



UCS JOB NO. S-4248-02

**MANUFACTURER DATA BOOK COVER SHEET**

<b>CUSTOMER</b>	<b>: UOP</b>
<b>CUSTOMER JOB NUMBER</b>	<b>: J-447/J-448</b>
<b>SUPPLIER</b>	<b>: UNITED CONTRACTING SERVICES, INC.</b>
<b>SUB-SUPPLIER</b>	<b>: NONE</b>
<b>DOCUMENT DESCRIPTION</b>	<b>: MANUFACTURING DATA BOOK</b>
<b>EQUIPMENT DESCRIPTION</b>	<b>: Pipe Spools &amp; Skid Structures</b>
<b>DATE</b>	<b>: 01-20-2016</b>



UCS JOB NO. S-4248

## Section 1

List of Contents

JOB: S-4248-02



UCS JOB NO. S-4248

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UCS JOB NO. S-4248

## Section 2

Certificate of Conformance

JOB: S-4248-02



**UNITED CONTRACTING SERVICES**  
**3989 N. OSAGE DR. TULSA, OK 74127**

**CERTIFICATE OF COMPLIANCE**

**UCS NUMBER: S-4248-02**

**DATE: 03-28-2017 JOB NUMBER: J-447-DEHY-SPOOLS PO NUMBER: 4500757656**

**CUSTOMER: UOP-**

**PROJECT MANAGER: ALEX ESTRADA**

**INSPECTED: YES**

UNITED CONTRACTING SERVICES, INC. CERTIFIES THAT THE ITEMS AND/OR MATERIALS USED IN THIS PROJECT ARE IN ACCORDANCE WITH ALL APPLICABLE CODES & STANDARDS; HAVING PAST INSPECTIONS AS NOTED.

**DESCRIPTION:**

**◇ DEHY PIPE SPOOLS**

◇	DEHY-001	SHEET	1	OF	1	REV	0
	DEHY-002	SHEET	1	OF	1	REV	0
	DEHY-003	SHEET	1	OF	1	REV	2
	DEHY-004	SHEET	1	OF	1	REV	2
	DEHY-005	SHEET	1	OF	1	REV	1
	DEHY-006	SHEET	1	OF	1	REV	1

**THE SIGNATURE BELOW CERTIFIES THAT ALL MATERIALS AND OR EQUIPMENT LISTED IS IN ACCORDANCE WITH THE REQUIRED CODES, SPECIFICATIONS, AND DRAWING REQUIREMENTS.**

  
 \_\_\_\_\_  
 SIGNATURE

3/28/17  
 \_\_\_\_\_  
 DATE

TULSA, OK (918)551-7649



UCS JOB NO. S-4248

## Section 3

Completed Signed /  
JOB TRAVLER

JOB: S-4248-02

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# A Honeywell Company

UOPR SF-009

## FABRICATORS PIPING & STRUCTURE INSPECTION PLAN

### HONEYWELL UOP RUSSELL PROCESS PLANTS FOR CRYO, REFRIGERATION, AMINE,

#### PROJECT SPECIFICATION

Job # ~~J-1147~~

PAGE 1 OF 3

PO- 4500757656

REV	DATE	BY	CHK	APV	REV	DATE	BY	CHK	APV
0	3/8/2016	JB							

REVISION	DESCRIPTION
0	Fabricators Skid ITP

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**A Honeywell Company**

UOPR SF-009

**FABRICATORS PIPING & STRUCTURE INSPECTION PLAN**

**HONEYWELL UOP RUSSELL PROCESS PLANTS FOR CRYO, REFRIGERATION, AMINE,**

Fabricator shall provide inspectors (UOPR and Client) with Two (2) working days advance notice for inspection points (A1 and A2).

Fabricator shall provide UOPR QC with Two (2) working days written notification for hold points (H). E-mail is the preferred method of written notification.

**Inspection Code:**

- A1 - 100% Actual Inspection
- A2 - Random Inspection

- R1 - 100% Review of Documentation
- R2 - Random Review of Documentation

- H - Hold Point - do not proceed until inspection by party requesting the hold is complete.
- W - Witness Point - do not proceed until inspection by party requesting the witness point is Complete or (waived.)

- AP - Approval Required
- NA - Not Applicable





**PROJECT SPECIFICATION**

Job # J-447  
PO- 4500757656

PAGE 2 OF 3

REV	DATE	BY	CHK	APV	REV	DATE	BY	CHK	APV
0	3/8/2016	JB							

As a minimum, Fabricator shall review and inspect the Control Activities indicated below.

Control Activity	Governing Code or Specification	Required Inspections Initials and Date			
		Fabricator/ vendor	UOPR	Client	A.I/3 <sup>rd</sup> party
<b>Fabrication Inspection and Testing plan</b>					
Review fabrication isometric drawings and PO Clarification SOP.	UOPR SOP-001 P&IDs ENG-14cf ENG-14ca ENG-14cas	R1  4/25	R1		 4/5
Review WPS's and PQR's	ENG-14cam ENG-13ap  UOPR Quality Control Manual ASME D1.1 Weld Maps  ASME Sec. IX	 4/25	R1		 4/5



**A Honeywell Company**

UOPR SF-009

**FABRICATORS PIPING & STRUCTURE INSPECTION PLAN**

**HONEYWELL UOP RUSSELL PROCESS PLANTS FOR CRYO, REFRIGERATION, AMINE,**

**PROJECT SPECIFICATION**

Job # J-447  
PO-4500757656

PAGE 3 OF 3

REV	DATE	BY	CHK	APV	REV	DATE	BY	CHK	APV
0	3/8/2016	JB							

Control Activity	Governing Code or Specification	Required Inspections Initials and Date			
		Fabricator/vendor	UOPR	Client	A.I/3rd party
VT/Dimensional check of skid top (Done on Ground).	AWS D1.1 ENG-14de	A1 N/A	H		
Visually examine weld quality and dimensional check of ALL structural components.	AWS D1.1	A1 N/A	A1,H, A2		
Verify trial fit of upper and lower stacked skid structures, ladders, platforms, stairs, handrails and any additional bolt on attachments.		H, A1 N/A	H, A1		
Visually examine piping weld quality.	ENG-13aae ASME B-31.3	A1 D 3/27	A1,AP		D 4/5
Conduct dimensional piping and fitting orientation check.	Structural Steel Plan, Elevation and Isometric drawings	H, A1 D 3/27	H, A1		D 4/5
Review radiographs and NDE test reports	ASME B-31.3	R1 D 4/5	R1		4/5
Witness pressure testing of piping. Verify pressure test results. <b>Chart Required.</b>	Line List ENG-13aae ASME B-31.3 HUR-1000	N/A	A1, R1		
Review skid documentation / data book.	ENG-13aae	R1 D 4/5	R1, AP		D 4/5

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UCS JOB NO. S-4248

## Section 4

# Material Test Reports

## JOB: S-4248-01

**VS**

Valeo - Valspar  
 Rua Industrial s/n - Distrito Industrial  
 Jeceaba - MG  
 35490-000 - Brasil

Trading Company: Sumitomo Corporation  
 NSGMC work No.: JYYS03910000  
 Buyer: Nippon Steel & Sumitomo Metal Corporation  
 Buyer Order No.: 3P16S274206  
 Customer: SUMITOMO CORPORATION OF AMERICA  
 Customer Order No / Item: 30457 / 6  
 Inspection Company: Valeo and Sumitomo Tubos do Brasil Ltda.

Size (O.D. X W.T.): 8.625 inch X 0.500 inch  
 Grade: X42 # B # B  
 Standard: API SPEC 5L, 42L2012, 45TH EDITION # PSL 1

In accordance also to the standards:  
 ASTM A106 - 11 / ASME SA-106 - 10, ADDENDA 2011 / ASTM A 53 - 12 / ASTM A 530 - 10 / ASME SA-53 - 10, ADDENDA 2011  
 Description of Products: SEAMLESS STEEL PIPE Heat Treatment: AS ROLLED, BEVELED ENDS 30 DEG  
 External Surface Protection: UV-VARNISH  
 Tolerances: Outside Diameter: - 0.75 % / + 0.75 %  
 Length: RANDOM: 40.0 FT / 42.0 FT

Acceptance Length: RANDOM, 10 %; 36.0 FT / 40.0 FT

Standard Marking:  
 PAINT STENCILED: VSB LOGO API SPEC. 5L 0887 API MONOGRAM MONTH/YEAR ASTM/ASME / ASA-106 A53-B 625 0.500 BIX42 PSL1 SMLS JYYS03910000 HEAT NUMBER PIPE TALLY  
 NO LENGTH B S TESTED 2970 PSI/ND WEIGHT HSSMC LOGO

Shipping Marking:  
 SUMITOMO CORPORATION OF AMERICA HOUSTON P. O. NO. 30457, MADE IN BRAZIL

Heat No.	Min. allowed tempering temperature (°F)	Pieces	Length(m)	Weight(kgr)	Length(ft)	Weight(lbf)
103193	N/A	145	1837.83	117917	6026.7	259961
103200	N/A	149	1890.48	121614	6202.1	268114
103966	N/A	91	1025.32	65912	3364	145313
103967	N/A	134	1657.64	109065	5570.7	240449
103968	N/A	149	1889.10	121324	6195.4	267472
103969	N/A	128	1626.60	104659	5337.6	230739
103970	N/A	85	1103.68	71035	3829.2	156610
Total		671	11509.55	711526	36319.7	1568658

The product is satisfactory in the following tests/inspections:  
 Dimensional # Visual # Flattening Test # Flux Leakage Electromag. Test: API 5L LONG, N5 EXT. # Maximum Residual Magnetism: 30 GAUSS # Hydrostatic Test: 2970.0 PSI 5 s #

**CHEMICAL COMPOSITION (%)** Process: Electric Arc Furnace (EAF), heats fully killed

Req: C+Mn/S+(Cr+Mo+V)/5 +[N]+Cu/15

CE1: Cr + Cu + Mo + Ni + V

CE2: Nb + V

CE3: Nb + V + Ti

**INSPECTION CERTIFICATE**

EN: 10204.3.1

No.:

30018887

Sheet: 1 / 3

Destination Country: USA

Work Order: 806 / 10

Material Number: 700858

Pipes Ends Protector: POLYETHYLENE CAP WITH HOLE

Wall Thickness: - 12.5 % / + 15.0 %

VS

VERIPDF SOLUTIONS  
 Rua Industrial s/n - Distrito Industrial  
 Japerão - MG  
 35488-000 - Brasil

INSPECTION CERTIFICATE No.: 30018887  
 EN 10204.3.1

Sheet: 2 / 3

		C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	Nb	B	Ti	Ceq	CE1	CE2	CE3	
Required:	Ladle analysis	Min.	0.29			0.10													
		Max.	0.23	1.20	0.030	0.030	0.40	0.40	0.15	0.40	0.08		0.001		0.43	1.00	0.06	0.15	
	Product analysis	Min.	0.29			0.10													
		Max.	0.23	1.20	0.030	0.030	0.40	0.40	0.15	0.40	0.08		0.001		0.43	1.00	0.06	0.15	
Heat No.	Pipe No.																		
103199	201120	Ladle	0.19	1.04	0.011	0.004	0.27	0.02	0.05	0.00	0.05	0.02	0.000	0.000	0.002	0.37	0.14	0.02	0.02
	301120	check1	0.19	1.05	0.011	0.003	0.26	0.02	0.05	0.00	0.05	0.02	0.000	0.001	0.002	0.38	0.14	0.02	0.02
		check2	0.19	1.05	0.011	0.003	0.27	0.02	0.05	0.00	0.06	0.03	0.000	0.001	0.002	0.39	0.17	0.03	0.03
103200	306110	Ladle	0.19	1.04	0.012	0.004	0.25	0.05	0.05	0.01	0.06	0.02	0.000	0.000	0.002	0.39	0.17	0.02	0.02
	406120	check1	0.20	1.04	0.011	0.004	0.25	0.03	0.05	0.01	0.06	0.02	0.000	0.001	0.002	0.40	0.17	0.02	0.02
		check2	0.20	1.04	0.012	0.004	0.25	0.04	0.05	0.01	0.06	0.02	0.000	0.001	0.002	0.40	0.18	0.02	0.02
103986	104210	Ladle	0.18	1.03	0.012	0.002	0.23	0.03	0.10	0.01	0.03	0.02	0.000	0.001	0.002	0.38	0.19	0.02	0.02
	502210	check2	0.19	1.04	0.011	0.002	0.23	0.03	0.10	0.01	0.03	0.02	0.000	0.001	0.002	0.39	0.19	0.02	0.02
		check1	0.19	1.05	0.012	0.001	0.23	0.03	0.10	0.01	0.03	0.02	0.000	0.001	0.002	0.40	0.19	0.02	0.03
103967	104110	Ladle	0.18	1.04	0.013	0.002	0.24	0.02	0.08	0.01	0.03	0.02	0.000	0.001	0.002	0.38	0.13	0.02	0.02
	405120	check2	0.18	1.05	0.012	0.002	0.23	0.02	0.08	0.01	0.03	0.02	0.000	0.001	0.002	0.38	0.15	0.02	0.02
		check1	0.18	1.05	0.012	0.002	0.23	0.02	0.08	0.01	0.03	0.02	0.000	0.001	0.002	0.38	0.15	0.02	0.02
103988	101120	Ladle	0.19	1.03	0.015	0.003	0.24	0.03	0.08	0.02	0.04	0.02	0.000	0.001	0.002	0.36	0.20	0.02	0.02
	105120	check2	0.19	1.05	0.014	0.003	0.24	0.02	0.09	0.01	0.03	0.02	0.000	0.001	0.002	0.36	0.17	0.02	0.02
		check1	0.19	1.06	0.016	0.003	0.24	0.03	0.09	0.02	0.04	0.02	0.000	0.001	0.002	0.40	0.20	0.02	0.02
103969	106120	Ladle	0.18	1.03	0.013	0.003	0.23	0.03	0.07	0.01	0.05	0.03	0.000	0.001	0.001	0.36	0.19	0.03	0.03
	105120	check2	0.19	1.06	0.013	0.003	0.23	0.03	0.08	0.01	0.05	0.03	0.000	0.001	0.002	0.40	0.20	0.03	0.03
	105110	check1	0.19	1.06	0.012	0.003	0.23	0.03	0.07	0.01	0.04	0.03	0.000	0.001	0.001	0.39	0.18	0.03	0.03
103970	101130	Ladle	0.19	1.02	0.013	0.000	0.23	0.03	0.06	0.01	0.05	0.03	0.000	0.001	0.002	0.39	0.20	0.03	0.03
	303120	check2	0.19	1.05	0.013	0.003	0.23	0.03	0.06	0.01	0.05	0.03	0.000	0.001	0.002	0.40	0.20	0.03	0.03
	401130	check1	0.19	1.05	0.012	0.003	0.23	0.03	0.08	0.01	0.06	0.03	0.000	0.001	0.002	0.39	0.20	0.03	0.03

CE: Combined Elements; Ceq: Carbon Equivalent

TENSILE TEST S: Direction: Longitudinal

Temperature: Room Temperature

Gage Length: 10±2"

YS method: 0.50 %

Type of specimen: STRIP 1.5" WIDTH

Thickness: 0.500"

Required	Heat No.	Pipe no.	Position of Sample	YS	TS	E	RA	YS/TS
				(Fw)	(Fw)	%	%	%
			Min.	42100	60200	35.0		
			Max.					
	103199	201120	Top	52200	78300	40.0		
	103200	306110	Bottom	53800	82300	40.0		
	103986	502210	Bottom	51100	79000	40.0		
	103967	405120	Bottom	48700	78000	41.0		
	103988	106120	Bottom	49900	77300	41.0		
	103969	405110	Bottom	52400	78800	40.0		
	103970	303120	Bottom	51200	78800	40.0		





**INSPECTION CERTIFICATE DIN EN 10204: 2005-01 3.1 / № 1-0744 /**

Quality management system has been certified according to ISO 9001:2008 by Bureau Veritas Certification (Certificate Number UA 226866/1)  
 Environmental management system has been certified according to ISO 14001:2004 by Bureau Veritas Certification (Certificate Number UA 226869/1)  
 Occupational health and safety management system has been certified according to OHSAS 18001:2007 by Bureau Veritas Certification (Certificate Number UA 227188)



Open Joint-Stock Company  
 "Byelorussian Steel Works – management company of  
 "Byelorussian Metallurgical Company" holding"  
 37, Promyshlennaya street 247210 Zhlobin – Belarus  
 Tel. +375 (2334) 5-41-29, Fax +375 (2334) 5-60-42  
 www.belsteel.com qualdir@bmz.gomel.by

Description of the goods: Hot formed seamless pipes for oil and gas industry.  
 Описание товара: Трубы бесшовные горячедеформированные для нефте- и газопроводов.  
 Final application: For pipeline transportation systems for petroleum and natural gas industries.  
 Конечное назначение: Для трубопроводных транспортных систем для нефтяной и газовой промышленности.  
 Delivery Conditional: Hot rolled  
 Условие поставки: Горячедеформированные.

Contract № 14025571 appendix 1  
 Контракт № приложение  
 PO number 10P15578SHE  
 Wagon № 61223749  
 Вагон  
 Country of destination: USA  
 Страна назначения  
 Consignee:  
 Получатель:

№ position / № позиция	heat № / плава №	Lot № / Партия №	Grade steel / Standard / Марка стали / Стандарт / With the sphere of spreading / (с областью распространения)	Chemical composition, % (химический состав, %)																Steel making process:		
				C	Si	Mn	P	S	Cr	Ni	Cu	Ti	Mo	V	Al	Nb	B	Nb+V	Nb+Ti+V		Cr+Ni+Mo+Cu+V	CEV
1	351762	151257	B acc. to ASTM A53/A53M-11 B acc. to ASME SA53/SA-53M-2011 B/C acc. to ASTM A106/A106M-14 B/C acc. to ASME SA106/SA106M-2011 NDE NACE MR 0175/ISO 15156-2:2009 and PED 97/23/EC, NACE MR 0103-2012	Norm/одна	max .30	min .10	.29 - 1.06	max .035	max .035	max .48	max .40	max .40	max .15	max .08							max 1.00	E+AOD
				Ladle (fact) / ковшовая (факт)	.23	.26	.56	.014	.006	.07	.12	.23		.02	.018							

№ position / № позиция	Dimensions – Размеры				Quantity – Количество				Hardness acc. to NACE MR 0175-2:2009 / Твердость согласно NACE MR 0175-2:2009 / ISO 6506-1 HBW		Mechanical properties – Механические свойства															
	OD Диаметр		WT Тол.ст.		Length Длина		Weight, kg (lb) Вес кг (фунт)		Total length (включая метки)		Tensile Test – Испытание на растяжение / Longitudinal Strip Test Specimens образцы в виде полос с продольным направлением / gauge width 1 / ширина образца / ASTM A370			Impact Test, KV Работа удара / ASTM A370 / 0,197 x 0,394												
	mm	inch	mm	inch	m	ft	Net, kg / Netto, кг	Net, lb / Netto, фунт	Gross, kg / Брутто, кг	Gross, lb / Брутто, фунт	m	ft	Tensile strength, Предел текучести, Rp <sub>0.2</sub>	Yield strength, Предел текучести, Rp <sub>0.2</sub>	Elongation Longitudinal / Удлинение	Ratio Коэффициент Р <sub>0.2</sub> / Rp <sub>0.2</sub>	Impact energy, KV, Работы удара продольное / min 10			T / F						
1	114.3	4.500	6.02	0.237	12.19 (-0/+0.10)	40.0 (-0/+0.33)	9	199	40557	89412.89	40593	89492.13	2439.22	8002.7	158	160	psi / min 70000	psi / min 40000	Ap, % / min 23		1	2	3	Ave / Средн	68	
<b>TOTAL</b>				9	199	40557	89412.89	40593	89492.13	2439.22	8002.7															

Personal for NDT-methods ET and UT is qualified acc. to EN 473, level II (персонал по неразрушающему контролю – методом ВТК и УЗК имеет квалификацию в соотв. с EN 473, уровень II)	NDT: Eddy current test ASTM E 309 / Метод испытаний вихревыми токами / reference standard pipe with hole (Ø 2.2 mm) / Эталонная труба с отверстием (Ø 2,2 мм)	Results: ok (результат)	Testing method / Метод испытаний / US test (УЗК) / ASTM E 213	Results: — (результат)	Technological Test / Технологическое испытание / Flattening Tests ASTM A106/A105M	Results: ok (результат)	Hydrostatic testing according API 5L 45 th ed. / Гидростатическое испытание согласно API 5L 45 th ed. / P: Duration:	Results: — (результат)
---	---	-------------------------	---	------------------------	---	-------------------------	--	------------------------

- It is hereby certified that products covered by this certificate has been tested and is complied with the requirements of the contract.  
 - Подтверждаем, что продукция, указанная в настоящем сертификате, испытана и соответствует условиям контракта.  
 - Visually measuring test was performed with satisfactory result.  
 - Визуально-измерительный контроль проведен с удовлетворительным результатом.  
 - No weld repair. Free of mercury and mercury containing compounds.  
 - Без следов ремонта сваркой. Без ртути и ртутьсодержащих элементов.  
 - Country of origin: Belarus (including steel melting process).  
 - Страна происхождения: Беларусь (включая выплавку стали).

