - Casella Postale 784 - C.C.I.A.A. 190669
Int. Tribunale di Vicenza n. 19944 - Cod. Fisc. e Partita IVA 01863340241

Buyer: **KG SPECIALTY STEEL INC.**
USA NORTH BRUNSWICK NJ 08902

Buyers Po. No: **V6570**

Mill Order No: **96 E 16623 - 3** Packing List. No: **97/ 483-F**

Delivery condition: **COND. A, COLD DRAWN**

Size: **SQUARE 1.1/4" 1.1/4"**

Qty. Lbs.: **2251**

Heat Paint:

SPECIFICATION

K.C. BAR, 95, 304
ASTM A182, 96, S30400
ASTM A479, 95D, S30400
QQ-S-763, F, 304

ASTM A193, 95A, B8
ASTM A114, 95, S30400
ASME (1) SA193, 95, B8
AMS 5639, C, S30400

ASTM A320, 94A, B8
ASTM A276, 96, S30400
ASME (1) SA479, 95, S30400
MIL-S-862, D/1, 304

*CHEMICAL ANALYSIS ONLY

(1) SECTION II PART A 95 EDITION THRU 95 ADD.

CHEMICAL ANALYSIS

HEAT No.	C	Mn	P	S	Si	Ni	Cr	Mo	Cu
225697	0.05	1.49	0.029	0.025	0.40	0.22	18.40	0.60	0.34
Ti	Co	Cb + Ta	Sn	H					
				0.07					

MECHANICAL PROPERTIES

TS Tensile Yield	YS Yield Tensile	E %	RA %	HARDNESS BRINELL	HARDNESS ROCKWELL	HARDNESS SHORE D
96500	60000	56.0	68.0	210		210

**MECHANICAL CAPABILITIES FOR
HEAT TREATED CONDITION**

OTHER TEST(S) and/or REQUIREMENTS:

- Material in form of mercury contamination
- Material in solution heat treated free from continuous carbide network.
- Grain size per ASTM E 112 : 7
- Annealing temperature : 1904 F min / water.
- No welding or weld repair
- Macro etch test : OK
- Intergranular corrosion test per ASTM A262 practice A-E: OK

mk. FI on Head Assembly

3/3/98

Quality Control Manager

Inspector

Vicenza. 18/02/97

cur 33H

TOTAL P.03

LUKENS

TEST CERTIFICATE

CUSTOMER P.O. BOX 26685
DESCRIPTION: 1 - 1/2" X 96" X 208" ALUMINUM

FILE NO: 8809-05-03
DATE: 07/15/97
MILL ORDER NO: 49760-001

60929-1000
5/8

SOLD TO:
REYNOLDS ALUMINUM SUPPLY CO.
P.O. BOX 26685

SEND TO:
TEST REPORT 2114 - 1/2" X 96" X 208"
P.O. BOX 26685

SHIP TO:
RASCOT
344 CIRCLE FREEWAY DRIVE

RICHMOND VA 23261

CINCINNATI OH 45246

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASER SPECIFICATIONS AND REQUIREMENTS

RASCOT 04:09:29 REV 1 YR 96 TYPE-304L
TYPE 304L AMS 5511F (QAIVE CLP)

ASTM A240-95A TYPE 304L, ASME SA240 95ED 96AD
ASTM A240 TYPE 304L, ASTM A480-95A

MELT/SLAB	CHEMICAL ANALYSIS														PRACTICES
B0929 /106	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	B	N		
B0929	.017	1.67	.031	.023	.41	.53	9.57	8.57	.43				.0240		
PROD ANALYSIS	.018	1.69	.030	.022	.40	.54	9.53	8.56	.43				.0240		

TENSILES				CHARPY V IMPACTS				OTHER TESTS PERFORMED			
TYPE	YLD. PSI	TENS. X 100	% ELONG 2"	% R.A.	TYPE	TEMP		UNILATERAL EXPANSION	% SHEAR		
BX	433	852	70.0	60.0							
								BEND TEST - LOC/OTR BX - PASS			
								PRINELL - 155 TEST LOC			
								CORROSION A262E SATISFACTORY			