Technical Control Inspector: Lohvinava  
 Отдел технического контроля  
 On: 20.03.2015  
 Date: 20.03.2015  
 QUALITY CONTROL FOR CERTIFICATE







**ИНТЕРПАЙП**  
НИКО ТЬЮБ

ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ  
"ИНТЕРПАЙП НИКО ТЬЮБ"  
Украина, г. Никополь, пр. Трубников, 56  
Тел./факс +38 (05662) 2-10-70

ИНСПЕКЦИОННЫЙ СЕРТИФИКАТ № 6006

INSPECTION CERTIFICATE № 6006

EN 10204:2004/ 3.1

Грузополучатель North American Interpipe, inc.  
Consignee 1800 West Loop South, Suite 1350,  
Houston, Texas 77027, USA

Контракт № 14-1553  
Contract № (09-14-28066)

Страна USA  
Country

Дата 31.12.2014г.  
Date

№ транспортного средства 56009487  
№ vehicle

Лист 1  
Sheet

Листов 1  
Sheets

ТРЕБОВАНИЯ API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/  
REQUIREMENTS A53M-2012/ ASME SA53-2013/ NACE MR0175-2009  
Наименование товара Class of delivery PSL-1  
Description of goods Трубы стальные бесшовные горячекатаные для нефтегазопроводов  
SEAMLESS STEEL HOT-ROLLED PIPES FOR OIL AND GAS PIPELINES

№ п/п Lot №	Марка стали Steel grade краткое обозн. brief designation	Код товара code of goods	Номер пакета bundle number	Номера пачек Hests numbers	Номера партий Lots numbers	Размеры Dimensions			шт. Qty pcs	Количество Quantity		
						диаметр diameter	толщина wall thickness	длина length		метраж metrage	масса weight	
						дюйм inch	дюйм inch	фут ft		фут ft	брутто gross lb	нетто netto lb
1.	B/CX42	31042818	1400	1145203	8213	3.500	0.300	20.7'-21.3'	30	630,00	6 551	6 559
2.	"	"	1401	1145293	8213	3.500	0.300	"	30	630,00	6 558	6 537
3.	"	"	1402	1145203	8213	3.800	0.300	"	27	567,00	6 541	6 519
4.	"	"	1403	1145714	8211	3.500	0.300	"	30	630,00	6 570	6 548
5.	"	"	1409	1145592	8214	3.500	0.300	"	30	630,00	6 581	6 559
6.	"	"	1511	1145714	8211	3.800	0.300	"	30	630,00	6 614	6 592
7.	"	"	1513	1143714	8211	3.500	0.300	"	30	630,00	6 636	6 614
8.	"	"	1514	1145714	8211	3.500	0.300	"	30	630,00	6 638	6 614
9.	B/CX42	31042818	1618	1145714	8211	3.500	0.300	20.7'-21.3'	30	630,00	6 638	6 614
						NPS 3"	SCH 60		257	5907,00	58 754	58 558
						TOTAL:			9			
						BUNDLES:			9			
10.	B/CX42	31044178	1496	1145140	7951	3.500	0.438	39.4'-40.0'	13	519,10	7 397	7 374
11.	"	"	1499	1145140	7951	3.500	0.438	"	13	519,10	7 388	7 363
12.	"	"	1500	1145140	7951	3.500	0.438	"	13	519,10	7 406	7 385
13.	"	"	1501	1145140	7951	3.500	0.438	"	13	519,10	7 430	7 408
14.	"	"	1502	1145140	7951	3.500	0.438	"	13	519,10	7 353	7 341
15.	"	"	1504	1145138	7959	3.500	0.438	"	13	519,10	7 303	7 341
15.	B/CX42	31044178	1505	1145138	7959	3.500	0.438	39.4'-40.0'	13	519,10	7 462	7 430
						NPS 3"	SCH 160"		51	3533,70	51 708	51 542
						TOTAL:			7			
						BUNDLES:			7			
17.	B/CX42	31044578	1338	18609	8187	4.500	0.337	"	12	475,20	7 077	7 055
18.	"	"	1339	18609	8187	4.500	0.337	"	12	475,20	7 077	7 055
19.	"	"	1340	18609	8187	4.500	0.337	"	12	475,20	7 077	7 055
20.	"	"	1343	18608	8193	4.500	0.337	"	12	475,20	7 143	7 121
21.	"	"	1388	48789	8198	4.500	0.337	"	12	475,20	7 077	7 055
22.	B/CX42	31044878	1389	48789	8198	4.500	0.337	39.4'-40.0'	12	475,20	7 164	7 132
						NPS 4"	SCH 60		72	2861,20	42 605	42 473
						TOTAL:			8			
						BUNDLES:			8			
						TOTAL:			430			
						BUNDLES:			22	12091,90	183 157	182 671



**INTERPIPE**  
NIKO TUBE

LIMITED LIABILITY COMPANY  
"INTERPIPE NIKO TUBE"  
UKRAINE, Nikopol, 56, Trubnikov ave. Tel./fax +38 (05662) 2-10-70

Инспекционный сертификат № 6006  
 Inspection certificate № 6006  
 Показатели качества товара  
 Quality characteristics

Лист  
Sheet 1

Листов  
Sheets 1

Номера листов Numbers of sheets	ХИМИЧЕСКИЙ СОСТАВ % - CHEMICAL COMPOSITION %												3-й поставщик
	C x100	Si x100	Mn x100	S x1000	P x1000	Cr x100	Ni x100	Ti x1000	Mo x1000	Cu x100	V x1000	Nb x1000	
1.1145293	21	24	88	9	11	8	12	5	12	19	5	10	«Днепросталь»
2.1145293	21	25	88	7	10	8	11	3	12	18	1	1	
3.1145293	21	25	88	7	10	8	11	3	12	18	1	1	
1.1145714	21	21	85	9	10	7	12	3	13	16	5	10	«Днепросталь»
2.1145714	21	22	87	7	9	7	11	3	14	15	1	1	
3.1145714	21	22	87	7	9	7	11	3	14	15	1	1	
1.1145992	21	23	88	9	13	7	14	3	14	14	1	1	«Днепросталь»
2.1145992	21	24	88	5	9	7	10	3	10	20	1	10	
3.1145992	21	24	88	5	9	7	10	3	10	17	1	1	
1.1145140	21	25	85	6	10	5	11	3	10	19	1	10	«Днепросталь»
2.1145140	23	25	90	6	11	5	10	4	10	18	1	1	
3.1145140	23	25	90	6	11	5	10	4	10	18	1	1	
1.1145138	21	24	88	4	9	7	12	5	11	15	5	10	«Днепросталь»
2.1145138	22	25	90	9	13	7	12	4	13	15	1	1	
3.1145138	22	24	89	9	13	8	12	4	13	15	1	1	
1.18909	24	25	89	5	8	6	2	1	5	3	3	2	«ОЗМК»
2.18909	25	26	89	5	9	5	2	3	3	3	3	1	
3.18909	25	27	88	5	9	5	2	3	3	3	3	1	
1.18908	25	25	87	4	9	4	2	1	5	3	3	2	«ОЗМК»
2.18908	26	24	88	5	8	4	2	3	3	3	3	1	
3.18908	25	26	88	4	10	4	2	3	3	3	3	1	
1.48789	25	27	87	4	12	7	1	1	6	4	2	2	«ОЗМК»
2.48789	24	30	88	4	13	8	1	3	3	4	3	1	
3.48789	24	29	87	4	13	7	1	3	3	4	3	1	

1. Heat analysis acc to the manufacturer certificate. 1. Анализ плазмы согласно сертификату завода-изготовителя  
 2.3-control analysis of plate 2.3 - контрольный анализ от труб

РЕЗУЛЬТАТЫ ИСПЫТАНИЙ - TEST RESULTS

Position/ Номер позиции	Lot/ Номер партии	Механические свойства - Mechanical properties				Механические испытания проведены на продольных образцах Mechanical test performed on longitudinal standard Длина образцов Length of standard, Inch-2"
		Условный предел текучести Conventional yield strength	Предел прочности при растяжении на разрыв Tensile strength	Относительное удлинение Percent elongation	Изгибная на твердость NACE MR-0175-09	
		PSI	PSI	%	Hardness Test acc. to NACE MR-0175-09	
		min 42 100	min 70 800		22 HRC max	
1.	8213 Heat 1145293	51 800 49 800	78 300 78 800	31,5 30,5	< 22HRC	
2.	8211 Heat 1145714	52 200 52 100	80 900 77 900	33,0 28,0	< 22HRC	
3.	8214 Heat 1145992	52 100 49 000	79 300 78 500	32,0 31,5	< 22HRC	Ширина образца, дюйм Breadth of standard inch-3/4"
4.	7951 Heat 1145140	49 700 50 000	77 200 79 500	37,0 36,5	< 22HRC	
5.	7969 Heat 1145138	50 300 50 800	80 000 81 200	36,5 36,0	< 22HRC	
6.	8187 Heat 18909	47 000 48 300	77 700 78 300	34,5 36,0	< 22HRC	
7.	8183 Heat 18908	47 700 47 400	78 800 79 800	36,5 34,8	< 22HRC	Ширина образца, дюйм Breadth of standard inch-1"
8.	8198 Heat 48789	43 700 48 300	74 800 79 300	35,0 35,5	< 22HRC	

Трубы испытаны согласно требованиям API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/A53M-2012/ ASME B36.103-2012/ NACE MR0175-2009, результаты удовлетворительные  
 Tubes test according to requirements API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/A53M-2012/ ASME B36.103-2012/ NACE MR0175-2009, result satisfactory.

Герметичность: ГИДРОИСПЫТАНИЕ УДОЛЕТВОРИТЕЛЬНО, ИСПЫТАТЕЛЬНОЕ ДАВЛЕНИЕ - 3000PSI, ВРЕМЯ ВЫДЕРЖКИ НЕ МЕНЕЕ 6 СЕКУНД.  
 Leak-proofness: HYDROSTATIC TEST SATISFACTORY, HYDRO-PRESSURE - 3000PSI DURATION NOT LESS THEN 5SEC.

Не разрушающий контроль: Магнитно-индукционный контроль, проведен с удовлетворительным результатом.  
 Non destructive test: Magnetic Induction test was performed with satisfactory result.

Технологические свойства - Technological properties

Pipes are flattening testing with satisfactory result.

Трубы прошли испытание на сплюсывание с удовлетворительным результатом.

Pipes are beveled.

Трубы отружены с фаской.

Visual inspection of external and internal surfaces was performed with satisfactory results.

Визуальный контроль наружной и внутренней поверхностей выполнен с удовлетворительными результатами.

Состояние поставки (инвентарность): Трубы покрыты черным лаком. Трубы отружены с заплатами.

Delivery condition (surface): Pipes are coated with black varnish. Pipes have caps.

Результаты испытаний в системе измерений USC преобразованы из результатов испытаний в системе измерений SI

The test results in USC measuring system were converted from SI measuring system test results

Ремонт сварной заправки.

Weld repair is not permitted.

Примечание: Ваши предложения по улучшению продукции просим направлять на ан. адрес Vladimir.Lysenko@nsp.interpipe.biz, по факсу +38066221070 или

по телефону +380667327313. При переписке просим ссылаться на номер сертификата

Note: You are requested to submit your proposals concerning product quality improvement to the following e-mail address:

Vladimir.Lysenko@nsp.interpipe.biz, fax +38066221070 or phone +380667327313. Please refer in your mails to the certificate number.

Дата

Date

Inspector

REVIEWED BY  
I. KLUKOV  
08.01.2015



Подпись \_\_\_\_\_ и.к.

08.01.2015  
Handwritten signature



**ИНТЕРПАЙП**  
НИКО ТЬЮБ

ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ  
"ИНТЕРПАЙП НИКО ТЬЮБ"  
Украина, г. Никополь, пр. Трубников, 56  
Тел./факс +38 (05662) 2-10-70

**ИНСПЕКЦИОННЫЙ СЕРТИФИКАТ № 6006**  
**INSPECTION CERTIFICATE № 6006**  
**EN 10204:2004/ 3.1**

Грузополучатель / Consignee: North American Interpipe, Inc.  
1800 West Loop South, Suite 1350,  
Houston, Texas 77027, USA

Контракт № / Contract №: 14-1553  
(09-14-28066)

Страна / Country: USA

Дата / Date: 31.12.2014г.

№ транспортного средства / № vehicle: 56009487

Лист / Sheet: 1

Листов / Sheets: 1

**ТРЕБОВАНИЯ / REQUIREMENTS:** API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/ A53M-2012/ ASME SA53-2013/ NACE MR0175-2009  
**Наименование товара / Description of goods:** Class of delivery PSL-1  
Трубы стальные бесшовные горячекатаные для нефтегазопроводов  
SEAMLESS STEEL HOT-ROLLED PIPES FOR OIL AND GAS PIPELINES

№ покл. / Invoice No	Мерка стали / Steel grade	Код товара / Code of goods	Коммерческий пакет / Package number	Номера пласок / Heat numbers	Номера партий / Lot numbers	Размеры / Dimensions			Количество / Quantity			
						диаметр / diameter	толщина / wall thickness	длина / length	шт. / Qty	метраж / metres	масса / weight	
						дюйм / inch	дюйм / inch	фут / ft			брутто / gross	нетто / net
1.	B/CX42	31042816	1400	1145293	8213	3.500	0.300	20.7'-21.3'	30	630,00	6 581	6 559
2.	"	"	1401	1145293	8213	3.500	0.300	"	30	630,00	6 559	6 537
3.	"	"	1402	1145293	8213	3.500	0.300	"	27	567,00	5 941	5 919
4.	"	"	1403	1145714	8211	3.500	0.300	"	30	630,00	6 579	6 546
5.	"	"	1409	1145592	8214	3.500	0.300	"	30	630,00	6 581	6 559
6.	"	"	1511	1145714	8211	3.500	0.300	"	30	630,00	6 614	6 592
7.	"	"	1513	1145714	8211	3.500	0.300	"	30	630,00	6 638	6 614
8.	"	"	1514	1145714	8211	3.500	0.300	"	30	630,00	6 638	6 614
9.	B/CX42	31042816	1518	1145714	8211	3.500	0.300	20.7'-21.3'	30	630,00	6 598	6 614
						NPS 3"	SCH 80	TOTAL:	267	5807,00	58 754	58 556
10.	B/CX42	31044178	1498	1145140	7951	3.500	0.438	39.4'-40.0'	13	518,10	7 397	7 374
11.	"	"	1499	1145140	7951	3.500	0.438	"	13	518,10	7 386	7 363
12.	"	"	1500	1145140	7951	3.500	0.438	"	13	518,10	7 408	7 385
13.	"	"	1501	1145140	7951	3.500	0.438	"	13	518,10	7 430	7 406
14.	"	"	1502	1145140	7951	3.500	0.438	"	13	518,10	7 383	7 341
15.	"	"	1504	1145138	7989	3.500	0.438	"	13	518,10	7 383	7 341
16.	B/CX42	31044178	1505	1145138	7989	3.500	0.438	39.4'-40.0'	13	518,10	7 482	7 430
						NPS 3"	SCH 160	TOTAL:	81	3853,70	51 788	51 642
17.	B/CX42	31044878	1338	18909	8187	4.500	0.337	39.4'-40.0'	12	475,20	7 077	7 055
18.	"	"	1339	18909	8187	4.500	0.337	"	12	475,20	7 077	7 055
19.	"	"	1340	18909	8187	4.500	0.337	"	12	475,20	7 077	7 055
20.	"	"	1343	18908	8193	4.500	0.337	"	12	475,20	7 143	7 121
21.	"	"	1368	48789	8198	4.500	0.337	"	12	475,20	7 077	7 055
22.	B/CX42	31044878	1369	48789	8198	4.500	0.337	39.4'-40.0'	12	475,20	7 154	7 132
						NPS 4"	SCH 80	TOTAL:	72	2881,20	42 606	42 473
								TOTAL:	430	12081,00	183 157	182 671
								BUNDLES:	22			



**INTERPIPE**  
НИКО ТЬЮБ

LIMITED LIABILITY COMPANY  
"INTERPIPE NIKO TUBE"  
UKRAINE, Nikopol, 56, Trubnikov ave. Tel./fax +38 (05662) 2-10-70

Испытационный сертификат № 6006  
 Inspection certificate № 6006  
 Показатели качества товара  
 Quality characteristics

Лист  
Sheet 1

Листов  
Sheets 1

Номера плавок Numbers of heats	ХИМИЧЕСКИЙ СОСТАВ % - CHEMICAL COMPOSITION %												3-D поставщик
	C x100	Si x100	Mn x100	S x1000	P x1000	Cr x100	Ni x100	Ti x1000	Mo x1000	Cu x100	V x1000	Nb x1000	
1.1145293	21	24	86	9	11	8	12	5	12	18	5	10	«Днепрсталь»
2.1145293	21	23	89	7	10	8	11	3	12	18	1	1	
3.1145293	21	23	88	7	10	8	11	3	12	18	1	1	
1.1145714	21	21	88	8	10	7	12	5	13	16	5	10	«Днепрсталь»
2.1145714	21	22	87	7	9	7	11	3	14	15	1	1	
3.1145714	21	22	87	7	9	7	11	3	14	15	1	1	
1.1145592	21	23	88	9	13	7	11	3	14	15	1	1	«Днепрсталь»
2.1145592	21	24	88	5	9	7	14	3	14	20	5	10	
3.1145592	21	24	89	5	9	7	10	3	10	17	1	1	
1.1145140	21	25	88	8	10	5	11	5	10	17	1	1	«Днепрсталь»
2.1145140	23	25	90	6	11	6	10	4	10	19	1	1	
3.1145140	23	25	90	8	17	5	10	4	10	18	1	1	
1.1145138	21	24	85	4	9	7	12	5	11	19	5	10	«Днепрсталь»
2.1145138	22	25	90	9	13	7	12	4	13	15	5	10	
3.1145138	22	24	89	9	13	8	12	4	13	18	1	1	
1.18609	24	26	89	6	8	8	2	1	5	3	2	2	«ОЗМК»
2.18609	25	26	88	5	9	5	2	1	3	3	1	1	
3.18609	25	27	88	6	8	6	2	3	3	3	1	1	«ОЗМК»
1.18608	25	25	87	4	9	4	2	1	5	3	2	2	
2.18608	26	24	86	5	6	4	2	2	3	3	1	1	
3.18608	25	26	88	4	10	4	2	3	3	3	1	1	
1.48789	25	27	87	4	12	7	2	1	6	4	2	2	«ОЗМК»
2.48789	24	30	88	4	13	8	2	3	3	4	2	1	
3.48789	24	29	87	4	13	7	2	3	3	4	2	1	

1. Heat analysis acc to the manufacturer certificate/1. Анализ плавок согласно сертификата завода-изготовителя  
 2.3.-control analysis of plate/2.3.- контрольный анализ ст труб

РЕЗУЛЬТАТЫ ИСПЫТАНИЙ - TEST RESULTS

Position/Номер пазарца	Lot/Номер партии	Механические свойства - Mechanical properties				Механические испытания проводились на продольных образцах Mechanical test was performed on longitudinal standard Длина образцов дюйм Length of standard, inch-2"
		Условный предел текучести Conventional yield strength	Предел прочности при растяжении Tensile strength	Относительное удлинение Percent elongation	Испытания на твердость NACE MR-0175-09	
		PSI	PSI	%	Hardness Test acc. to NACE MR-0175-09	
		min 42 100	min 70 000		22 HRC max	
1.	8213 Heat 1145293	51 600 49 500	78 300 78 800	31,5 30,5	< 22HRC	
2.	8211 Heat 1145714	52 200 52 100	80 900 77 800	35,0 38,0	< 22HRC	
3.	8214 Heat 1145592	52 100 49 000	79 300 78 500	32,0 31,5	< 22HRC	Ширина образца, дюйм Breadth of standard inch-3/4"
4.	7981 Heat 1145140	49 700 50 000	77 200 79 800	37,0 36,5	< 22HRC	
5.	7983 Heat 1145138	50 300 50 800	80 000 81 200	36,5 36,0	< 22HRC	
6.	8187 Heat 18609	47 000 48 300	77 700 75 300	34,5 36,0	< 22HRC	
7.	8183 Heat 18608	47 700 47 400	78 800 79 600	36,5 34,8	< 22HRC	Ширина образца, дюйм Breadth of standard inch-1"
8.	8198 Heat 48789	43 700 48 300	74 800 75 300	36,0 35,5	< 22HRC	

Трубы испытаны согласно требованиям API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/A53M-2012/ ASME BAA3-2013/ NACE MR0175-2009, результаты удовлетворительные  
 Tubes test according to requirements API 5L (PSL-1) - 2012/ ASTM A106/A106M-2014/ ASME SA106-2013/ ASTM A53/A53M-2012/ ASME BAA3-2013/ NACE MR0175-2009, result satisfactory.