INFORMATION

WEIGHT PER PIECE = 4293 LBS. 1951 KG.
MERCURY OR MERCURY COMPOUNDS ARE NOT USED IN THE
MANUFACTURE OF LUKENS'/WASHINGTON'S PRODUCTS.
** CORROSION TEST PER ASTM A262 PRACTICE A & E **
MATERIAL WAS NOT INTENTIONALLY EXPOSED TO
ANY CARBON CONTAMINATION AFTER FINAL CLEANING.
ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN U.S.A.
PART NO. 02657179
CUSTOMER ITEM NO. 001
** SIZE = 1.6250" NOM X 96.0000" NOM X 208.0000" NOM

HEAT TREAT CYCLES - MATL OR TESTS - DEG FAHR

MATL	TEST	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS.	COOL METHOD	TEMP
X	X	1950			3019	LIQ	

HEAT TREAT CYCLES - TESTS ONLY - DEG FAHR

START END TEMP	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS.	HEAT RATE MAX	COOL RATE MAX

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:
FORM NO.2221T (R 5/96)

Quality Assurance Laboratory
Coatesville, PA 19320

ELIJAH ZAPLITNY

SUPERVISOR - TEST REPORTING

GENEVA STEEL

GENEVA STEEL COMPANY CERTIFIES ALL SMELTING, MELTING AND MANUFACTURING PROCESSES OCCURRED IN THE U.S.A.

CONTRACT NO.

P.O. DATE

PURCHASE ORDER NO.

SR-09426

SHIPPER'S NO.

MILL ORDER NO.

TALLY NO.

GP32543F 10-17-97

FL 53075

GP32943F

VEHICLE IDENTIFY

SP 508660

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MANUFACTURED, SAMPLED, TESTED AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.

Larry D. Clinger
DIVISION MANAGER, QUALITY
DATE 10-17-97

GENEVA STEEL
P.O. BOX 2500
PROVO, UTAH 84603

CHATHAM STEEL CORP
P.O. BOX 2567
SAVANNAH GA 31498-0001

CHATHAM STEEL CORP
501 W BOUNDARY ST
SAVANNAH GA 31498

SHIP TO

PLATE
ASTM A516-90 GRADE 70 AND ASME SA-516 GR.70 1995
EDITION 1996 ADDENDA PRECURRE VESSEL QUALITY-MANDATORY DIE STAMPING

P.O. 28143-97713

01 MILL RA/SN CERTIFIED T/R

2/25/98

M.L. P17

S.N.	O.	MATERIAL DESCRIPTION			QUAN- TITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD ST. *KSI	TENSILE STR. KSI	ELONGATION %		% RED. OF AREA	B
		THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH							IN 8"	IN 2"		
		.5000"	96.0000"	240.0000"	5	16335#	1C4228	28-01	61.0	86.3		36.0		
								28-01	56.5	79.9		40.0		
								28-01	56.3	79.5		22.0		
				CUSTOMER INFO PT#61276--										
		.5000"	96.0000"	240.0000"	1	3267#	1C4229	24-01	58.4	84.7		38.0		
								24-01	51.2	77.3		36.0		
								24-01	49.3	75.3		34.0		
								END OF DATA						

YIELD STRENGTH-TOTAL EXTENSION UNDER LOAD 0.5%

HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO	CA	
1C4228	HEAT	22	109	007	009	29	01	01	02	004		039		021			003			FINE GRAIN
1C4229	HEAT	21	110	007	009	29	02	01	02	004		043		020			003			FINE GRAIN
GENEVA STEEL COMPANY CERTIFIES ALL SMELTING, MELTING AND MANUFACTURING PROCESSES OCCURRED IN THE U.S.A.																				
END OF DATA																				