Герметичность: ГИДРОИСПЫТАНИЕ УДОВЛЕТВОРИТЕЛЬНО, ИСПЫТАТЕЛЬНОЕ ДАВЛЕНИЕ - 3000PSI, ВРЕМЯ ВЫДЕРЖКИ НЕ МЕНЕЕ 6 СЕКУНД.  
 Leak-proofness: HYDROSTATIC TEST SATISFACTORY, HYDRO-PRESSURE - 3000PSI DURATION NOT LESS THEN 5SEC.

Не разрушительный контроль: Магнитно-индукционный контроль проведен с удовлетворительным результатом.  
 Non destructive test: Magnetic induction test was performed with satisfactory result.

Технологические свойства: Технологические свойства труб прошли испытание на сплюснение с удовлетворительным результатом.  
 Pipes are flattening testing with satisfactory result.

Трубы прошли испытание на сплюснение с удовлетворительным результатом.  
 Pipes are beveled.

Трубы отгружены с фаской.  
 Visual inspection of external and internal surfaces was performed with satisfactory result.

Визуальный контроль наружной и внутренней поверхности выполнен с удовлетворительными результатами.  
 Surface condition (surface) Pipes are coated with black varnish. Pipes have caps.

Результаты испытаний в системе измерений USC преобразованы из результатов испытаний в системе измерений SI.  
 The test results in USC measuring system were converted from SI measuring system test results.

Ремонт сварной заготовки.  
 Weld repair is not permitted.

Примечание: Ваши предложения по улучшению продукции просим направлять на эл. адрес Vladimir.Lysenko@ntrp.intarpipe.biz, по факсу +380566221070 или по телефону +380567327313. При переписке просим ссылаться на номер сертификата.  
 Note: You are requested to submit your proposals concerning product quality improvement to the following e-mail address:

Vladimir.Lysenko@ntrp.intarpipe.biz, fax +380566221070 or phone +380567327313. Please refer in your mails to the certificate number.

Дата

Inspector

REVIEWED BY  
I. KLUKOV  
08.01.2015






Подпись \_\_\_\_\_

08.01.2015  
[Handwritten signature]

<b>NORMA (INDIA) LIMITED</b>				<b>Works Test Certificate</b>			
48, Site IV industrial Area, Sahibabad, Ghaziabad-201010 (U.P) INDIA				Tel: 91-120-2896091, 2895404 Fax: 91-120-2895930 E-mail: normaindia@gmail.com			
NORMA/LAB NO-1659/15-16		INVOICE NO. E-108		DATE:-16.05.15			
P. Order. No:	205506	Customer:-		Forging specification		ASME SA105 -13	
Component	1 1/2" 600# SWRF Sch-160 FLG			Steel Supplier		R.I.N.L	
Drawing No.		Quantity:-		Mill Heat No.		412399	
Machining STD	ANSI B16.5-2009 ASME B16.5-2009			19Nos.		NORMA HEAT NO-558	
<b>TEST RESULTS</b>				<b>MECHANICAL PROPERTIES</b>			
<b>CHEMICAL COMPOSITION</b>				<b>MECHANICAL PROPERTIES</b>			
Elements %	Specified Composition	Actual		PROPERTIES	SPECIFIED	OBTAINED	Specified carbon as per Purchase Order 0.25max.
		NORMA LAB	MILL T.C.				
Carbon	0.35max.	0.22	0.22	Yield Strength (mpa)	250.00 min.	325.25	Serrated face as per MSS-SP-6 With in limits of 125-250AARH
Manganese	0.60-1.05	0.98	1.00				
Silicon	0.10-0.35	0.21	0.23				
Sulphur	0.040max.	0.011	0.012	Tensile Strength (mpa)	485.00 min.	513.36	H.T:- Normalized at temp 920°C
Phosphorous	0.035max.	0.026	0.030				
Chromium	0.30max.	0.014	0.012	%Elongation in 50mm / 4D	22.00 min	28.60	CARBON EQUIVALENT (CE) CE = C + Mn/6 + Cr/5 + Mo/15 + Ni + Cu/15
Nickel	0.40max.	0.004	---	Hardness HB.	187. max.	149-163	MARKING AS PER MSS-SP-25-2008 1 1/2" 600 Sch-160 SA/A105 N 558 B16.5 NORMA INDIA.
Copper	0.40max.	0.010	---				
Molybdenum	0.12max.	0.002	---	% Reduction of Area	30.00 min.	63.20	
Vanadium	0.080max.	0.003	---	Remarks:- We here by certify that the material described here in has been tested in accordance with the applicable specifications referred above and meets the requirements as per EN10204/5.1B & NACE Standard-MR0175-2003. MR0103. "As per ASTM A105 Table 1 Note:-For each reduction of 0.01% below the specified carbon maximum(0.35%)an increase of 0.06% manganese above the specified maximum (1.05%)will be permitted up to maximum 1.35%.		Checked by:	
Carbon Equivalent (CE)	0.47max.	0.387	0.388			Metallurgist	
						Quality Control Manager	
				Country of Origin-India			

<b>NORMA (INDIA) LIMITED</b> 48, Site IV industrial Area, Sahibabad, Ghaziabad-201010 (U.P) INDIA. Tel: 91-120-2896091, 2895404 Fax: 91-120-2895930 E-mail: normaindia@gmail.com				<b>Works Test Certificate</b>			
NORMA/LAB NO-2808/15-16		INVOICE NO.E-167		DATE:-29.06.15			
P. Order No: 205503		Customer:-		Forging specification		ASME SA105 -13	
Component 2"-600# WNR# XII FLG.				Steel Supplier		ASTM A105 -13	
Drawing No.		Quantity:- 174Nos.		Mill Heat No.		L 3/24	
Machining STD ANSI B16.5- 2009 ASME B16.5- 2009				NORMA HEAT NO-580			
TEST RESULTS							
CHEMICAL COMPOSITION				MECHANICAL PROPERTIES.			
Elements %	Specified Composition	Actual		PROPERTIES	SPECIFIED	OBTAINED	Specified carbon as per Purchase Order 0.25max.
		NORMA LAB	MILL T.C.				
Carbon	0.35max.	0.195	0.20	Yield Strength (mpa)	250.00 min.	351.28	Serrated face as per MSS-SP-6 With in limits of 125-250AARH
Manganese	0.60-1.05	1.14	1.13				
Silicon	0.10-0.35	0.25	0.26				
Sulphur	0.040max.	0.011	0.013	Tensile Strength (mpa)	485.00 min.	530.24	H.T:- Normalized at temp 920°C
Phosphorous	0.035max.	0.019	0.020				
Chromium	0.30max.	0.070	0.080	%Elongation in 50mm / 4D	22.00 min	33.20	CARBON EQUIVALENT (CE) CE = C + $\frac{Mn}{6}$ + $\frac{Cr}{5}$ + $\frac{Mo}{15}$ + $\frac{Ni+Cu}{15}$
Nickel	0.40max.	0.028	0.030				
Copper	0.40max.	0.008	0.010	Hardness IIB.	187. max.	149-163	MARKING AS PER MSS-SP-25-2008 2"-600 XH SA/A105 N 580 B16.5 NORMA INDIA.
Molybdenum	0.12max.	0.008	0.010				
Vanadium	0.080max.	0.004	0.005	% Reduction of Area	30.00 min.	67.21	Checked by: <i>[Signature]</i> Metallurgist
Carbon Equivalent (CE)	0.47max.	0.401	0.409				
				Remarks:- We here by certify that the material described here in has been tested in accordance with the applicable specifications referred above and meets the requirements as per EN10204/3.1B & NACI: Standard-MR0175-2003. MR0103. *As per ASTM A105 Table I Note:-For each reduction of 0.01% below the specified carbon maximum(0.35%),an increase of 0.06% manganese above the specified maximum (1.05%)will be permitted up to maximum 1.65%. Country of Origin-India. /Met: INDIA.		Certified by: <i>[Signature]</i> Quality Control Manager	

		<b>SUDHIR FORGINGS PVT.LTD</b> KANGANWAL ROAD,P.O JUGIANA, G.T.ROAD,LUDHIANA (INDIA)		Control No. TC/01 Rev. 01										
<b>TEST CERTIFICATE</b> (in accordance with BS EN 10204 3.1 B)														
ITEM	2" 600 WNRF XH	CERTIFICATE No.	SF/FLANGE/0139/015	DATED	8-Jun-2015									
QUANTITY	300 PCS	LAB Ref. No.	937											
FINISH	BLACK PAINT	CUSTOMER NAME												
MAT. SPECIFICATION	ASME SA105-10N / ASTM A105N-10A	INVOICE No.												
P.O. No.	INVOICE DATE													
<b>Chemical Analysis</b>														
Heat No.	Supplier Heat No.	Description	C%	Mn%	P%	S%	Si%	Cu%	Ni%	Cr%	Mo%	V%	TOTAL % (Cu+Ni+Cr+Mo+V)	TOTAL % (Cr+Mo)
937	C-03	Specified	0.25 max	0.60 - 1.05	0.035 max	0.040 max	0.10 - 0.35	0.40 max	0.40 max	0.30 max	0.12 max	0.08 max	1.00 max	0.32 max
		Observed	0.210	1.040	0.035	0.028	0.320	0.000	0.035	0.084	0.023	0.000	0.142	0.107
<b>Physical / Mechanical Properties</b>														
Heat No.	Supplier Heat No.	Description	UTS MPa		YIELD Mpa		Elongation%		R.A.%		Hardness (HBW)			
937	C-03	Specified	485 min		250 min		22 min		30 min		187 max			
		Observed	541.70		311.3		30.00		68.63		156			
REMARKS.														
<ul style="list-style-type: none"> <li>Material is in accordance with NACE STD, MR-0175/ISO-15156</li> <li>Flanges satisfy the requirement of latest revision of ANSI /ASME B16.5 ASME SA105-10/ASTM A105N-10a MSS SP-25</li> <li>The flange have been normalized in accordance with ASTM A961.</li> <li>The product is free of radiation &amp; The product is free from weld repair</li> <li>We certify that the Material Suits the Requirement of P.O./Relevant specifications.</li> <li>Flanges have serrated face as per MSS-SP-6 within the limit of 125 - 250 RMS</li> <li>Flanges are painted with black paint &amp; Marked as. SF 2 WNRF XH 600 A105N B16.5 937 INDIA</li> </ul>														
 Q.C. Engg.						FOR SUDHIR FORGINGS PVT. LTD 								

# NORMA (INDIA) LIMITED

48, Site IV industrial Area, Sahibabad, Ghaziabad-201010 (U.P) INDIA.  
 Tel: 91-120-2896091, 2895404 Fax: 91-120-2895930 E-mail: normaindia@gmail.com

## Works Test Certificate

NORMA/LAB NO-10132/14-15		INVOICE NO.		DATE:-31.01.15			
P. Order. No:		Customer:-		Forging specification	ASME SA105 -09		
Component	3"-150# WNR STD FLG.				ASTM A105 -12		
Drawing No.				Steel Supplier	P.G.I.(P) Ltd.		
Machining STD	ANSI B16.5- 2009 ASME B16.5- 2009	Quantity:-		57Nos.			
TEST RESULTS				NORMA HEAT NO-556			
CHEMICAL COMPOSITION				MECHANICAL PROPERTIES.			
Elements %	Specified Composition	Actual		PROPERTIES	SPECIFIED	OBTAINED	Specified carbon as per Purchase Order 0.25max.
		NORMA LAB	MILL T.C.				
Carbon	0.35max.	0.205	0.21	Yield Strength (mpa)	250.00 min.	327.17	Serrated face as per MSS-SP-6 With in limits of 125-250AARH
Manganese	0.60-1.05	1.13	1.14				
Silicon	0.10-0.35	0.26	0.27				
Sulphur	0.040max.	0.019	0.018	Tensile Strength (mpa)	485.00 min.	523.47	CARBON EQUIVALENT (CE) CE = C + Mn + Cr+Mo+V + Ni+Cu 6 5 15
Phosphorous	0.035max.	0.020	0.021				
Chromium	0.30max.	0.040	0.060	%Elongation in 50mm / 4D	22.00 min	29.40	MARKING AS PER MSS-SP-25-2008 3"-150 STD SA/A105 556 B16.5 NORMA INDIA.
Nickel	0.40max.	0.018	0.020	Hardness HB.	187. max.	149-163	
Copper	0.40max.	0.022	0.020				
Molybdenum	0.12max.	0.009	0.010	% Reduction of Area	30.00 min.	68.53	
Vanadium	0.080max.	0.003	0.006	Remarks:- We here by certify that the material described here in has been tested in accordance with the applicable specifications referred above and meets the requirements as per EN10204/3.1B & NACE Standard-MR0175-2003.MRO103. **As per ASTM A105 Table 1 Note:-For each reduction of 0.01% below the specified carbon maximum(0.35%),an increase of 0.06% manganese above the specified maximum (1.05%)will be permitted up to maximum 1.35%. <b>Country of Origin-India.</b>			Checked by:
Carbon Equivalent (CE)	0.47max.	0.405	0.417				Metallurgist
							Certified by:
							Quality Control Manager

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**MANUFACTURING TEST CERTIFICATE**  
 CERTIFICATION AS PER EN 10204: 3.1

TC NO : 1164 DT. 08/03/2015  
 CUSTOMER NAME :-

INV. NO./EC NO.-

P.O. No.	DESCRIPTION	P.O. DT.	SR NO.	INV. SR NO.	QTY	MATERIAL	MILL HEAT NO.	H.L. NO.	DIMENSION STD
	2" 600 WN RF SCH 160		46	1	375	A 105	01/04/06	-	ASME B16- 2013
	3" 600 WN RF XH		48	2	1200		02/04/07	-	
	3" 600 WN RF XH		48	2	1200		02/03/12	-	
	3" 600 WN RF SCH 160		49	3	15		B 2703	-	

Chemical Composition		C%	Mn%	P%	S%	Si%	Cu%	Ni%	Cr%	Mo%	V%	Nb%	N%	CE.
Std. Reqmnt.	MIN.	0.18	0.60			0.10								
	MAX	0.25	1.05	0.035	0.040	0.35	0.40	0.40	0.30	0.12	0.02	0.02	-	0.43
Check Analysis	01/04/06	0.21	1.03	0.03	0.020	0.24	0.03	0.01	0.00	0.00	0.00	0.00	-	0.39
	02/04/07	0.23	1.01	0.02	0.013	0.18	0.05	0.01	0.01	0.00	0.00	0.00	-	0.40
	02/03/12	0.21	0.91	0.02	0.017	0.25	0.06	0.02	0.01	0.00	0.00	0.00	-	0.37
	B 2703	0.21	0.95	0.03	0.008	0.31	0.11	0.04	0.07	0.01	0.00	0.00	-	0.39

MECHANICAL PROPERTIES	U.T.S.	Y.S.(0.2% offset)	ELONGA-TION%	REDUCTION IN AREA%	HARDNESS (BHIN)	HEAT TREATMENT DETAILS	IMPACT ENERGY ABSORBED AT °C				
	N/mm2	N/mm2	MIN.	MIN.	MIN.		Specimen (J)				Avg.(J)
Std.	485	250	22%	30%	137 TO 187		1	2	3		
Requirement	MIN.	MIN.	MIN.	MIN.							
Result	01/04/06	517.87	302.12	30.86	63.44	NORMALIZING					
	02/04/07	509.86	265.34	31.78	61.59	NORMALIZING					
	02/03/12	532.36	301.02	30.00	60.13	NORMALIZING					
	B 2703	529.30	332.70	34.50	48.90	NORMALIZING					



**Identification** Size, Pressure Rating, Type, Nominal Bore, SA/A 105 N, B-16, Heat No, INDIA

**Remark:-**  
 Materials Was manufactured, sampled, Tested and Inspected in accordance with specification(s) solely by the manufacturer listed herein and was found to meet the requirements.  
 No weld repair was performed.  
 Materials is free of mercury and radioactive contamination.  
 We hereby certify that the above mentioned items conform to requirements of - **ASME SA 105 / ASTM A-105-2014, NACE MR0103-2012, NACE MR0175 / ISO15156-2009.**




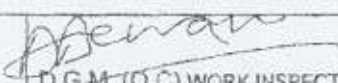
Metallurgist  
 LB:10 REV.00, DL-15.05.2013



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<b>NORMA (INDIA) LIMITED</b> 48, Site IV industrial Area, Sahibabad, Ghaziabad-201010 (U.P) INDIA Tel: 91-120-2896091, 2895404 Fax: 91-120-2895930 E-mail: norma.india@gmail.com				<b>Works Test Certificate</b>			
NORMA/LAB NO-8797/14-15		INVOICE NO.		DATE:-25.12.14			
P. Order No.	Customer:-		Forging specification		ASME SA105 -09		
Component	4" 600# WNRFXH FLG.		Steel Supplier		ASTM A105 -12		
Drawing No.	Quantity:-		Mill Heat No.		Adhunik Metaliks Ltd.		
Machining STD	ANSI B16.5- 2009 ASME B16.5- 2009	100Nos.		14AD 119			
TEST RESULTS				NORMA HEAT NO-080			
CHEMICAL COMPOSTION				MECHANICAL PROPERTIES.			
Elements %	Specified Composition	Actual		PROPERTIES	SPECIFIED	OBTAINED	Specified carbon as per Purchase Order 0.25max.
		NORMA LAB	MILL T.C.				
Carbon	0.35max.	0.219	0.204	Yield Strength (mpa)	250.00 min.	346.37	Serrated face as per MSS-SP-6 With in limits of 125-250AARH
Manganese	0.60-1.05	1.09	1.07				
Silicon	0.10-0.35	0.20	0.20	Tensile Strength (mpa)	485.00 min.	537.25	H.T:- Normalized at temp 920°C
Sulphur	0.040max.	0.020	0.019				
Phosphorous	0.035max.	0.012	0.013	%Elongation in 50mm / 4D	22.00 min	32.50	CARBON EQUIVALENT (CE) CE = C + Mn / 6 - Cr / 5 + Mo + V / 5 + Ni + Cu / 15
Chromium	0.30max.	0.006	0.013				
Nickel	0.40max.	0.016	0.019	Hardness HB.	187. max.	149-159	MARKING AS PER MSS-SP-25-2008 4"-600 XH SA/A105 N 080 B16.5 NORMA INDIA.
Copper	0.40max.	0.008	0.011				
Molybdenum	0.12max.	0.001	0.001	% Reduction of Area	30.00 min.	61.03	
Vanadium	0.080max.	0.0009	0.002	Remarks:- We here by certify that the material described here in has been tested in accordance with the applicable specifications referred above and meets the requirements as per EN10204/3.1B & NACE Standard-MR0175-2003.MR0103. *As per ASTM A105 Table 1 Note:-For each reduction of 0.01% below the specified carbon maximum(0.35%)an increase of 0.06% manganese above the specified maximum (1.05%)will be permitted up to maximum 1.35%. Country of Origin-India.		Checked by:  Metallurgist	
Carbon Equivalent (CE)	0.47max.	0.404	0.388			Certified by:  Quality Control Manager	