TEST CERTIFICATE

CUSTOMER P.O. NO. 11117
DESCRIPTIONPAGE NO. 01 OF 2
FILE NO. 7856-01-02
DATE 01/19/98
MILL ORDER NO. 64773-001

ITEM NO. 3125 - 1/2" DIA. - 24"

SOLD TO:

THYPIN STEEL
P.O. BOX 7808

SEND TO:

TEST REPORT WITH SHIPMENT

FOR BOL. 8 97444

MK. P2 on Head Assemblies

SHIP TO:

THYPIN STEEL
CHARLOTTE PRIMARY WAREHOUSE
12825 SAM NEELY ROAD

CHARLOTTE

NL 28217

CHARLOTTE

NL 28217

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION.

THYPI TS001-TS04L REV 2 YR 91 TYPE-004L
95 ED TYPE 304/304L, ASTM A480-94B, ASTM A167-90
(NATIVE CLM), AMS 5513F (NATIVE CLM), ETL-S-40436ASTM A240-94B TYPE 304/304L, ASME SA240/SA480
TYPE 304/304L, NQS-766D COND. A, AMS 5511F
(NATIVE CLM), ASTM A262-93A PRACT. E

MELT/SLAB

CHEMICAL ANALYSIS

PRACTICES

B2181	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	B	N			
B2181	.015	1.71	.028	.003	.24	.42	8.73	18.64	.53				.0660			
PROD ANALYSIS	.014	1.70	.027	.003	.22	.41	8.68	18.68	.53				.0630			

TENSILES

CHARPY V IMPACTS

OTHER TESTS PERFORMED

TYPE	YLD (PSI)	TENS (X 100)	% ELONG (2")	% RA	TYPE	TEMP	MILS LATERAL EXPANSION	% SHEAR	BEND TEST - LOC/DIR BX - PASS
BX	417	836	72.0	59.0					BRINELL - 156
									CORROSION A262E SATISFACTORY

2/26/98

INFORMATION

HEAT TREAT CYCLES - MATL OR TESTS - DEG FAHR

WEIGHT PER PIECE = 2218 LBS. 1008 KG.
MERCURY OR MERCURY COMPOUNDS ARE NOT USED IN THE
MANUFACTURE OF LUKENS/WASHINGTON'S PRODUCTS.
** CORROSION TEST PER ASTM A262 PRACTICE A & B **
** SIZE = .3125" NOM X 96.0000" NOM X 241.0000" ACT X WGT. = 2084

MATL	TEST	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	COOL METHOD	END TEMP
Y	A	1950			0012	UQ	

HEAT TREAT CYCLES - TESTS ONLY - DEG FAHR							FAHR
START END TEMP	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	HEAT RATE MAX	COOL RATE MAX	

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:
FORM NO.2221T (R 5/96)Quality Assurance Laboratory
Coatesville, PA 19320

ELINORE ZAPLITNY

SUPERVISOR - TEST REPORTING

SENT BY:2055496618

: 8- 9-95 :11:09AM :

GULF STATES-

9128440259:# 3/ 3

Gulf States Steel, Inc.

DALLAS, AL 36004-1083

1789-01		PURCHASE ORDER DATE 06 13 95		COUNT NUMBER 14160001		PAGE NO 1		INVOICE NUMBER 742-74491	
C 40379 05 742		SHIPPED FROM ALA CITY		DATE SHIPPED 08 04 95		ROUTE/VEHICLE IDENTIFICATION 80U 115883			
SR 07430				I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE TO THE SPECIFICATIONS.					
				C.F. BEARDEN, JR. NCR, TECHNOLOGY AND QUALITY - PLATE PRODUCTS					