<b>NORMA (INDIA) LIMITED</b>				<b>Works Test Certificate</b>			
48, Site IV industrial Area, Sahibabad, Ghaziabad-201010 (U.P) INDIA. Tel: 91-120-2896091, 2895404 Fax: 91-120-2895930 E-mail: norma.india@gmail.com							
NORMA/LAB NO-254/15-16		INVOICE NO.E-023		DATE:-07.04.15			
P. Order. No:		Customer:-		Forging specification	ASME SA105 -09		
Component	8"-600# WNRFXH -1LG			Steel Supplier	ASTM A105 -12		
Drawing No.		Quantity:- 54Nos.		Mill Heat No.	B 04690		
Machining STD	ANSI B16.5- 2009 ASME B16.5- 2009			NORMA HEAT NO-1328			
<b>TEST RESULTS</b>							
<b>CHEMICAL COMPOSITION</b>				<b>MECHANICAL PROPERTIES.</b>			
Elements %	Specified Composition	Actual		PROPERTIES	SPECIFIED	OBTAINED	Specified carbon as per Purchase Order 0.25max.  Serrated face as per MSS-SP-6 With in limits of 125-250AARH  H.T:- Normalized at temp 920°C  CARBON EQUIVALENT (CE) $CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$  MARKING AS PER MSS-SP-25-2008 8"-600 XH SA/A105 N 1328 B16.5 NORMA INDIA.
		NORMA LAB	MILL T.C.				
Carbon	0.35max.	0.20	0.19	Yield Strength (mpa)	250.00 min.	394.07	
Manganese	0.60-1.05	1.20	1.19				
Silicon	0.10-0.35	0.24	0.22				
Sulphur	0.040max.	0.018	0.008	Tensile Strength (mpa)	485.00 min.	562.47	
Phosphorous	0.035max.	0.026	0.011				
Chromium	0.30max.	0.11	0.016	%Elongation in 50mm / 4D	22.00 min	26.00	
Nickel	0.40max.	0.021	0.006	Hardness HB.	187. max.	149-163	
Copper	0.40max.	0.013	0.007				
Molybdenum	0.12max.	0.010	0.001	% Reduction of Area	30.00 min.	48.80	
Vanadium	0.080max.	0.003	0.003	Remarks:- We here by certify that the material described here in has been tested in accordance with the applicable specifications referred above and meets the requirements as per EN10204/3.1B & NACE Standard-MRD175-2003. MRD103. *As per ASTM A105 Table 1 Note:-For each reduction of 0.01% below the specified carbon maximum(0.35%),an increase of 0.06% manganese above the specified maximum (1.05%)will be permitted up to maximum 1.35%. No Weld Repair Performed. Country of Origin-India.			
Carbon Equivalent (CE)	0.47max.	0.426	0.394				
				Checked by:		Metallurgist	
				Certified by:		Quality Control Manager	

		<b>MUNISH FORGE PVT. LTD</b> VILL. GOBINDGARH ADJOINING PHASE -VII FOCAL POINT LUDHIANA- 141 010 INDIA. TEL:- + 91-161-2673307, 2673407 Fax: + 91-161-2676046 AN ISO 9001 : 2008 CERTIFIED COMPANY CERTIFICATE No. 25446-2008-AQ-IND-RvA Rev.03) PED 97/23/EC CERTIFIED COMPANY CERTIFICATE AS PER DIN EN 10204 3.1 - 2004										FM.NO. 960A REV: 00 EFF. DT: 22.07.08		
		INVOICE NO. & DATE		CERTIFICATE NO.								19668/15		
CUSTOMER'S NAME		DATE								30..04.2015				
PART NO. / NAME		8" 600 WNRF XH								P.O. NO. & DATE				
MATERIAL SPECIFICATION		ASTM A105N/ SA105N 2011, NACE MR 0175-2003												
STANDARD		ASME B16.5:2009 (REVISION OF ASME B16.5:2003)								BATCH NO.		201206		
QUANTITY		01 Pcs												
DESCRIPTION	QTY (PCs)	BATCH NO.	CHEMICAL COMPOSITION											
			C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	CE%
SPECIFIED			0.35 MAX	0.60 1.05	0.035 MAX	0.040 MAX	0.10 0.35	0.40 MAX	0.40 MAX	0.30 MAX	0.12 MAX	0.08 MAX	0.02 MAX	0.47 MAX
MILL TEST REPORT	01	2714	0.192	0.935	0.013	0.016	0.20	---	---	---	---	---	---	---
OBSERVED BY US	01	201206	0.19	0.91	0.014	0.020	0.184	0.021	0.018	0.030	0.0049	0.001	0.003	0.356
MECHANICAL TESTING AS PER ASTM A 370 - 09						MECHANICAL PROPERTIES								
BATCH NO.	DESCRIPTION	YIELD STRENGTH PSI		TENSILE STRENGTH PSI		% ELONGATION		% REDUCTION		HARDNESS BHN				
-	SPECIFIED	36000 MIN		70000 MIN		22 MIN		30 MIN		137-187				
201206	OBSERVED	50151.64		78148.45		31.91		61.95		159				
NORMALIZED AT - 890°C IN BELL TYPE FURNACE. (INDUCTION FURNACE) SOAKING TIME: 2.20 Hrs														
SPECIAL REMARKS: - WE CERTIFY THAT THE MATERIAL MEETS THE REQUIREMENT OF ASTM A105N/SA105N-11 & DIMENSIONAL STD.ASME B16.5:2009 (REVISION OF ASME B16.5:2003) CARBON STEEL FLANGES ARE FORGED & FULLY MACHINED WITH SERRATED FINISH AS PER STD.MSS SP-6-2007 FLANGES ARE PAINTED WITH BLACK PAINT & MARKED AS : <span style="float: right;">MUNISH 8 WNRF XH 600 A/SA105N B16.5 201206 INDIA</span>														
MADE BY				CHECKED BY (Q.C.M)				 D.G.M. (Q.C) WORK INSPECTOR FOR MUNISH FORGE PVT. LTD.						



Capitol Manufacturing  
1125 Capitol Avenue  
Crowley, LA 70526

2X1-1/2 160WPB CON SW BBE / 2 Phoenix 160WPB CON SW BBE

CapProducts

Certified Mill Test Report

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P.O. 16-4116-DS  
Tag

Heat No 144940  
Heat Code 74BG  
Phoenix Order # 1226727

Material ASTM A234-2014 WPB / ASME SA234-2015 Edition

Part Number  
48201136

Description  
2X1-1/2 160WPB CON SW BBE

Chemical Properties

C	Mn	P	S	Si	Cu	Ni	Cr	C Eq. Long	
0.2100	0.9600	0.0060	0.0250	0.2400	0.2200	0.0700	0.1260	0.4255	

Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0190	0.0360		0.0020	0.0020					

Additional Chemical Properties


Cr + Cu + Ni
0.4160

Mechanical Properties

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
82,400	63,000	25.0%	51.0%	169	169

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Average	Test Temp.
N/A	N/A	N/A	N/A	N/A

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Certified Mill Test Report**

Commanding a Higher Standard™

Printed: 1/18/2017  
 Customer  
 LEE SUPPLY CO  
 PO BOX 1475  
 TULSA, OK 74101

Certified: 06/02/2016  
 P.O. 17-0261-DS  
 Tag

Heat No. 5F4412  
 Heat Code 7417  
 Phoenix Order # 1255325

Material ASTM A106-2014 / **ASME SA106-2015 Edition**

Part Number 15130512 Description **1/2 X 6" SCH 160 SMLS NIPPLE**

**Chemical Properties**

C	Mn	P	S	Si	Cu	Ni	Cr	C Eq. Long	
0.2500	0.7500	0.0090	0.0080	0.2500	0.2300	0.1400	0.1000	0.4257	

Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0200	0.0100		0.0000	0.0000					

**Additional Chemical Properties**

									Cr + Cu + Ni
									0.4700

**Mechanical Properties**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
78,000	49,000	43.0%	0.0%	0	0

**Charpy Minimum Impact - ft/lbs**

Test 1	Test 2	Test 3	Average	Test Temp.
N/A	N/A	N/A	N/A	N/A

- \* Eddy Current test passed.
- \* Bend test passed.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Meets ASME SA 106 Grade B Requirements.**

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## MILL TEST REPORTS

This product has not come in direct contact with mercury or any of its compounds, nor with any mercury containing device employing a single boundary of containment. No welding performed. We certify that the contents of this report are correct and accurate and that all test results and operations performed by WFI or its subcontractors are in compliance with the material specification and requirements of the referenced code or standard and that the material conforms to the dimensional requirements of the order. This document is in accordance with EN10204 3.1.B. Material grade verified on alloy material using a PMI analyzer.

**WFI International,  
Inc.**  
**Nuclear Products, Inc.**  
4407 Haygood Street  
Houston, TX 77022  
Phone: 713.695.3633

Manufacturer of Piping and  
Pressure Vessel Components

Heat Code	Material	Revision	Class	Description
59983	A/SA105	13		36 - 3/4 X 1/2 3M SWP A105

### MECHANICAL PROPERTIES

Tensile PSI	Yield PSI	Elong %	RA %	Hardness
78500	53500	32	68	147 BHN 151 BHN

### CHEMICAL COMPOSITION

Element %	
C	0.2
Co	0.001
Cr	0.04
Cu	0.03
Mn	1.05
Mo	0.005
Nb	0.011
Ni	0.02
P	0.005
S	0.017
Si	0.28
V	0.001

### Heat Treat

As forged

This data has been provided in electronic form.  
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KREHER STEEL COMPANY, LLC.  
1550 NORTH 25TH AVENUE  
MELROSE PARK, IL 60160  
Tel: 708-345-8180 Fax: 708-345-8293

P/O No 3159  
Rel  
S/O No 1 257650-001  
B/L No 1 208363-001 Shp 13Jan14  
Inv No Inv

1-16-14

Tel: 918-836-3585 Fax: 918-835-9681

CERTIFICATE of ANALYSIS and TESTS

Cert. No: 1 110591  
13Jan14

Part No  
COLD DRAWN ROUNDS SA105  
1.3750 X 16'R/L

1 3/8" SA105

0

ASTM A105-

ASME SA105

HEAT NUMBER 396923

Cu .15 , V .002 AND Cb/Nb <.008

LOT NUMBER 286422 WEIGHT 13,120

TENSILE 72,200

YIELD 39,400

ELONGATION 25 %

REDUCTION OF AREA 40.5%

HARDNESS 140 -

AT SURFACE

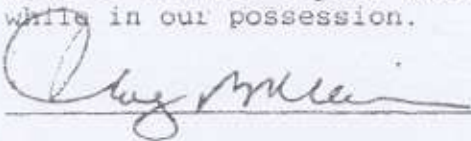
MADE IN THE USA

Heat Number  
396923

\*\*\* Chemical Analysis \*\*\*

C=0.1900 Mn=0.7100 P=0.0100 S=0.0220 Si=0.2200 Cu=0.1500  
Ni=0.0800 Cr=0.0900 Mo=0.0200 Al=<.023> Cb=<<.008> V=<.002>  
Ti=<.001>

I hereby certify that this data is correct as contained in the records of this company. I hereby certify that no mercury came in contact with or no weld repair was done to this product while in our possession.



PRODUCTION MFG, TULSA, OKLA.  
CUSTOMER Lee Supply  
P.O. # 14-3186-KB  
ITEM 3/4" 3000# X 4" TOE  
HEAT CODE 33K



# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (128711-A)

LOT 13256 & 13259, Jalan Haji Abd. Manan

Off Jalan Meru, 42200 Klang, Selangor, Malaysia

Tel: 603-3393 1623 Fax: 603-3393 1733 E-mail: pantech2@streamyx.com



Corp. No. 908000015  
 No. 1072300-A (M) 1 (2004) 4-2  
 Corp. No. 1072300-A (M) 1 (2004) 4-2

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204-2004 Type 3.1

Certificate No: PSI 86981

Date: 23-Jul-13

Order No	Invoice No.	Starting Material	Specification for Fittings										Specification for Inspection				
11813CPS-3	000009653	Seamless Pipe	ASTM A234-11a WPB / ASME SA234-16 WPB / CSA Z245.11-05 Cat. I Gr.241 / NACE MR0175 / NACE MR 0103 / ISO15156*										ASME B16.9 - 12 / ASTM A900 - 10				
Heat No.	Product & Size		Quantity (pcs)		Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing									
P 201	5" 90 DEG LR STD ELBOW		2650		GOOD	GOOD	H	N/A									
PC 908	8" 90 DEG LR STD ELBOW		157		GOOD	GOOD	H	N/A									
PC 705	6" 90 DEG LR STD ELBOW		1		GOOD	GOOD	H	N/A									
P 202	5" 90 DEG LR XS ELBOW		790		GOOD	GOOD	H	N/A									
JK 907	5" 90 DEG LR S160 ELBOW		70		GOOD	GOOD	H	N/A									
Specification	Chemical Composition (%)												Tensile Test**			Hardness	
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)	
	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000		x100	(KSI / MPa)	(%)	1	2	
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	197	
Heat No.	30	-	106	50	58	40	40	15	40	80	-	50	-	-	-	-	
P 201	12	20	76	6	4	3	5	2	3	0	< 0.10	29	311	456	37.0	124	122
PC 908	11	17	77	11	0	2	7	2	3	0	< 0.10	26	311	437	34.2	125	126
PC 705	10	25	45	12	7	2	2	0	4	2	< 0.10	29	326	467	39.2	131	136
P 202	14	16	76	13	6	2	4	2	4	2	< 0.10	29	365	440	40.1	121	123
JK 907	18	23	49	20	12	-	4	1	5	5	< 0.10	29	341	482	38.6	106	125

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION.

AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175 / NACE MR 0103 / ISO 15156

NOTE:

C: Cold formed at temperature below 920°C

S: Stress relieved in temperature between 265°C - 690°C and cooled in still air

H: Hot formed in temperature between 845°C - 945°C and cooled in still air

N: Normalised at 910°C

Q: Heated to 910°C and quenched in water

T: Tempered between 590°C - 690°C

\* YS = Yield strength TS = Tensile strength E = Elongation

*[Signature]*  
 Quality Assurance Manager



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# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (98971-A)

LOT 13268 & 13269, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 Klang, Selangor, Malaysia.

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



ISO 9001

Cert. No.: KLR 040828  
 PSD 97/25/NC Annex 1 Clause 4.8  
 Cert. No.: 059/PSD/MIRA/0610070/2

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No : PSI 95577

Date : 28-Nov-14

Purchaser :

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless										Specification for Inspection					
82214PS-3	E 000011271	Seamless Pipe	ASTM A234 -13 WPB / ASME SA234 -13 WPB NACE MR0175/ NACE MR 0103/ ISO15156*										ASME B16.9 - 12 / ASTM A980 - 10					
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing											
RG 306	3" 90 DEG LR XS ELBOW		960	GOOD	GOOD	H	N.A											
JH 306	2" 90 DEG SR S160 ELBOW		60	GOOD	GOOD	H	N.A											
GA 307	6" 90 DEG SR S160 ELBOW		20	GOOD	GOOD	H	N.A											
RJ 807	4" 45 DEG LR STD ELBOW		580	GOOD	GOOD	H	N.A											
RG 901	4" STD TEE		280	GOOD	GOOD	C & S	GOOD											
Specification	Chemical Composition (%)												Tensile Test <sup>1</sup>			Hardness		
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)		
	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000	-	x100	(KSI / MPa)	(%)	1	2		
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-		
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Heat No.	30	-	108	50	58	40	40	15	40	80	-	50	-	-	-	197		
RG 306	12	19	69	12	2	11	11	2	7	0	< 0.10	31	355	504	31.6	133	134	
JH 306	17	25	44	23	11	1	3	0	1	3	< 0.10	26	311	438	41.6	128	123	
GA 307	20	23	60	7	4	3	3	1	7	0	< 0.10	31	292	458	43.5	131	130	
RJ 807	11	18	79	12	7	2	4	2	3	2	< 0.10	26	321	468	38.2	132	133	
RG 901	17	30	50	10	5	3	3	0	5	7	< 0.10	28	382	474	30.8	132	133	

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION

AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A270 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

NOTE:

C: Cold formed at temperature below 820°C

S: Stress relieved in temperature between 596°C - 690°C and cooled in still air.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air.

N: Normalised at 910°C

Q: Heated to 910°C and quench in water.

T: Temper between 890°C - 890°C.

<sup>1</sup>: YS = Yield strength TS=Tensile strength E = Elongation

Made in Malaysia

*[Signature]*  
 Quality Assurance Manager

ORIGINAL



INSPECTION CERTIFICATE  
(EN 10204-3.1)  
ARAH DAGANG SDN.BHD. (202873-46)

No.10 Jalan Jannine 3, SKM 8810, Bandar Bukit Beruntung, 48300 Selangor Darul Ehsan, Malaysia  
Tel : 603-60261653, 60261865, 60261833 Fax : 603-60262003

Purchaser :  
Order No :  
Starting Material : SEAMLESS PIPE

Certificate No : AD/02/14/4104L  
Date : 02/17/2014

No	Manufacturing No. (Heat ID No.)	Raw Material Heat No.	Article & Size	Heat Treatment (°)	Quantity	Specification for Inspection	ASME B16.9 (2007) NACE MR-01-75-03
1	BK1361	825720	20" L.R. 45 STD ELL WPB	A	3	Specification for Material	ASME SA-234 WPB
2	B406C1	826411	24" L.R. 45 STD ELL WPB	A	5	Appearance (Visual)	Satisfactory
3	C47D	1112175	20" L.R. 90 XH ELL WPB	A	2000	Dimension	Satisfactory
4	WE542	322549	3" STD TEE WPB	S	150	Certification	Certified acc. to PED 97/23/EC
5	HSS51	518447	3" XH TEE WPB	S	670	Note : INVOICE NO	AD/EX/S/2028/14
6	H4F23A	324123	5" XH TEE WPB	S	185		
7	HP60U	1231765V	10" XH TEE WPB	S	25		
8	RCK20	322549	4" X 2" STD RED TEE WPB	S	100		
9	RD150	322549	4" X 2 1/2" STD RED TEE WPB	S	10		
10	RP235	322549	4" X 3" STD RED TEE WPB	S	200		

Specification	Chemical Composition											Tensile Test (20°C)			Hardness (HV)	Type Maker	Seamless Bore (mm)	
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Yield Strength P.S.J (MPa)	Tensile strength	Elongation (% min)				
	x100	x100	x100	x1000	x1000	>100	x100	x100	x100	x100	x100							
Min		10	25									35 000	60 000	30				
Max	30		105	90	58							95 000			197 HB MAX			
Heat No.																		
1	825720	26	27	55	12	8	2	8	1	0	0	0	47500	88800	33.2	140-143	TPCO STEEL	Y
2	826411	25	27	59	15	8	2	5	17	1	1	0	45200	86800	32.8	137-140	TPCO STEEL	Y
3	1112175	16	21	60	13	6	5	2	3	1	0	0	52800	70700	31.2	148-149	HENGYANG STEEL	Y
4	322549	13	18	70	9	7	5	3	3	1	0	0	51200	71700	34.4	145-149	BAOSTEEL	Y
5	318447	14	19	75	7	4	6	3	4	3	0	0	48500	67100	33.6	145-143	BAOSTEEL	Y
6	324123	13	23	75	9	3	2	3	3	1	0	0	45600	72000	33.2	140-152	BAOSTEEL	Y
7	1231765V	17	23	85	13	6	9	3	4	1	1	1	54000	70000	32	146-149	HENGYANG STEEL	Y
8	322549	13	19	77	8	3	4	2	3	1	0	0	58200	71600	33.2	146-149	BAOSTEEL	Y
9	322549	13	19	77	6	3	4	2	3	1	0	0	60800	73800	33	148-152	BAOSTEEL	Y
10	322549	15	18	77	6	3	4	2	3	1	0	0	56700	74100	34.5	152-156	BAOSTEEL	Y

1) Hot Forming operation : at a temperature between 950°C - 980°C and cooled in still air.  
2) Cold Forming operation : Normalizing at a temperature between 850°C - 910°C and cooled in still air.  
Y = Basic oxygen process L = Longitudinal T = Transverse  
E = Electric furnace  
We hereby certify that the product described herein has been manufactured in accordance with the specification concerned and also with the purchaser's requirement and the result of all examination and test are acceptable.



*[Signature]*  
Factory Manager

PDR: 18-3655-DS Pichw 390206 Order: 1014936 Lot#: ada c47d Desc: 3 XH SMLS L.S.90 A.SA234 WPB ADA

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# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (508721-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 Kaper, Selangor, Malaysia

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



ISO 9001

Cert. No.: KLR 0403926

PD 97/Z/FC Annex 3 Clause 4.3  
Cert. No.: 0038/PED/MUM/0810070/1

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204-2004 Type 3.1

Certificate No: PSI 104549

Date: 27-Oct-15

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless				Specification for Inspection										
90815PS-5	E 000012093	Seamless Pipe	ASTM A234-14 WPB/ASME SA234-15 WPB NACE MR0175/NACE MR0103/ISO15156*				ASME B16.9-12 / ASTM A960-14a										
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing										
PG 610	4" x 3" XS RED TEE		200	GOOD	GOOD	C&S	GOOD										
Specification	Chemical Composition (%)												Tensile Test *			Hardness	
	C x100	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100	Cu x100	V x1000	Pb	CE x100	YS (KSI / MPa)	TS (KSI / MPa)	E (%)	(HB)	
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Heat No.	30	-	105	50	58	40	40	15	40	80	-	50	-	-	-	197	
PG 610	12	16	76	6	5	3	5	1	3	4	<0.10	27	368	477	35.6	130	131

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

NOTE:

C: Cold formed at temperature below 620°C

N: Normalised at 910°C

S: Stress relieved in temperature between 595°C - 690°C and cooled in still air

Q: Heated to 910°C and quench in water.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air.

T: Temper between 590°C - 690°C.

\* YS = Yield strength TS = Tensile strength E = Elongation

Made in Malaysia



Quality Assurance Manager

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# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (509731-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 **Kapar, Selangor, Malaysia**

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



Cert. No.: KLR 0403926

PD 97/23/EC Annex 1 Clause 4.3  
Cert. No.: 0038/PED/MUM/0810070/1

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No: **PSI 106161**

Date: **6-Jan-16**

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless				Specification for Inspection										
		Seamless Pipe	ASTM A234-14 WPB/ASME SA234-15 WPB NACE MR0175/NACE MR0103/ISO15156*				ASME B16.9-12 / ASTM A960-14a										
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing										
<b>RJ 819</b>	4" XS TEE		250	GOOD	GOOD	C&S	GOOD										
Specification	Chemical Composition (%)												Tensile Test <sup>1)</sup>			Hardness	
	C	S	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)	
Min	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000		x100	(KSI / MPa)	(%)		1	2
Max	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	
Heat No.	30	-	106	50	58	40	40	15	40	80	-	50	-	-	-	197	
<b>RJ 819</b>	14	20	76	7	11	2	4	1	3	0	<0.10	28	322	466	31.8	126	127

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

NOTE:

C: Cold formed at temperature below 620°C

N: Normalised at 910°C

S: Stress relieved in temperature between 595°C - 690°C and cooled in still air Q: Heated to 910°C and quench in water.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air.

T: Temper between 590°C - 690°C.

<sup>1)</sup> YS = Yield strength TS=Tensile strength E = Elongation

Made in Malaysia

Quality Assurance Manager



# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (501731-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 Kaper, Selangor, Malaysia.

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



Cert. No.: KLR 0403926

PED 97/23/EC Annex 1 Clause 4.3  
Cert. No.: 0038/PED/MUM/0810070/L

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No: PSI 103492

Date: 8-Sep-15

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless				Specification for Inspection	
		Seamless Pipe	ASTM A234-14 WPB/ASME SA234-15 WPB NACE MR0175/NACE MR0103/ISO15156*				ASME B16.9-12 / ASTM A960-14a	
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing	
SE 406	4" 90 DEG LR STD ELBOW		1984	GOOD	GOOD	H	N.A	

Specification	Chemical Composition (%)												Tensile Test <sup>1)</sup>			Hardness	
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)	
	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000	-	x100	(KSI / MPa)	(%)	1	2	
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Heat No.	30	-	108	50	58	40	40	15	40	80	-	50	-	-	-	197	
SE 406	15	1.5	77	8	0	1	4	1	2	0	<0.10	29	327	452	37.4	127	128

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

**NOTE:**

- C: Cold formed at temperature below 620°C
- S: Stress relieved in temperature between 595°C - 690°C and cooled in still air
- H: Hot formed in temperature between 645°C - 945°C and cooled in still air.
- N: Normalised at 910°C
- Q: Heated to 910°C and quench in water.
- T: Temper between 590°C - 690°C.

<sup>1)</sup> YS = Yield strength TS=Tensile strength E = Elongation



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Quality Assurance Manager



# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (010721-A)

LOT 13268 & 13269, Jalan Haji Abi. Manan,

Off Jalan Meru, 42200 Klang, Selangor, Malaysia.

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



Cert. No.: 92A 0403925

PD 97/23/EC Annex 1 Class 4.3  
Cert. No.: 033M/920/MUM/0610070/1

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No: PSI 98992

Date: 9-Apr-15

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless				Specification for Inspection										
12115PS-6	E 000011678	Seamless Pipe	ASTM A234-13 WPB/ASME SA234-13 WPB NACE MR0175/NACE MR0103/ISO15156*				ASME B16.9-12 / ASTM A960-10										
Heat No.	Product & Size			Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing									
RM 220	4" 90 DEG LR XS ELBOW			200	GOOD	GOOD	H	N-A									
Specification	Chemical Composition (%)												Tensile Test <sup>1)</sup>			Hardness	
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)	
	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000	-	x100	(KSI / MPa)	(%)	-	1	2
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	-
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat No.	30	-	108	50	58	40	40	15	40	80	-	50	-	-	-	197	-
RM 220	1.5	27	48	22	11	3	3	1	6	10	<0.10	26	345	493	39.2	129	131

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION

TENSILE REQUIREMENT: CONFORMS TO ASTM A570 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

NOTE:

- C: Cold formed at temperature below 620°C
- S: Stress relieved in temperature between 605°C - 690°C and cooled in still air
- H: Hot formed in temperature between 845°C - 945°C and cooled in still air
- N: Normalized at 910°C
- Q: Heated to 910°C and quench in water.
- T: Temper between 690°C - 690°C.

<sup>1)</sup> YS = Yield strength TS=Tensile strength E = Elongation

Made in Malaysia

*[Signature]*  
 QA/QC MANAGER  
 HOI YS  
 PANTECH STEEL INDUSTRIES SDN BHD  
 539731-A  
 Quality Assurance Manager

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# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (806731-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 Klang, **Selangor, Malaysia**

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



Cert. No.: KLR 0403925

ISO 9001  
PED 97/23/EC Annex 1 Clause 4.3  
Cert. No.: 0038/PED/MUM/0810070/1

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No : **PSI 102560**

Date : **29-Jul-15**

Purchaser :

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless										Specification for Inspection				
52215PS-1	E000011924	Seamless Pipe	ASTM A234-14 WPB/ASME SA234-15 WPB NACE MR0175/NACE MR0103/ISO15156*										ASME B16.9-12 / ASTM A960-14a				
Heat No.	Product & Size			Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing									
S 702C	4" x 3" STD CON RED			880	GOOD	GOOD	C&S	N-A									
Specification	Chemical Composition (%)												Tensile Test *			Hardness	
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS (KSI / MPa)	TS	E (%)	(HB)	
Min	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000	-	x100	240	415	22	-	
Max	-	10	29	-	-	-	-	-	-	-	-	-	-	-	-	-	
Heat No.	30	-	106	50	58	40	40	15	40	80	-	50	-	-	-	187	
S 702C	14	23	102	19	7	5	6	3	5	5	<0.10	34	379	500	30.4	120	121

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

**NOTE:**

C: Cold formed at temperature below 620°C

N: Normalised at 910°C

S: Stress relieved in temperature between 595°C - 690°C and cooled in still air Q: Heated to 910°C and quench in water.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air.

T: Temper between 590°C - 690°C.

\*1: YS = Yield strength TS=Tensile strength E = Elongation

*[Signature]*  
Quality Assurance Manager

Made in Malaysia

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# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (509731-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,

Off Jalan Meru, 42200 Klang, **Selangor, Malaysia.**

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



ISO 9001

Cert. No.: KL3 0403926

PED 97/23/EC Annex I Clause 4.3  
Cert. No.: 0038/PED/MUM/0810070/1

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No: **PSI 101450**

Date: **10-Jun-15**

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless					Specification for inspection									
		Seamless Pipe	ASTM A234-13 WPB/ASME SA234-13 WPB NACE MRO175/NACE MRO103/ISO15156*					ASME B16.9-12 / ASTM A960-10									
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing										
RH 710C	4" x 3" XS CON RED		100	GOOD	GOOD	C&S	N-A										
Specification	Chemical Composition (%)												Tensile Test <sup>1)</sup>			Hardness	
	C x100	Si x100	Mn x100	P x1000	S x1000	Ni x100	Cr x100	Mo x100	Cu x100	V x1000	Pb	CE x100	YS (KSI / MPa)	TS (KSI / MPa)	E (%)	(HB)	
Min	-	10	29	-	-	-	-	-	-	-	-	-	240	415	22	-	
Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Heat No.	30	-	106	50	58	40	40	15	40	60	-	50	-	-	-	197	
<b>RH 710C</b>	10	21	117	14	3	2	4	0	5	6	<0.10	32	320	441	36.6	128	129

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE **MANUFACTURER LISTED AT THE ADDRESS ABOVE** IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION.

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

**NOTE:**

C: Cold formed at temperature below 620°C

N: Normalised at 910°C

S: Stress relieved in temperature between 595°C - 690°C and cooled in still air Q: Heated to 910°C and quench in water.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air

T: Temper between 590°C - 590°C.

<sup>1)</sup> YS = Yield strength TS=Tensile strength E = Elongation

Made in Malaysia

  
Quality Assurance Manager



# INSPECTION CERTIFICATE

PANTECH STEEL INDUSTRIES SDN. BHD. (106731-A)

LOT 13258 & 13259, Jalan Haji Abd. Manan,  
Off Jalan Meru, 42200 Klang, Selangor, Malaysia.

Tel: 603-3393 1633 Fax: 603-3393 1733 E-mail: info@pantechsteel.com



ISO 9001

Cert. No.: IIR 0403826

## WROUGHT CARBON STEEL BUTTWELDING FITTINGS

INSPECTION DOCUMENT: EN10204:2004 Type 3.1

Certificate No: PSI 97591

Date: 18-Feb-15

Purchaser:

Order No.	Invoice No.	Starting Material	Specification for Fittings- Seamless				Specification for Inspection	
12115PS-6	E 000011537	Plate	ASTM A234-13 WPB/ASME SA234-13 WPB NACE MR0175/NACE MR0103/ISO15156*				ASME B16.9-12 / ASTM A960-10	
Heat No.	Product & Size		Quantity (pcs)	Visual Examination	Dimensional Inspection	Heat Treatment	Magnetic Particle Testing	
RJ 704	4" XS CAP		438	GOOD	GOOD	C&S	N-A	

Specification	Chemical Composition (%)												Tensile Test <sup>1)</sup>			Hardness		
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Pb	CE	YS	TS	E	(HB)		
	x100	x100	x100	x1000	x1000	x100	x100	x100	x100	x1000		x100	(KSI / MPa)	(%)	1	2		
Min	-	10	26	-	-	-	-	-	-	-	-	-	240	415	22	-		
Max	30	-	106	50	68	40	40	15	40	80	-	50	-	-	-	197		
Heat No.	RJ 704	6	16	43	16	5	1	2	1	1	4	<0.10	15	252	441	40.4	126	128

WE CERTIFY THAT ALL PRODUCTS WERE MANUFACTURED, SAMPLED, TESTED, AND INSPECTED SOLELY BY THE MANUFACTURER LISTED AT THE ADDRESS ABOVE IN ACCORDANCE WITH INDICATED SPECIFICATION AND FOUND TO MEET REQUIREMENTS. MATERIAL IS FREE FROM MERCURY AND RADIOACTIVE CONTAMINATION

TENSILE REQUIREMENT: CONFORMS TO ASTM A370 STANDARD, LONGITUDINAL DIRECTION, GAUGE LENGTH 2" (50mm)

\* HARDNESS ACCORDING TO NACE MR0175/ NACE MR 0103/ ISO15156

NOTE:

C: Cold formed at temperature below 820°C

N: Normalised at 910°C

S: Stress relieved in temperature between 550°C - 690°C and cooled in still air Q: Heated to 910°C and quench in water.

H: Hot formed in temperature between 845°C - 945°C and cooled in still air.

T: Temper between 590°C - 690°C.

1): YS = Yield strength TS=Tensile strength E = Elongation

*[Signature]*  


Made in Malaysia

Quality Assurance Manager



INSPECTION CERTIFICATE  
(MILL TEST CERTIFICATE)  
EN 10204 3.1

CHARM MING VIETNAM CO., LTD  
SAIGON - LINH TRUNG EXPORT PROCESSING ZONE  
THU DUC DISTRICT, HO CHI MINH CITY, VIET NAM  
TEL : 84-8-3897 4885  
FAX : 84-8-3897 4894

PURCHASER :  
ORDER NO. :  
SPEC. FOR RAW MATERIAL : ASTM A516 Gr. 65, ASTM A234 Gr. WPB  
SPEC. FOR INSPECTION : ASTM A234 - 13e1 WPB  
ASME SA234 - 2013 WPB  
ASME B16.9-2012 / ASME B16.25-2012  
BS EN 10204 3.1-2004

JOB NO. :  
CERTIFICATE NO. : Q150527003C-13  
DATE : MAY. 27, 2015

PO Item No.	Product & Size(Inch)		Heat Code	Quantity	Heat No.	Raw Material Mfg	Certificate No.											
58	102	CAP 4 XH	A88	225	21A88	C.S.C	020221A0005											
59	102	CAP 4 XH	T42	32	3NT42	C.S.C	010517A0007											
60	102	CAP 4 XH	043	135	SF29043	POSCO	130513-PPSF-005-004											
61	102	CAP 4 XH	607	564	SF36607	POSCO	131209-PPSE-001-005											
62	102	CAP 4 XH	729	484	N10729	HYUNDAI	20140701-PS-025-005											
Spe	Chemical Composition %													Tension Test			Hardness Test	Magnetic Particle Exam.
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Pb	CE	Yield Strength	Tensile Strength	Elongation		
	X100	X100	X100	X1000	X1000	X100	X100	X100	X100	X1000	X1000	X1000	X100	P.S.I	P.S.I	%	HRW	
IN	10	29												35000	60000	30		
AX	25		120	50	58	40	40	40	15	80	20		42		95000		197	
58	17	23	103	11	3	1	1	2	*1	1	<1	*<3	35	42775	67135	35	120 - 126	Acceptable
59	17	19	99	18	5	0	1	2	*2	3	4	*<3	34	46110	73080	36	122 - 128	Acceptable
60	15	25	110	12	2	1	1	2	0	2	1	*<3	34	44225	70180	35	129 - 132	Acceptable
61	14	25	106	12	3	1	1	4	0	2	1	*<3	33	44805	71340	39	124 - 130	Acceptable
62	16	23	106	13	2	1	1	1	0	0	1	*<3	34	45095	70905	37	126 - 131	Acceptable
Visual Examination		Dimensional Inspection			Heat Treatment				(*) Product Analysis by CHARM MING									
Acceptable		Acceptable			S.R 700°C x 0.5H													

$$CE = C + Mn/6 + (Cr + Mo + V) / 5 + (Ni + Cu) / 15$$

MATERIAL CONFORMS TO NACE MR0103-2012/ NACE MR0175-2009 and ISO 15156-2009  
We hereby certify that the products described here in have been manufactured and tested in accordance with specifications and also the purchaser's requirements concerned.

- NOTE:
- THE QUALITY MANAGEMENT SYSTEM OF ISO 9001-2008 AND PED 97/23/EC, ANNEX I SEC. 4.3 HAVE BEEN APPROVED BY LRQA
  - ANOTHER PED 97/23/EC, ANNEX I SEC. 4.3 TUV-NORD 0045

Quality Assurance Section/Manager



UCS JOB NO. S-4248

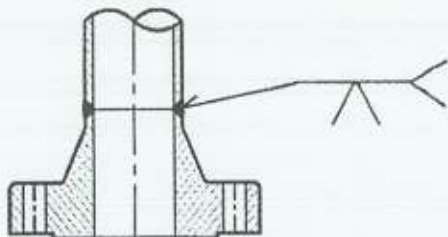
## Section 5

Welding Procedures / Procedure  
Qualification Records

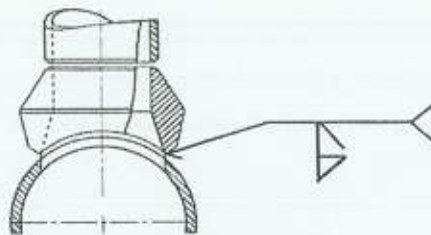
JOB: S-4248-02



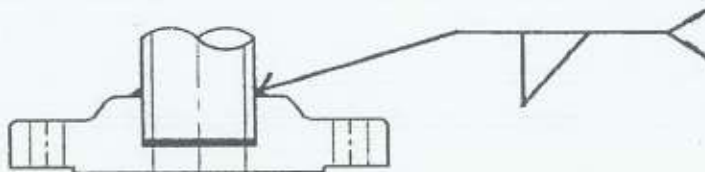
UCS JOB NO. S-4248-02  
 CUSTOMER JOB NO. J-447  
 PO NO. 4500757656  
 DATE: 1/25/2017  
 REVISION: 1



**BUTT WELD, TYP.**



**O-LET WELD, TYP.**



**FILLET WELD, TYP.**

JOINT TYPE: VARIOUS, PIPE				
WPS	PROCESS	MAX DEPOSIT-T	GROOVE-T, min/max	NOTES
5004A	GTAW	0.25"	0.187"-1.0"	P1-Gr.1or2 to P1-Gr.1or2, UNLIMITED PIPE DIA.
	SMAW	0.75"		
5011A	GMAW	0.25"	0.187"-1.50"	P1-Gr.1or2 to P1-Gr.1or2, UNLIMITED PIPE DIA.
	FCAW	1.25"		
5012A	GTAW	1.812"	0.187"-1.812"	P1-Gr.1or2 to P1-Gr.1or2, UNLIMITED PIPE DIA.
GT-1-1.2-50CVN	GTAW	0.625"	0.375"-0.75"	P1-Gr.1or2 to P1-Gr.1or2, 8NH, UNLIMITED PIPE DIA.
GM-FC-1-1.2-50CVN	GMAW	0.1375	0.375"-0.75"	P1-Gr.1or2 to P1-Gr.1or2, 8NH, UNLIMITED PIPE DIA.
	FCAW	0.50"		
5001A	GTAW	0.864"	0.187"-0.864"	P8-Gr.1 to P8Gr.1, 308L, 309L, 316L
5002A	GMAW	0.137"	0.187"-0.864"	P8-Gr.1 to P8-Gr.1, 308L OR 316L, MIN. PIPE DIA. =0.75"
	FCAW	0.614"		
5007A	GTAW	0.294"	0.062"-0.294"	P8-Gr.1 to P8G-Gr.1, 308L or 316L, UNLIMITED PIPE DIA.
<b>ADDITIONAL NOTES:</b> Rev. 1 added 5007A for P8 Gr. 1 weld groove thickness down to 0.062"				

UCS QUALITY REVIEW:   
 CUSTOMER REVIEW: \_\_\_\_\_  
 3RD PARTY/ END USER: \_\_\_\_\_  
 DATE: 1/25/17  
 DATE: \_\_\_\_\_  
 DATE: \_\_\_\_\_

**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
 (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

  
 Justin W Davis  
 CWI 12111941  
 QC1 EXP. 11/1/2015  
 05MAR2015

Company Name UNITED CONTRACTING SERVICES By: Tim Morris Approved By: [Signature] 10-22-12  
 Welding Procedure Specification No. 5004-A Date 8-14-09 Supporting PQR No.(s) 5004-A  
 Revision No. 3 Date 10-22-12  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW) & SHIELDED METAL ARC WELDING (SMAW) Type(s) GTAW/ SMAW -manual  
 (Automatic,Manual,Machine,Semi-auto)

**Joints (QW-402)** Details

Joint Design Single Vee or Bevel, Double Vee or Bevel  
 Backing (Yes) Optional (No) GTAW-open root  
 Backing Material (type) Weld metal for double sided weld  
 (Refer to both backing and retainers.)

**Joint Designs page 3 of WPS**

- Metal       Nonfusing Metal  
 Nonmetallic       Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfg., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)

See shop drawings for optional joint designs used with this WPS. This WPS may be used in conjunction with other WPS' as indicated on shop drawings.