CHATHAM STEEL CORP
P O BX 2567
SAVANNAH GA 31498

CHATHAM STEEL CORP
H BOUNDARY & GUYNETTS STS
SAVANNAH GA 31498

B
I
P
T
O

MATERIAL DESCRIPTION

PLATE CARBON ASTM A-516-70 GRD 70 PQQ MELTED & MFG IN USA

QUANTITY SHIPPED

.5000 X 120.0000 SHEARED EDGE X 480.0000 IN

130680

HT 7444049 T U132001 1 PC8
HT 7437247 T U132201 1 PC8
HT 7837247 T U132301 1 PC8
HT 7837247 T U132302 1 PC8
HT 7837247 T U132303 1 PC8
HT 7443941 T U135301 1 PC8
HT 7443941 T U135302 1 PC8
HT 7443941 T U135303 1 PC8
HT 7443941 T U135304 1 PC8
HT 7443941 T U135305 1 PC8
HT 7443941 T U135306 1 PC8
HT 7443941 T U135307 1 PC8

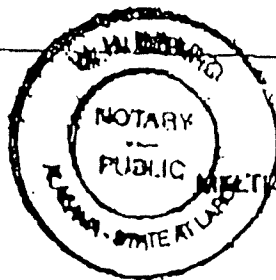
301- mk p7A,7B

AC
2/25/98

STATE OF ALABAMA, COUNTY OF EDWARD.
SWORN AND SUBSCRIBED TO BEFORE ME

THIS THE 4 DAY OF AUG 1995
W. H. Bearden

Notary Public



MELTED AND MANUFACTURED IN THE USA

Notary Public																		
ITEM NUMBER	W	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Co	V	Al	N	H	Ca	Ti	CL
7444049		.23	1.07	.009	.007	.220	0.06	0.09	0.04	.04	.003	.001	.047					
7437247		.22	1.15	.012	.010	.250	0.03	0.03	0.15	.06	.004	.002	.042					
7837247		.22	1.13	.012	.010	.250	0.03	0.03	0.15	.06	.004	.002	.042					
7443941		.22	1.05	.015	.016	.270	0.03	0.01	0.03	.02	.004	.001	.034					
HEAT NUMBER	TEST OR PIECE IDENTITY NO.	YIELD KSI	TENSILE KSI	% ELONG		HARDNESS	DCND TEST	HEAT TREAT	YS/TG RATIO	% RED. AREA	GALV COATING	DROPT WEIGHT TEST TESTS						
				D"	D"							DIR	TEMP °F	1	2	AVG		
7437247	U132201	33.0	80.0			26		RR	.66									
7443941	U135301	50.0	77.0			26		RR	.64									
7443941	U135302	50.0	76.0			27		RR	.63									
7443941	U135303	51.0	78.0			23		RR	.65									
7443941	U135304	52.0	79.0			26		RR	.65									
7443941	U135305	52.0	78.0			26		RR	.66									
7443941	U135306	51.0	77.0			25		RR	.66									
7443941	U135307	50.0	77.0			27		RR	.64									
7443941	U135308	52.0	77.0			20		RR	.67									
7443941	U135309	52.0	77.0			26		RR	.67									
HEAT NUMBER	TEST OR PIECE IDENTITY NO.	HEAT TREAT	SIZE	DIR	TEMP °F	ENERGY				% BHEAT				MILS LATERAL EXPANSION				
						1	2	3	AVG	1	2	3	AVG	1	2	3	AVG	
CONTINUED																		
750804194479																		

CONTINUED

759804194429

S00500 1

AS

C1953

RINGMASTERS

236

SWENSON PROCESS EQUIPMENT INC.
A HENLEY GROUP CO.
15700 LATHROP AVE
HARVEY, IL

60426-5152

MATERIAL CERTIFICATION

WE'RE ISO 9002 APPROVED CERTIFICATE #32368

97019-05-8-6

CUSTOMER ORDER NUMBER SS-7216	ITEM 1	OF 1	CUSTOMER JOB NUMBER	DATE SHIPPED 01/06/1998
PART NUMBER	B/P NUMBER SB-99175-1 REV NONE		F.O.B. RINGMASTERS VIA R & L	DATE PREPARED 01/12/1998