**\* BASE METALS (QW-403)**

P-No. 1 Group No. 1 or 2 to P-No. 1 Group No. 1 or 2  
 OR  
 Specification type and grade Example: SA-106B  
 To Specification type and grade Example: SA-106B  
 OR  
 Chem. Analysis and Mech. Prop. \_\_\_\_\_  
 To Chem. Analysis and Mech. Prop. \_\_\_\_\_  
 Thickness Range:  
 Base Metal: Groove 3/16" - 1" Fillet Unlimited  
 Pipe Dia. Range: Groove All Diameters Fillet All Diameters  
 Other \_\_\_\_\_

<b>* FILLER METALS (QW-404)</b>	<b>GTAW Root</b>	<b>SMAW Fill</b>
Spec. No. (SFA)	5.18	5.1
AWS No. (Class)	ER70S-2 or ER70S-6	E7018 or E7018-1
F-No.	6	4
A-No.	1 (verify that ER70S-6 meets A1 chemistry)	1
Size of Filler Metals	1/16", 3/32", 1/8"	3/32", 1/8", 5/32"
Weld Metal	No autogenous welding allowed	
Thickness Range:		
Groove	250" (1/4") maximum deposit	.750" (3/4") max. deposit
Fillet	Unlimited	Unlimited
Electrode-Flux (Class)	NONE USED	NA
Flux Trade Name	NONE USED	NA
Consumable Insert	None	NA
Other	Bare (Solid wire)	Max. pass thk. < 1/2"
	Addition of flux: None	

\*Each base metal-filler metal combination should be recorded individually.

<b>POSITIONS (QW-405)</b>		<b>POSTWELD HEAT TREATMENT (QW-407)</b>			
Positions(s) of Groove	All positions	Temperature Range	As Welded Condition		
Welding Progression:	Up <input type="checkbox"/> Yes <input type="checkbox"/> Down <input type="checkbox"/>	Time Range	N/A		
Position(s) of Fillet	All positions				
<b>PREHEAT (QW-406)</b>		<b>GAS (QW-408)</b>			
Preheat Temp. Min.	3/16" to 1" = 55°F	GTAW	Gas(es)	Percent Composition	Flow rate
Interpass Temp. Max.	550°F	Shielding	Argon	99.995%	20-50 CFH
Preheat Maintenance	None	Trailing	None		
(Continuous or special heating where applicable should be recorded)		Backing	None		

<b>ELECTRICAL CHARACTERISTICS (QW-409)</b>			
Current AC or DC	Below	Polarity	Below
Amps (Range)	Below	Volts (Range)	Below
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)			
Tungsten Electrode Size and Type	EWTh-2 3/32" or 1/8"		
	(Pure Tungsten, 2% Thoriated, etc.)		
Mode of Metal Transfer for GMAW	N/A		
	(Spray arc, short circuiting arc, etc.)		
Electrode Wire feed speed range	N/A		

<b>TECHNIQUE (QW-410)</b>	
String or Weave Bead	GTAW- weave SMAW- String or weave (3X rod dia, Max)
Orifice or Gas Cup Size	GTAW: #4 - #12
Initial and Interpass Cleaning (Brushing, Grinding, etc. All deleterious materials shall be removed 1" both sides of weld joint by grinding or wire brushing. Interpass cleaning with wire brush, chipping hammer or pneumatic scaling gun required.	
Method of Back Gouging N/A for GTAW single side open root stringer deposit. Back gouge and/or grind second side for double side weld using the GTAW process if required.	
Contact to Tube Work Distance	N/A
Multiple or Single Pass (per side)	Multiple
Multiple or Single Electrodes	Single
Travel Speed (Range)	See Below
Peening	None
Other	Oscillation: None Pulsing current: None

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other Max. J/in.
		Class	Dia.	Type Polar.	Amp Range			
Root & Hot pass	GTAW	ER70S-2	1/16", 3/32"	DC/SP	40-200	12-25	Manual	
		or ER70S-6	1/8"	DC/SP	130-300	18-25	Manual	
Fill & cap	SMAW	E7018	3/32"	DC/RP	70-100	19-24	Manual	
		or	1/8"	DC/RP	110-135	19-24	Manual	
		E7018-1	5/32"	DC/RP	130-200	19-25	Manual	
			3/16"	DC/RP	180-250	22-28	Manual	

**WELD PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)

WPS No.: 5004-A      Date: 8-14-09      Rev. No.: 3      Date: 05MAR2015

**JOINTS (QW-402)**

<b>Single-V groove:</b> <u>GTAW /SMAW</u>	<b>Single bevel groove:</b> <u>GTAW/SMAW</u>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" – 3/16"</u>	Root opening: <u>3/32" – 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>

<b>Single-V groove:</b>	<b>Single bevel groove:</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>

<b>Double bevel groove:</b>	<b>Single J groove:</b> <u>3/8" J GTAW</u>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" – 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

<b>Double V groove:</b>	<b>Single U groove:</b> <u>1/4" U GTAW</u>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" – 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

**Single or double fillet weld: GTAW/SMAW**

Backing: Base metal

Root opening: 3/16" Max.

Weld size: See drawings

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

Prepared By: <u>Tim Morris</u>	Approved By: 	Date: <u>10-22-12</u>
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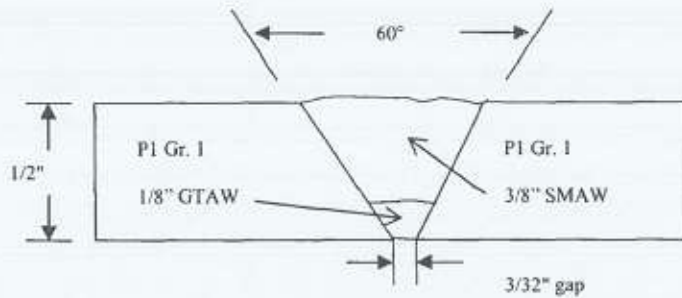


05MAR2015

**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES  
 Procedure Qualification Record No. 5004-A Date 8-14-09  
 WPS No. 5004-A  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW) & SHIELDED METAL ARC WELDING (SMAW)  
 Types (Manual, Automatic, Semi-auto.) GTAW/ SMAW : Manual

**JOINTS (QW-402)**



**Groove Design of Test Coupon**

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

<b>BASE METALS (QW-103)</b> Material Spec. <u>SA-106-B</u> Type or Grade <u>Gr. B</u> P No. <u>P 1 Gr. 1 to P 1 Gr. 1</u> Thickness of Test Coupon <u>1/2"</u> Diameter of Test Coupon <u>8.825"</u> Other <u>Qualifies T thk. 3/16" - 1" with no PWHT</u> <u>Qualifies GTAW t thk. 1/4" max.</u> <u>Qualifies SMAW t thk. 3/4" max.</u>  <u>Max. bead thk. &lt; 1/2"</u>		<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature <u>As Welded</u> Time <u>N/A</u> Other _____																																																										
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;"><b>FILLER METALS (QW-404)</b></td> <td style="width:33%;"><b>SMAW</b></td> <td style="width:33%;"><b>GTAW</b></td> </tr> <tr> <td>SFA Specification</td> <td><u>5.1</u></td> <td><u>5.18</u></td> </tr> <tr> <td>AWS Classification</td> <td><u>E7018</u></td> <td><u>ER70S-2</u></td> </tr> <tr> <td>Filler metal F-No.</td> <td><u>4</u></td> <td><u>6</u></td> </tr> <tr> <td>Weld Metal Analysis A-No.</td> <td><u>1</u></td> <td><u>1</u></td> </tr> <tr> <td>Size of Filler Metal</td> <td><u>1/8"</u></td> <td><u>1/8"</u></td> </tr> <tr> <td>Other <u>GTAW :Solid wire</u></td> <td></td> <td></td> </tr> <tr> <td><u>Consumable inserts: None</u></td> <td></td> <td></td> </tr> <tr> <td><u>Addition of flux for GTAW: None</u></td> <td></td> <td></td> </tr> <tr> <td>Weld Metal Thickness</td> <td><u>3/8" *</u></td> <td><u>1/8"</u></td> </tr> <tr> <td>Max. pass thk. &lt;1/2"</td> <td></td> <td><u>With filler*</u></td> </tr> </table>		<b>FILLER METALS (QW-404)</b>	<b>SMAW</b>	<b>GTAW</b>	SFA Specification	<u>5.1</u>	<u>5.18</u>	AWS Classification	<u>E7018</u>	<u>ER70S-2</u>	Filler metal F-No.	<u>4</u>	<u>6</u>	Weld Metal Analysis A-No.	<u>1</u>	<u>1</u>	Size of Filler Metal	<u>1/8"</u>	<u>1/8"</u>	Other <u>GTAW :Solid wire</u>			<u>Consumable inserts: None</u>			<u>Addition of flux for GTAW: None</u>			Weld Metal Thickness	<u>3/8" *</u>	<u>1/8"</u>	Max. pass thk. <1/2"		<u>With filler*</u>	<b>GAS (QW-408)</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td align="center" colspan="3">Percent Composition</td> </tr> <tr> <td></td> <td align="center">Gas(es)</td> <td align="center">(Mixture)</td> <td align="center">Flow rate</td> </tr> <tr> <td>Shielding</td> <td><u>Argon</u></td> <td><u>99.995%</u></td> <td><u>40 CFH</u></td> </tr> <tr> <td>Trailing</td> <td><u>None</u></td> <td></td> <td></td> </tr> <tr> <td>Backing</td> <td><u>None</u></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </table>			Percent Composition				Gas(es)	(Mixture)	Flow rate	Shielding	<u>Argon</u>	<u>99.995%</u>	<u>40 CFH</u>	Trailing	<u>None</u>			Backing	<u>None</u>			Other			
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<b>POSITION (QW-405)</b> Position of Groove <u>6G</u> Weld Progression (Uphill, Downhill) <u>Uphill</u> Other _____		<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current <u>GTAW: DC</u> <u>SMAW: DC</u> Polarity <u>GTAW: SP</u> <u>SMAW: RP</u> Amps <u>GTAW: 130</u> <u>SMAW: 98</u> Volts <u>GTAW: 19</u> <u>SMAW: 19</u> Tungsten Electrode Size <u>1/8" dia. EWTh-2</u> Pulsing Amps <u>None</u> J/in. Qualified ( CVN's) <u>N/A</u> Other _____																																																										
<b>PREHEAT (QW-406)</b> Preheat Temp. (min.) <u>70°F</u> Interpass Temp. (max.) <u>550°F</u> Other _____		<b>TECHNIQUE (QW-410)</b> Travel Speed <u>Manual</u> String or Weave Bead <u>GTAW: Weave</u> <u>SMAW: String</u> Oscillation <u>None</u> Multipass or Single Pass (per side) <u>Multipass</u> Single or Multiple Electrodes <u>Single</u> Other _____																																																										

\*Corrected SMAW deposit from 1/2" to 3/8" and added with filler addition to GTAW process. Recertified 10-22-10



**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
 (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name U CONTRACTING SERVICES INC. By: Juston Davis Approved by: Jose R. Estrada  
 Welding Procedure Specification No. 5011A Date 4/18/12 Supporting PQR No.(s) 5011A  
 Revision No. 3 Date 11-23-2016  
 Welding Process(es) GMAW/FCAW Type(s) Semi-Auto/Semi-Auto  
 (Automatic, Manual, Machine, Semi-auto)

**Joints (QW-402)**

Details

Joint Design Any\*  
 Root Spacing SEE SHEET 3  
 Backing (Yes) FCAW (No) GMAW  
 Backing Material (type) PER CUSTOMER REQUIREMENT  
 (Refer to both backing and retainers.)

See page 3 of WPS for joint design details.

\*1 See shop drawings for optional joint designs used with this WPS.

- Metal  Nonfusing Metal  
 Nonmetallic  Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)

This WPS may be used in conjunction with other WPS' as indicated on shop drawings. (Ex. Used for repair or root pass.)

**\* BASE METALS (QW-403)**

P-No. 1 Group No. 1 or 2 to P-No. 1 Group No. 1 or 2

OR

Specification type and grade EXAMPLE: SA-516-60

To Specification type and grade EXAMPLE: SA516-70

OR

Chem. Analysis and Mech. Prop. SEE P NO. ABOVE

To Chem. Analysis and Mech. Prop. SEE P NO. ABOVE

Thickness Range:

Base Metal: Groove 3/16"-1.5" Fillet UNLIMITED

Maximum Pass Thickness  $\leq \frac{1}{4}$  in. (Yes) X (No) \_\_\_\_\_

Other Not allowed for ASME Services greater than 1.5". Thicknesses between 1.0-1.25" shall have a minimum pre-heat of 175°F and thicknesses from 1.25-1.5" shall have a minimum pre-heat of 200°F.

**\* FILLER METALS (QW-404)**

	<b>FCAW</b>	<b>GMAW</b>
Spec. No. (SFA)	5.20/5.36	5.17/5.18
AWS No. (Class)	E71T-M1/E71T1-M21A2	ER70S-3 or ER70S-6
F-No.	6	6
A-No.	1 (VERIFY E71T-M MEETS A1 CHEM.)	1 (VERIFY ER70S-6 MEETS A1 CHEM.)
Size of Filler Metals	0.045", 1/16"	0.035", 0.045"
Filler Metal Product Form	TUBULAR	BARE WIRE
Supplemental Filler Metal	NONE ALLOWED	NONE ALLOWED
Weld Metal		
Thickness Range:		
Groove	3/16"-1.375"	0.062"-0.250"
Fillet	UNLIMITED	UNLIMITED
Electrode-Flux (Class)	NO ADDITIONAL FLUX ADDED	NO ADDITIONAL FLUX ADDED
Flux Trade Name	NONE	NONE
Consumable Insert	NONE	NONE
Other	NO ALLOYING ELEMENTS	NO ALLOYING ELEMENTS

\*Each base metal-filler metal combination should be recorded individually.

<b>POSITIONS (QW-405)</b> Position(s) of Groove <u>ALL</u> Welding Progression: Up <u>FCAW</u> Down <u>GMAW</u> Position(s) of Fillet <u>ALL</u> Other _____	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature Range <u>N/A</u> Time Range <u>N/A</u> Other _____																				
<b>PREHEAT (QW-406)</b> Preheat Temp. Min. <u>50°F</u> Interpass Temp. Max. <u>500°F MAX.</u> Preheat Maintenance <u>NONE AFTER WELDING</u> (Continuous or special heating where applicable should be recorded)	<b>GAS (QW-408)</b> <table style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Gas(es)</td> <td style="text-align: center;">Percent Mixture</td> <td style="text-align: center;">Flow rate</td> </tr> <tr> <td>Shielding</td> <td><u>AR/CO2</u></td> <td><u>75/25</u></td> <td><u>30-50CHF</u></td> </tr> <tr> <td>Trailing</td> <td><u>NONE</u></td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Backing</td> <td><u>NONE</u></td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Other</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table>		Gas(es)	Percent Mixture	Flow rate	Shielding	<u>AR/CO2</u>	<u>75/25</u>	<u>30-50CHF</u>	Trailing	<u>NONE</u>	_____	_____	Backing	<u>NONE</u>	_____	_____	Other	_____	_____	_____
	Gas(es)	Percent Mixture	Flow rate																		
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Trailing	<u>NONE</u>	_____	_____																		
Backing	<u>NONE</u>	_____	_____																		
Other	_____	_____	_____																		

**ELECTRICAL CHARACTERISTICS (QW-409)**

Weld Layer(s)	Process	Filler Metal		Current			IPM Travel Speed Range	Wire Feed Speed Range	Energy or Power Range	(e.g. Remarks Comment Technique)
		Class	Dia.	Type Polar.	Amp Range	Volt Range				
ROOT	GMAW	ER70S-3 or ER70S-6	.035"	DC/RP	115-145	18-23	MAN.	VAR.	*	
FILL/ CAP	FCAW	E71T-M	.045"	DC/RP	140-240	22-29	MAN.	VAR.	*	
	FCAW	E71T-M	1/16"	DC/RP	220-380	22-32	MAN.	VAR.	*	

Amps and volts, or power or energy range, should be recorded for each electrode size

Pulsing Current NONE Heat Input Range. \*NOT REQUIRED FOR IMPACT EXEMPT APPLICATIONS  
 Tungsten Electrode size NONE  
 Mode of Transfer for GMAW (FCAW) GMAW-GLOB., FCAW-GLOB. or SPRAY  
 Other \_\_\_\_\_

**TECHNIQUE (QW-410)**

String or Weave Bead GMAW- STRING or WEAVE, FCAW-STRING (3/4" MAX.)  
 Orifice or Gas Cup Size 5/16" or 3/8" I.D.  
 Initial and Interpass Cleaning (Brushing, Grinding, etc. All deleterious materials shall be removed 1" both sides of weld joint by grinding or wire brushing. GMAW - WIRE BRUSH EACH PASS REQUIRED.  
FCAW - Interpass cleaning with wire brush, chipping hammer, or pneu. Sealing gun required.  
 Method of Back Gouging N/A for single side w/ no access to second side; grinding optional if second side accessible.  
FCAW may be used for dbl. sided welding with sec. side back gouged to bright metal & welded w/FCAW  
 Oscillation None  
 Contact to Tube Work Distance 1/2" ~ 1-1/4"  
 Multiple or Single Pass (per side) MULT.  
 Multiple or Single Electrodes SINGLE  
 Electrode Spacing NONE  
 Peening NONE ALLOWED  
 Other NO OCCILATION

**PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)

WPS No.: 5011A      Date: 4-18-12      Rev. No.: 3      Date: 11-23-16

**JOINTS (QW-402)**

<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32"~3/16"</u>	Root opening: <u>3/32"~3/16"</u>
Groove angle: <u>50° Min. included</u>	Groove angle: <u>45° Min. included</u>
Root face: <u>1/8" Max.</u>	Root face: <u>1/8" Max.</u>

<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50° Min. included</u>	Groove angle: <u>45° Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>

<b>Double bevel groove: GMAW/FCAW</b>	<b>Single J groove: GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32"~3/16"</u>
Groove angle: <u>50° Min. included</u>	Groove angle: <u>15° Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max.</u>

<b>Double V groove: GMAW/FCAW</b>	<b>Single U groove: GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32"~3/16"</u>
Groove angle: <u>45° Min. included</u>	Groove angle: <u>15° Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max.</u>

**Single or double fillet weld: GMAW/FCAW**

Backing: Base metal

Root opening: 3/16" Max.

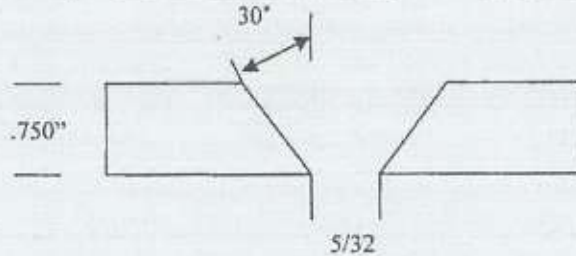
Weld size: See drawing details

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

Prepared By: <u>Juston Davis</u>	Approved By: <u>Jose R. Blada</u>	Date: <u>11/23/16</u>
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**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.0 Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company UNITED CONTRACTING SERVICES  
 PQR No. 5011 Date 4-18-12  
 WPS No. 5011-A Welding Process(es) GMAW/FCAW  
 Types (Manual, Automatic, Semi-Auto) SEMI-AUTO  
JOINTS (QW-402)



Groove Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

**BASE METALS (QW-403)**  
 Material Spec. SA516  
 Type or Grade 70  
 P-No. 1 Gr. 1 to P-No. 1 Gr. 1  
 Thickness of Test Coupon 0.750"  
 Diameter of Test Coupon N.A.  
 Maximum Pass Thickness 0.250"  
 Other OPEN ROOT, NO BACKING

**POSTWELD HEAT TREATMENT (W-407)**  
 Temperature N/A  
 Time N/A  
 Other \_\_\_\_\_

**FILLER METALS (QW-404)**

SFA Specification	<u>5.18</u>	<u>5.20</u>
AWS Classification	<u>ER70S-6</u>	<u>E71T-1M</u>
Filler Metal F-No.	<u>6</u>	<u>6</u>
Weld Metal Analysis A-No.	<u>1</u>	<u>1</u>
Size of Filler Metal	<u>0.035"</u>	<u>0.045"</u>
Filler Metal Product Form	<u>SOLID</u>	<u>TUBULAR</u>
Supplemental Filler Metal	<u>NONE</u>	<u>NONE</u>
Electrode Flux Classification	<u>N/A</u>	<u>N/A</u>
Flux Type	<u>N/A</u>	<u>N/A</u>
Flux Trade Name	<u>N/A</u>	<u>N/A</u>
Weld Metal Thickness	<u>0.125"</u>	<u>0.437"</u>
Other		

**GAS (QW-408)**

	Percent Composition		
	Gas(es)	Mixture	Flow Rate
Shielding	<u>ARGON/CO2</u>	<u>75/25</u>	<u>35 CFH</u>
Trailing	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Backing	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

**POSITION (QW-405)**  
 Position of Groove 1G  
 Weld Progression N.A.  
 Other N/A

**ELECTRICAL CHARACTERISTICS (QW-409)**  
 Current DCEP /DCEP  
 Polarity REVERSE /REVERSE  
 Amps. 130 / 150 Volts 21/23  
 Tungsten Electrode Size N/A  
 Mode of Transfer for GMAW (FCAW) SEE BELOW  
 Other GMAW: GLOBULAR FCAW: GLOBULAR

**PREHEAT (QW-406)**  
 Preheat Temp. AMBIENT (70°F)  
 Interpass Temp. 475°F MAX  
 Other \_\_\_\_\_

**TECHNIQUE (QW-410)**  
 Travel Speed 12 IPM  
 String or Weave Bead STRINGER  
 Oscillation NONE  
 Multipass or Single Pass (per side) MULTIPASS  
 Single or Multiple Electrodes SINGLE  
 Other \_\_\_\_\_

QC Approved  
 By HZ  
 Date 4/18/12

# TULSA GAMMA RAY, INC.

1127 S Lewis Ave. Tulsa, OK 74104  
 PH 918-585-3228 FX 918-598-5584

PQR No. 5011-A

### Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb.	Ultimate Unit Stress psi	Type of Failure & Location
1 (	0.755"	0.714"	0.5391	44,191	81,972	DUCTILE BASE METAL
2	0.755"	0.722"	0.5451	44,190	74,249	DUCTILE BASE METAL

### Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE FIG. 462.3(a) 102131246	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.3(a) 102131246	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.3(a) 102131246	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.3(a) 102131246	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"

### Toughness Tests (QW-170) N/A

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Break (Y/N)
				Ft. lbs	Lateral Expansion	% Shear	
1	WM 1/16" ROOT	10mm x 10mm	-20°F	23	19	55	N
2	WM 1/16" ROOT	10mm x 10mm	-20°F	19	17	50	N
3	WM 1/16" ROOT	10mm x 10mm	-20°F	13	13	45	N
4	WM 1/16" CAP	10mm x 10mm	-20°F	32	28	45	N
5	WM 1/16" CAP	10mm x 10mm	-20°F	23	22	50	N
6	WM 1/16" CAP	10mm x 10mm	-20°F	34	27	50	N
7	HAZ	10mm x 10mm	-20°F	18	18	40	N
8	HAZ	10mm x 10mm	-20°F	15	21	45	N
9	HAZ	10mm x 10mm	-20°F	16	19	45	N

Comments: \_\_\_\_\_

### Fillet-Weld Test (QW-180) N/A

Result-Satisfactory Yes  No  Penetration into Parent Metal: Yes  No

Macro-Results \_\_\_\_\_

### Other Tests

Type of Test \_\_\_\_\_

Deposit Analysis \_\_\_\_\_

Other \_\_\_\_\_

Welder's Name JORGE PANDO Clock No. \_\_\_\_\_ Stamp No. \_\_\_\_\_

Tests Conducted By Tulsa Gamma Ray, Inc. JP Laboratory Test No. 102131246

We certify that the statements in this record are correct and that the test welds were prepared, welded, and attested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer UNITED CONTRACTING SERVICES

Date 4/18/12 By H. T. Edwards

# UNITED CONTRACTING SERVICES

Tulsa, Ok.

## QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATIONS (WPS) (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

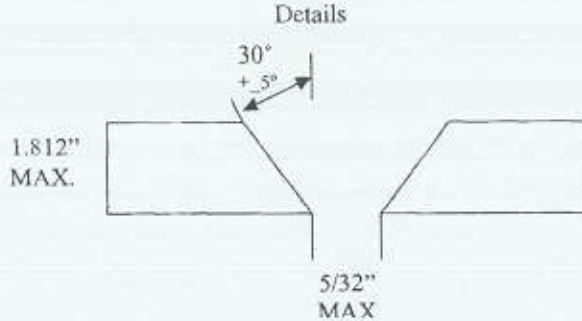
Company Name UNITED CONTRACTING SERVICES Approved by / Date *[Signature]* 8-21-13  
 WPS No: 5012-A Date 6-1-12 Supporting PQR No. (s) 5012  
 Revision No. 2 Date of Rev. 8-21-13 Added "with filler Addition" comment

Welding Process(es) GTAW Type MANUAL  
(Automatic, Manual, Machine, or Semi-Auto)

**JOINTS (QW-402)**

Joint Design Any  
 Backing With or without  
 Backing Material (Type) Per customer requirement  
Refer to both backing and retainers

Metal  Nonfusing Metal  
 Nonmetallic  Other  
 No nonmetallic or non-fusing metal retainers used.



Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr. / sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g., for notch toughness procedures, for multiple process procedures, etc.)

V,J or U bevel grooves, fillets or other joints detailed on engineering drawings, production routing or repair procedures.

**\*BASE METALS (QW-403)**

No. 1 Group No. 1 or 2 to P-No. 1 Group No. 1 or 2

OR  
 Specification type and grade or UNS Number \_\_\_\_\_  
 to Specification type and grade or UNS Number \_\_\_\_\_

OR  
 Chem. Analysis and Mech. Prop \_\_\_\_\_  
 To Chem. Analysis and Mech. Prop \_\_\_\_\_

Thickness Range:  
 Base Metal: Groove 0.1875" TO 1.812" MAX Fillet UNLIMITED  
 Diameter Groove UNLIMITED Fillet UNLIMITED  
 Maximum Pass Thickness  $\leq \frac{1}{2}$  in. (13mm)

Other No pass greater than 1/2"

**\*FILLER METALS (QW-404)**

Spec. No. (SFA)	<u>5.18</u>
AWS No. (Class)	<u>ER70S-6/ER70S-2</u>
F-No.	<u>6</u>
A-No.	<u>1(Verify Chemistry)</u>
Size of Filler Metals	<u>3/32", 1/8"</u>
Filler Metal Product Form	<u>SOLID</u>
Supplemental Filler Metal	<u>NONE</u>
Weld Metal	
Thickness Range:	
Groove	<u>1.812"</u>
Fillet	<u>ANY</u>
Electrode-Flux (Class)	<u>N.A.</u>
Electrode Trade Name	<u>N.A.</u>
Consumable Insert	<u>N.A.</u>
Other	<u>With Filler Addition</u>

\*Each base metal-filler metal combination should be recorded individually.

# UNITED CONTRACTING SERVICES

Tulsa, Ok.

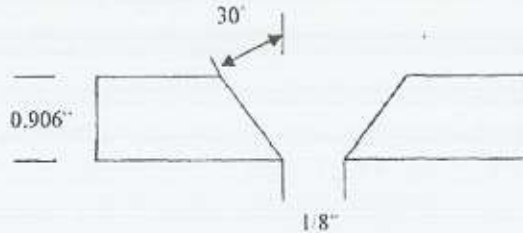
				WPS No. 5012-A	Rev. 2			
<b>POSITIONS (QW-405)</b>				<b>POSTWELD HEAT TREATMENT (QW-407)</b>				
Position(s) of Groove		ALL		Temp Range	N.A.			
Welding Progression:		<input type="checkbox"/> DOWN <input checked="" type="checkbox"/> Up		Time Range	N.A.			
Position(s) of Fillet		ALL		Other				
Other								
<b>PREHEAT (QW-406)</b>				<b>GAS (QW-408)</b>				
Preheat Temp. Min.		50°		Gas(es)	Mixture			
Interpass Temp. Max.		550°		Argon	100			
Preheat Maintenance		Shielding		N.A.	N.A.			
Other		Trailing		N.A.	N.A.			
(Continuous or special heating where applicable should be recorded)		Backing		N.A.	N.A.			
		Other						
<b>ELECTRICAL CHARACTERISTICS (QW-409)</b>								
Weld Pass(es)	Process	Filler Metal		Current		Volt Range	Travel Speed (Range)	Other ; Remarks And Comments
		Class	Dia.	Type Polar	Amp. Range			
ALL	GTAW	ER70S-6 OR ER70S-2	3/32" OR 1/8"	DCEN	75-150	10-13	3-7 ipm	
ALL	GTAW	ER70S-6 OR ER70S-2	3/32" OR 1/8"	DCEN	75-150	10-13	3-8 ipm	
Amps and volts range should be recorded for each electrode size, position, and thickness, etc.								
Pulsing Current		N/A		Heat Input (max.)		N/A		
Tungsten Electrode Size and Type: 3/32" or 1/8" EWTh-2								
(Pure Tungsten, 2% Thoriated, etc.)								
Mode of Metal Transfer for GMAW (FCAW): N/A								
(Spray Arc, Short Circuiting Arc, etc.)								
Electrode Wire Feed Speed Range: N/A								
Other:								
<b>TECHNIQUE (QW-410)</b>								
String or Weave Bead: STRING or WEAVE								
Orifice, Nozzle or Gas Cup Size: #4 TO #12								
Initial and Interpass Cleaning (brushing, Grinding, etc.) BRUSHING AND GRINDING AS NEEDED								
Method of Back Gouging CARBON ARC GOUGHING								
Oscillation: NONE								
Contact Tube to Work Distance: N/A								
Multiple or Single (per side): MULTIPASS								
Multiple or Single Electrodes: SINGLE								
Electrode Spacing: N/A								
Peening: NONE ALLOWED								
Other:								

# TULSA GAMMA RAY, INC.

1127 S Lewis Ave. Tulsa, OK 74104  
 PH 918-585-3228 FX 918-598-5584

## QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR) (See QW-200.0 Section IX, ASME Boiler and Pressure Vessel Code) Record Actual Conditions Used to Weld Test Coupon.

Company UNITED CONTRACTING SERVICES  
 PQR No. 5012 Date 6-1-12 Corrected Deposited Filler Metal Thickness & Typos Date: 8-21-13  
 WPS No. 5012-A Welding Process(es) GTAW  
 Types (Manual, Automatic, Semi-Auto) MANUAL  
 JOINTS (QW-402)



Groove Detail of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

**BASE METALS (QW-403)**  
 Material Spec. SA106  
 Type or Grade B  
 P-No. 1 Gr. 1 to P-No. 1 Gr. 1  
 Thickness of Test Coupon 0.906"  
 Diameter of Test Coupon N.A.  
 Maximum Pass Thickness 0.250"  
 Other OPEN ROOT, NO BACKING

**POSTWELD HEAT TREATMENT (W-407)**  
 Temperature N/A  
 Time N/A  
 Other \_\_\_\_\_

**FILLER METALS (QW-404)**  
 SFA Specification 5.18  
 AWS Classification ER70S-6  
 Filler Metal F-No. 6  
 Weld Metal Analysis A-No. 1  
 Size of Filler Metal 3/32"  
 Filler Metal Product Form SOLID  
 Supplemental Filler Metal NONE  
 Electrode Flux Classification N/A  
 Flux Type N/A  
 Flux Trade Name N/A  
 Weld Metal Thickness 0.906"  
 Other With filler addition

**GAS (QW-408)**

	Percent Composition		
	Gas(es)	Mixture	Flow Rate
Shielding	ARGON	100%	35 CFH
Trailing	N/A	N/A	N/A
Backing	N/A	N/A	N/A

**POSITION (QW-405)**  
 Position of Groove 1G  
 Weld Progression N.A.  
 Other N.A.

**ELECTRICAL CHARACTERISTICS (QW-409)**  
 Current DCEN  
 Polarity STRAIGHT  
 Amps. 130 Volts 19  
 Tungsten Electrode Size 1/8" EWTH-2  
 Mode of Transfer for GMAW (FCAW) N/A  
 Other N/A

**PREHEAT (QW-406)**  
 Preheat Temp AMBIENT (90°F)  
 Interpass Temp. 475°F MAX  
 Other \_\_\_\_\_

**TECHNIQUE (QW-410)**  
 Travel Speed 10 IPM  
 String or Weave Bead STRINGER  
 Oscillation NONE  
 Multipass or Single Pass (per side) MULTIPASS  
 Single or Multiple Electrodes SINGLE  
 Other \_\_\_\_\_

**TULSA GAMMA RAY, INC.**

1127 S Lewis Ave. Tulsa, OK 74104  
PH 918-585-3228 FX 918-598-5584

QW-483 (BACK)

PQR No. 5012

Specimen No	Width	Thickness	Tensile Test (QW-150)		Ultimate Unit Stress psi	Type of Failure & Location
			Area	Ultimate Total Load lb.		
1	0.748	0.893	0.6679	53,726	80,440	DUCTILE BASE METAL
2	0.753	0.905	0.6814	51,064	74,940	DUCTILE BASE METAL

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE FIG. 462.2	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.2	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.2	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"
SIDE FIG. 462.2	PASS NO RELEVANT INDICATIONS GREATER THAN 1/8"

Hardness Test- Brinell Hardness

Location	Readings		
	1	2	3
HAZ	162	176	226
WELD	200	210	198
HAZ	196	176	185

Comments:

Result-Satisfactory Yes  No  Filler-Weld Test (QW-180) N/A Penetration into Parent Metal: Yes  No

Macro-Results

Other Tests N/A

Type of Test

Deposit Analysis

Other

Welder's Name JORGE PANDO

Clock No. \_\_\_\_\_

Stamp No. A

Tests Conducted By Tulsa Gamma Ray, Inc. AP

Laboratory Test No. 102131720

We certify that the statements in this record are correct and that the test welds were prepared, welded, and attested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer UNITED CONTRACTING SERVICES

Date 8-21-13

By [Signature]

**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**

(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)



Company Name UNITED CONTRACTING SERVICES By: Tim Morris Approved By: \_\_\_\_\_  
 Welding Procedure Specification No. GT-1-1.2 -50CVN Date 11-18-14 Supporting PQR No.(s) 14-14534  
 Revision No. 0 Date N/A  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW) Type(s) Manual  
 (Automatic, Manual, Machine, Semi-auto)

<p><b>Joints (QW-402)</b></p> <p>Joint Design <u>Single Vee or Bevel, Double Vee or Bevel, Fillet</u>                  Root Spacing <u>3/32" to 3/16"</u>                  Backing (Yes) <u>Optional</u> (No) <u>GTAW- open root</u>                  Backing Material (type) <u>Weld metal or base metal</u>                  (Refer to both backing and retainers.)</p> <p><input checked="" type="checkbox"/> Metal      <input type="checkbox"/> Nonfusing Metal  <input type="checkbox"/> Nonmetallic    <input type="checkbox"/> Other</p> <p>Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.</p> <p>(At the option of the Mfg., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)</p>	<p>Details</p> <p><b>See page 3 of WPS for joint design details.</b>                  *1 See shop drawings for optional joint designs used with this WPS.</p> <p>This WPS may be used in conjunction with other WPS' as indicated on shop drawings. (Ex. Used for repair or root pass.)</p>
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**\* BASE METALS (QW-403)**

P-No. 1 Group No. 1 or 2 to P-No. 1 Group No. 1 or 2

OR

Specification type and grade Ex: SA-106-B  
 To Specification type and grade Ex: SA-105

OR

Chem. Analysis and Mech. Prop. \_\_\_\_\_  
 To Chem. Analysis and Mech. Prop. \_\_\_\_\_

Thickness Range:  
 Base Metal: Groove 3/8" to 3/4" Fillet Unlimited  
 Maximum Pass Thickness  $\leq$  1/2 in. (Yes) X (No) \_\_\_\_\_  
 Other \_\_\_\_\_

<b>* FILLER METALS (QW-404)</b>	<b>GTAW</b>	
Spec. No. (SFA) _____	5.18	
AWS No. (Class) _____	<b>ER70S-6</b>	
F-No. _____	6	
A-No. _____	1 *	*ER70S-6 weld cert. must meet
Size of Filler Metals _____	1/16", 3/32", 1/8"	1.60% max. Mn and 1.0% max. Si
Filler Metal Product Form _____	Solid (bare) wire	to meet A1 chemistry.
Supplemental Filler Metal _____	None	
Weld Metal		
Thickness Range:		
Groove _____	5/8" maximum deposit.**	
Fillet _____	Unlimited	
Electrode-Flux (Class) _____	None used for aid in penetration	
Flux Trade Name _____	N/A	
Consumable Insert _____	None	
Other <u>** Due to the mismatch on the coupon, the mechanical testing and CVN's were taken from 5/16" thk. machined material.</u>		

\*Each base metal-filler metal combination should be recorded individually.

<b>POSITIONS (QW-405)</b>		<b>POSTWELD HEAT TREATMENT (QW-407)</b>		
Positions(s) of Groove	1G & 2G	Temperature Range	None (As welded condition)	
Welding Progression:	Up <u>N/A</u> Down <u>N/A</u>	Time Range	<u>N/A</u>	
Position(s) of Fillet	1F & 2F	Other	<u>N/A</u>	
Other				
<b>PREHEAT (QW-406)</b>		<b>GAS (QW-408)</b>		
Preheat Temp. Min.	60° F	Gas(es)	Percent Composition	Flow rate
Interpass Temp. Max.	450° F	Shielding	Argon	99.995%
Preheat Maintenance	None after completion of weldment.	Trailing	None	25-40 CFH
(Continuous or special heating where applicable should be recorded)		Backing	None	
		Other		

**ELECTRICAL CHARACTERISTICS (QW-409)**

Weld Layer(s)	Process	Filler Metal		Current			IPM Travel Speed Range	Wire Feed Speed Range	Energy or Power Range	(e.g. Remarks Comment Technique
		Class	Dia	Type Polar.	Amp Range	Volt Range				
	GTAW	ER70S-6	1/16"	DC/SP	70-120	14-21	2.8-6	N/A	*	
	GTAW	ER70S-6	3/32"	DC/SP	80-150	14-21	2.8-7	N/A		
	GTAW	ER70S-6	1/8"	DC/SP	120-150	15-21	2.8-8	N/A		

Amps and volts, or power or energy range, should be recorded for each electrode size

Pulsing Current None Heat Input Range. 67,500 J/in. maximum qualified  
 Tungsten Electrode size 3/32" or 1/8" EWTh-2  
 Mode of Transfer for GMAW (FCAW) N/A  
 Other \* Power range is not recorded.