DESCRIPTION OF MATERIAL AND SPECIFICATIONS

FORGINGS PER B/P SB-99175-1 REV NONE
STEEL TO MEET ASME SA-105 1995 ED. 1995 ADD.
NORMALIZE @ 1550/1700 F TO 187 BHN MAX

MECHANICAL TEST REQ'D TO MEET

70,000 TENSILE 36,000 YIELD

22 % ELOG. 30 % RED

ROUGH MACHINE TO SIZES SHOWN PER B/P - 500 RMS

NO. OF PIECES 1 HEAT NUMBER Y3877

(MILL - FIRSTMISS STEEL INC)

Additional prefix letter stamped on product with heat
number is for RINGMASTERS inventory purposes only and
not relevant to heat number

(MSDS PREVIOUSLY SENT

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Al	V	GRAIN
.18	1.258	.007	.014	.20	.064	.11	.024	.15	.023	.005	8

Cb

.002

MECHANICAL PROPERTIES

K
2/25/98

PCS	TENSILE PSI	YIELD PSI (.2% OFFSET)	ELONGATION IN 2 - %	REDUCTION OF AREA %	COMMENTS
1	77,600	50,500	30.9	64.4	

HARDNESS RESULTS

MK. A2 on Head

PCS
1BRINELL
3000 KG LOAD
148

NORMALIZED AT 1650 DEGREES FOR 3.75 HOURS

RECEIVED

JAN 20 1998

SWENSON

THIS IS TO CERTIFY THAT THE REPORTED LADLE ANALYSIS (AND/OR
TESTS) SHOWN ON THIS REPORT ARE CORRECT AS CONTAINED IN THE
RECORDS OF THE COMPANY.

APPROVED BY: 

C1952

SWENSON PROCESS EQUIPMENT INC.
A HENLEY GROUP CO.
15700 LATHROP AVE
HARVEY, IL

60426-5152

MATERIAL CERTIFICATION

WE'RE ISO 9002 APPROVED CERTIFICATE #32368

CUSTOMER ORDER NUMBER SS-7216	ITEM 1	OF 1	CUSTOMER JOB NUMBER	DATE SHIPPED 01/06/1998
PART NUMBER	B/P NUMBER SB-99175-1 REV NONE		F.O.B. RINGMASTERS VIA R & L	DATE PREPARED 01/12/1998

DESCRIPTION OF MATERIAL AND SPECIFICATIONS

97019-25-8-6

FORGINGS PER B/P SB-99175-1 REV NONE
STEEL TO MEET ASME SA-105 1995 ED. 1995 ADD.
NORMALIZE @ 1550/1700 F TO 187 BHN MAX

MECHANICAL TEST REQ'D TO MEET
70,000 TENSILE 36,000 YIELD
22 % ELOG. 30 % RED

ROUGH MACHINE TO SIZES SHOWN PER B/P - 500 RMS

NO. OF PIECES 3 HEAT NUMBER 42338

(MILL - DUFERCO)

Additional prefix letter stamped on product with heat
number is for RINGMASTERS inventory purposes only and
not relevant to heat number

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Al	V	GRAIN
.174	1.35	.008	.023	.28	.13	.12	.03	.23	.025	.001	6/7

MECHANICAL PROPERTIES

PCS	TENSILE PSI	YIELD PSI (.2% OFFSET)	ELONGATION IN 2 - %	REDUCTION OF AREA %	COMMENTS
3	77,400	51,400	31.4	63.4	

2/25/98

HARDNESS RESULTS

PCS
3

BRINELL
3000 KG LOAD
152/165

mk. A3, and A2 on Head
on channel

NORMALIZED AT 1650 DEGREES FOR 3.75 HOURS

RINGMASTERS only processes materials manufactured or
purchased to produce the forgings you purchase. Our process in
no way adds to or changes constituents in the raw material as
received.

Material Safety Data Sheet from producing mill to follow after
received from our supplier.

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