**TECHNIQUE (QW-410)**

String or Weave Bead String or weave bead  
 Orifice or Gas Cup Size #6 - #10  
 Initial and Interpass Cleaning (Brushing, Grinding, etc.) All deleterious materials shall be removed 1" both sides of weld joint by grinding or wire brushing or descaling. Light flash rust after grinding or descaling is acceptable.  
Interpass cleaning with wire brush, grinding or chatter gun.  
 Method of Back Gouging Double side weld- Air carbon arc and/or grind second side to sound metal. NA for fillet welds or open root.  
 Oscillation None  
 Contact to Tube Work Distance N/A  
 Multiple or Single Pass (per side) Multiple  
 Multiple or Single Electrodes Single  
 Electrode Spacing Manual  
 Peening None  
 Other \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_


**PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)


WPS No.: GT-1-1.2 -50CVN      Date: 11-18-14      Rev. No.: 0      Date: N/A

**JOINTS (QW-402)**

<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" - 1/4"</u>	Root opening: <u>3/32" - 1/4"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>
<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>
<b>Double bevel groove: GTAW</b>	<b>Single J groove: GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>
<b>Double V groove: GTAW</b>	<b>Single U groove: 3/4" U GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>
<b>Single or double fillet weld: GTAW</b>	
Backing: <u>Base metal</u>	
Root opening: <u>3/16" Max.</u>	
Weld size: <u>See drawings</u>	

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications WS 1.00-10 and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

Prepared By:	Tim Morris	Approved By:		Date:	
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 Justin W Davis  
 CWI 12111641  
 GC1 EXP. 11/12/15

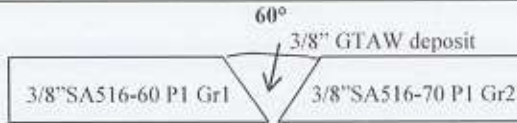
**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**

(See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)

Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES  
 Procedure Qualification Record No. 14-14534 Date 11-18-14  
 WPS No. GT-1-1.2 -50 CVN  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW)  
 Types (Manual, Automatic, Semi-auto.) Manual

**JOINTS (QW-402)**



**Groove Design of Test Coupon**

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

<b>BASE METALS (QW-403)</b>		<b>POSTWELD HEAT TREATMENT (QW-407)</b>	
Material Spec.	<u>SA-516-60 to SA-516-70</u>	Temperature	<u>None (As welded)</u>
Type or Grade	<u>Dual certified plate</u>	Time	<u>N/A</u>
P No. <u>1</u> Gr. No. <u>1</u> to P No. <u>1</u> Gr. No. <u>2</u>		Other	<u>N/A</u>
Thickness of Test Coupon	<u>3/8"</u>		
Diameter of Test Coupon	<u>N/A (plate test)</u>		
Max. pass thk.	<u>&lt; 1/2"</u>		
Other	<u>SA-516-60/70 Nucor Ht# 4500920</u>		

<b>FILLER METALS (QW-404)</b>	<b>GTAW</b>	<b>ELECTRICAL CHARACTERISTICS (QW-409)</b>		
SFA Specification	<u>5.18</u>	Current	<u>DC</u>	
AWS Classification	<u>ER70S-6</u>	Polarity	<u>Straight</u>	
Filler metal F-No.	<u>6</u>	Amps	<u>150</u>	
Weld Metal Analysis A-No.	<u>1</u>	Volts	<u>21</u>	
Size of Filler Metal	<u>3/32"</u>	Tungsten Electrode Size	<u>1/8" EWTh-2</u>	
Filler metal product form	<u>Bare (solid) wire</u>	Pulsing Amps	<u>None</u>	
Supplemental Filler Metal	<u>N/A</u>	J/in. Qualified ( CVN's)	<u>67,500 J/in</u>	
Electrode Flux Classification	<u>N/A</u>	Mode of metal transfer	<u>GMAW/FCAW N/A</u>	
Flux Type	<u>N/A</u>	Other		
Flux trade name	<u>None</u>			
Weld Metal Thickness	<u>3/8"</u>			
Consumable inserts	<u>None</u>			
Other	<u>GTAW: Oxford Alloys 3/32" HT# SA02684</u>			
	<u>Meets A1 chemistry</u>			

<b>POSITION (QW-405)</b>	<b>TECHNIQUE (QW-410)</b>
Position of Groove	<u>1G</u>
Weld Progression (Uphill, Downhill)	<u>N/A</u>
Other	
	Travel Speed <u>2.8 IPM</u>
	String or Weave Bead <u>Weave</u>
	Oscillation <u>None</u>
	Multipass or Single Pass (per side) <u>Multipass</u>
	Single or Multiple Electrodes <u>Single</u>
	Other

<b>PREHEAT (QW-406)</b>	
Preheat Temp. (min.)	<u>60°F (ambient temp.)</u>
Interpass Temp. (max.)	<u>400°F</u>
Other	

QW-483 (Back)

PQR No. 14-1453

Tensile Test (QW-150)

Specimen No.	Width (in)	Thickness (in)	Area (sq. in)	Ultimate Total Load lb	Ultimate Unit Stress Psi	Type of Failure & Location
1	0.751	0.328	0.246	19,840	80,650	Base-ductile
2	0.746	0.304	0.277	18,230	80,308	Base-ductile

Guided-Bend Tests (QW-160)

Type and Figure No. QW-462.2a	Result
#1 Side bend	Satisfactory
#2 Side bend	Satisfactory
#3 Side bend	Satisfactory
#4 Side bend	Satisfactory

Toughness Tests (QW-170) (N/A)

Specimen No.	Notch Location	Notch Type	Test Temp. °F	Impact Values			Drop Weight	
				Values ft/lb	% Shear	Mils (in.)	Break	No Break
1,2,3	Weld	"V"	-50 *	45,45,10	N/A	N/A	N/A	N/A
1,2,3	HAZ (SA516-60)	"V"	-50 *	57,46,64	N/A	N/A	N/A	N/A
1,2,3	HAZ (SA516-70)	"V"	-50 *	64,54,34	N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A

Specimen Size 10mm X 7mm \*(Actual test temperature due to sub-sized specimen was -58°F)

Fillet-Weld Tests (QW-180)

Result- Satisfactory: Yes N/A No N/A Penetration into Parent Metal: Yes N/A No N/A  
 Macro- Results N/A


Other Tests

Type of Test BHN: SA-516-70 ( 141,139,141) , HAZ (156,156,159) Weld (162,153,159) SA-516-60 (132,130,137) HAZ (153,156,159)  
 Other N/A

Welders Name Jorge Pando Sr. Clock No. N/A Stamp No. A  
 Test conducted by: Sun Materials Testing / Element Laboratory Test No. 14-14534-1/-2

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the Requirements of Section IX of the ASME Code.


Organization UNITED CONTRACTING SERVICES

Date 11-18-14 By: Tim Morris Certified by 



**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**

(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name UNITED CONTRACTING SERVICES By: Tim Morris Approved By:   
 Welding Procedure Specification No. GM-FC-1-1.2-50 CVN Date 11-9-14 Supporting PQR No.(s) 14-14510  
 Revision No. 0 Date N/A  
 Welding Process(es) GAS METAL ARC WELDING (GMAW) & FLUX CORED ARC WELDING (FCAW) Type(s) Semi-automatic  
 (Automatic, Manual, Machine, Semi-auto)

Joints (QW-402)	Details
Joint Design <u>Single V or Bevel, Double V or Bevel, Fillet</u>	<p>See page 3 of WPS for joint design details.                      *1 See shop drawings for optional joint designs used with this WPS.</p>
Root Spacing <u>3/32" to 3/16"</u>	
Backing (Yes) <u>Optional</u> (No) <u>GMAW- open root</u>	
Backing Material (type) <u>Weld metal or base metal</u>	
(Refer to both backing and retainers.)	
<input checked="" type="checkbox"/> Metal <input type="checkbox"/> Nonfusing Metal <input type="checkbox"/> Nonmetallic <input type="checkbox"/> Other	
<p>Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.</p>	
<p>(At the option of the Mfr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)</p>	
<p>This WPS may be used in conjunction with other WPS' as indicated on shop drawings. (Ex. Used for repair or root pass.)</p>	

**\* BASE METALS (QW-403)**  
 P-No. 1 Group No. 1 or 2 to P-No. 1 Group No. 1 or 2  
 OR  
 Specification type and grade Ex: SA-106-B Normalized  
 To Specification type and grade Ex: SA-516-60/70 Normalized  
 OR  
 Chem. Analysis and Mech. Prop. Base material must be in the normalized condition.  
 To Chem. Analysis and Mech. Prop. \_\_\_\_\_  
 Thickness Range:  
 Base Metal: Groove 3/8" to 3/4" \* Fillet Unlimited  
 Maximum Pass Thickness ≤ 1/2 in. (Yes) X (No) \_\_\_\_\_  
 Other \*Maximum fill on a 3/4" thk. base metal is 0.6375" due to GMAW short circuiting arc process.

* FILLER METALS (QW-404)	FCAW	GMAW
Spec. No. (SFA)	5.20	5.18
AWS No. (Class)	E71T-12MJ	ER70S-6
F-No.	6	6
A-No.	E71T-12MJ (Kobe DWA-55ESR) *	ER70S-6 *
Size of Filler Metals	.045"	.035"
Filler Metal Product Form	Flux cored wire wire	Solid (bare) wire
Supplemental Filler Metal	None	None
Weld Metal		
Thickness Range:		
Groove	1/2" maximum	0.1375" maximum
Fillet	Unlimited	Unlimited
Electrode-Flux (Class)	N/A	N/A
Flux Trade Name	N/A	N/A
Consumable Insert	N/A	N/A
Other	Alloy elements: None	Alloy elements: None
	*Cert. must meet < 1.60 Mn & < .90 Si for A1	*Cert. must meet < 1.60 Mn & < .90 Si for A1

\*Each base metal-filler metal combination should be recorded individually.

<b>POSITIONS (QW-405)</b> Positions(s) of Groove <u>All positions</u> Welding Progression: Up <u>x</u> Down _____ Position(s) of Fillet <u>All positions</u> Other _____	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature Range <u>As Welded Condition</u> Time Range <u>N/A</u> Other _____																				
<b>PREHEAT (QW-406)</b> Preheat Temp. Min. <u>60° F</u> Interpass Temp. Max. <u>450° F</u> Preheat Maintenance <u>None after completion of weldment.</u> (Continuous or special heating where applicable should be recorded)	<b>GAS (QW-408)</b> <table style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Gas(es)</td> <td style="text-align: center;">Percent Composition</td> <td style="text-align: center;">Flow rate</td> </tr> <tr> <td style="border: none;">Shielding</td> <td style="border: none;"><u>Argon/CO2</u></td> <td style="border: none;"><u>75/25%</u></td> <td style="border: none;"><u>25-40 CFH</u></td> </tr> <tr> <td style="border: none;">Trailing</td> <td style="border: none;"><u>None</u></td> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;">Backing</td> <td style="border: none;"><u>None</u></td> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;">Other</td> <td style="border: none;">_____</td> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> </table>		Gas(es)	Percent Composition	Flow rate	Shielding	<u>Argon/CO2</u>	<u>75/25%</u>	<u>25-40 CFH</u>	Trailing	<u>None</u>	_____	_____	Backing	<u>None</u>	_____	_____	Other	_____	_____	_____
	Gas(es)	Percent Composition	Flow rate																		
Shielding	<u>Argon/CO2</u>	<u>75/25%</u>	<u>25-40 CFH</u>																		
Trailing	<u>None</u>	_____	_____																		
Backing	<u>None</u>	_____	_____																		
Other	_____	_____	_____																		

**ELECTRICAL CHARACTERISTICS (QW-409)**

Weld Layer(s)	Process	Filler Metal		Current			IPM Travel Speed Range	Wire Feed Speed Range	Energy or Power Range	(e.g. Remarks  Comment Technique
		Class	Dia.	Type Polar.	Amp Range	Volt Range				
Root Fill & Cap	GMAW	ER70S-6	.035"	DC/RP	70-100	14-16	4 - 6	N/A	*	
	FCAW	E71T-12MJ	.045"	DC/RP	175-190	23-25	11-14	N/A		

Amps and volts, or power or energy range, should be recorded for each electrode size

Pulsing Current None Heat Input Range. GMAW: 24,000 J/in. max. FCAW: 25,909 J/in max.

Tungsten Electrode size N/A

Mode of Transfer for GMAW (FCAW) GMAW; Short circuiting arc FCAW: Globular

Other \* Power range is not recorded.

**TECHNIQUE (QW-410)**

String or Weave Bead GMAW- string or weave bead FCAW- String bead

Orifice or Gas Cup Size 5/16" or 3/8" I.D.

Initial and Interpass Cleaning (Brushing, Grinding, etc. All deleterious materials shall be removed 1" both sides of weld joint by grinding or wire brushing or descaling. Light flash rust after grinding or descaling is acceptable.

Interpass cleaning with wire brush, grinding or chatter gun.

Method of Back Gouging NA for single side GMAW welding w/out access to back side of joint. Grinding optional if back side is accessible. FCAW may be used for double sided weld with second side backgouged, ground to bright metal and welded with FCAW.

Oscillation None

Contact to Tube Work Distance 1/2" to 1 1/4"

Multiple or Single Pass (per side) Multiple

Multiple or Single Electrodes Single

Electrode Spacing Manual

Peening None

Other \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_


**PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)


WPS No.: GM-FC-1-1.2 -50CVN      Date: 11-9-14      Rev. No.: 0      Date: N/A

**JOINTS (QW-402)**

<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" - 1/4"</u>	Root opening: <u>3/32" - 1/4"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>
<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>
<b>Double bevel groove: GMAW/FCAW</b>	<b>Single J groove: GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>
<b>Double V groove: GMAW/FCAW</b>	<b>Single U groove: 3/4" U GMAW/FCAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>
<b>Single or double fillet weld: GMAW/FCAW</b>	
Backing: <u>Base metal</u>	
Root opening: <u>3/16" Max.</u>	
Weld size: <u>See drawings</u>	

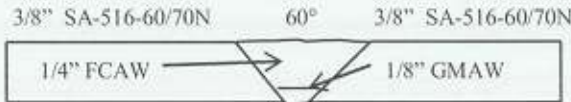
- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications WS 1.00-10 and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

Prepared By:	Tim Morris	Approved By:		Date:	11-9-14
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 Justin W Davis  
 CWI 12115641  
 QC1 EXP. 11/12/2015

**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES  
 Procedure Qualification Record No. 14-14510 Date 11-9-14  
 WPS No. GM-FC-1-1.2 -50 CVN  
 Welding Processes(es) GAS METAL ARC WELDING (GMAW) & FLUX CORED ARC WELDING (FCAW)  
 Types (Manual, Automatic, Semi-auto.) Semi-automatic



**Groove Design of Test Coupon**

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

<b>BASE METALS (QW-403)</b>		<b>POSTWELD HEAT TREATMENT (QW-407)</b>	
Material Spec. <u>SA-516 to SA516</u>		Temperature <u>As welded condition</u>	
Type or Grade <u>Dual certified to Gr.60 &amp; Gr. 70 normalized.</u>		Time <u>N/A</u>	
P No. <u>1</u> Gr. No. <u>1/2</u> to P No. <u>1</u> Gr. No. <u>1/2</u>		Other _____	
Thickness of Test Coupon <u>3/8"</u>		<b>GAS (QW-408)</b>	
Diameter of Test Coupon <u>N/A plate test</u>		Percent Composition	
Max. pass thk. <u>&lt; 1/2"</u>		Shielding Gas(es) (Mixture) Flow rate	
Other <u>NUCOR SA-516-60/70 HT# 4500920</u>		<u>Ar/CO2 75/55% 30 CFH *</u>	
<u>Qualifies T thk. 3/8" - 3/4" with CVN's</u>		Trailing <u>None</u>	
<u>Qualifies t thk. GMAW: Sec. IX CVN's 0.1375" max.</u>		Backing <u>None</u>	
<u>Qualifies t thk. FCAW: Sec. IX CVN's 1/2" max.</u>		<u>*FCAW 40 CFH</u>	

<b>FILLER METALS (QW-404)</b>		<b>ELECTRICAL CHARACTERISTICS (QW-409)</b>	
<b>FCAW</b>	<b>GMAW</b>	Current <u>GMAW - DC FCAW - DC</u>	
SFA Specification <u>5.20</u>	<u>5.18</u>	Polarity <u>GMAW - Reverse FCAW - Reverse</u>	
AWS Classification <u>E71T-12MJ</u>	<u>ER70S-6</u>	Amps <u>GMAW- 100 FCAW- 190</u>	
Filler metal F-No. <u>6</u>	<u>6</u>	Volts <u>GMAW- 16 FCAW- 25</u>	
Weld Metal Analysis A-No. <u>E71T-12MJ</u>	<u>ER70S-6</u>	Tungsten Electrode Size <u>N/A</u>	
Size of Filler Metal <u>.045"</u>	<u>.035"</u>	Pulsing Amps <u>None</u>	
Filler metal product form <u>Flux cored</u>	<u>Bare (solid) wire</u>	J/in. Qualified ( CVN's) <u>GMAW: 24,000 J/in FCAW: 25,909 J/in</u>	
Supplemental Filler Metal <u>None</u>	<u>None</u>	Mode of metal transfer	
Electrode Flux Classification <u>N/A</u>	<u>N/A</u>	GMAW/FCAW <u>GMAW: Short circuiting arc</u>	
Flux Type <u>N/A</u>	<u>N/A</u>	Other <u>FCAW: Globular</u>	
Flux trade name <u>N/A</u>	<u>N/A</u>	_____	
Weld Metal Thickness <u>1/4"</u>	<u>1/8"</u>	_____	
Consumable inserts <u>N/A</u>	<u>N/A</u>	_____	
Other <u>GMAW: Exocor<sup>®</sup> HT# X7910 Ally elements: None</u>		_____	
<u>FCAW Kobelco DW-A55ESR HT# AW4569</u>		_____	

<b>POSITION (QW-405)</b>	<b>TECHNIQUE (QW-410)</b>
Position of Groove <u>3G</u>	Travel Speed <u>GMAW- 4 IPM FCAW- 11 IPM</u>
Weld Progression (Uphill, Downhill) <u>Up-hill</u>	String or Weave Bead <u>GMAW -Weave FCAW- String</u>
Other _____	Oscillation <u>None</u>
	Multipass or Single Pass (per side) <u>Multipass</u>
	Single or Multiple Electrodes <u>Single</u>
	Other _____

<b>PREHEAT (QW-406)</b>
Preheat Temp. (min.) <u>70°F (ambient temp.)</u>
Interpass Temp. (max.) <u>450°F</u>
Other _____

Tensile Test (QW-150)

Specimen No.	Width (in)	Thickness (in)	Area (sq. in)	Ultimate Total Load lb	Ultimate Unit Stress Psi	Type of Failure & Location
1	0.752	0.330	0.248	19,020	76,694	Weld -ductile
2	0.753	0.347	0.261	20,490	78,508	Weld -ductile

Guided-Bend Tests (QW-160)

Type and Figure No. QW-462.2a	Result
#1 Side bend	Satisfactory
#2 Side bend	Satisfactory
#3 Side bend	Satisfactory
#4 Side bend	Satisfactory

Toughness Tests (QW-170) (N/A)

Specimen No.	Notch Location	Notch Type	Test Temp. °F	Impact Values			Drop Weight	
				Values ft/lb	% Shear	Mils (in.)	Break	No Break
1,2,3	Weld 1/16" root surface	"V"	-50	62,61,41	N/A	N/A	N/A	N/A
1,2,3	HAZ	"V"	-50	39,74,61	N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
					N/A	N/A	N/A	N/A
Specimen Size 10mmX10mm								

Fillet-Weld Tests (QW-180)

Result- Satisfactory: Yes N/A No N/A Penetration into Parent Metal: Yes N/A No N/A  
 Macro- Results N/A

Other Tests

Type of Test BHN: Base- 150,179,141 Weld- 150,159,141 HAZ- 169,162,147  
 Deposit Analysis N/A  
 Other N/A

Welders Name Marco Morenos Clock No. N/A Stamp No. M2

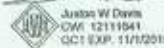
Test conducted by: Sun Materials Testing / Element Laboratory Test No. 14-14510-1/-2

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the Requirements of Section IX of the ASME Code and NACE standards.

Organization UNITED CONTRACTING SERVICES

Date 11-9-14 By: Tim Morris

Certified by 





# MATERIALS TESTING

Division of Sun Heat Treating Inc.

Client: **United Contracting Service**  
2716 East Apache St  
Tulsa, Oklahoma 74110

Report No: 14-14510-1  
Date: November 5, 2014  
Auth By: Tim Morris

Subject: Weld Procedure Qualification per ASME Section IX.

Identification: Procedure No: GM-FC-1.1-1.2-50CVN (GMAW/FCAW)  
Base Material: SA516-60/70 to SA516-60/70  
Heat No: 812A36440  
Electrode: Filler 1: ER-70S-6CF Plus/Heat X7910  
Filler 2: DW-A55ESR/Heat AW456A E71T-12MJ  
Welder: Mr. Marco Morenos/Stamp M2  
Position: 3G Uphill

### TENSILE TEST (QW-150)

	Tensile 1	Tensile 2
Width (in)	0.752	0.753
Thickness (in)	0.330	0.347
Area (sqin)	0.248	0.261
Ultimate load (lbs)	19,020	20,490
Ultimate stress (psi)	<b>76,694</b>	<b>78,508</b>
Failure Type	Ductile	Ductile
Failure Location	Weld	Weld

### TRANSVERSE GUIDED BEND TEST (QW-160)

Specimen Type	Accept/Reject QW-163	Specimen Type	Accept/Reject QW-163
No 1 Side Bend	<b>Acceptable</b>	No 2 Side Bend	<b>Acceptable</b>
No 3 Side Bend	<b>Acceptable</b>	No 4 Side Bend	<b>Acceptable</b>

### BRINELL HARDNESS SURVEY OF WELD CROSS SECTION

Location	Reading 1	Reading 2	Reading 3	Average Rb/BHN
Weld Zone	80/150	83/159	77/141	80Rb/150BHN
Heat Affected Zone	86/169	84/162	79/147	83Rb/159BHN
Base Material	80/150	79/179	77/141	79Rb/147BHN

SUN HEAT TREATING INC.  
Materials Testing Division  
*Paul R. Secrest*  
Paul R. Secrest/President



P.O. Box 9921

Tulsa, Oklahoma 74157

(918) 227-2188



# MATERIALS TESTING

Division of Sun Heat Treating Inc.

Client: **United Contracting Service**  
2716 East Apache St  
Tulsa, Oklahoma 74110

Report No: 14-14510-2  
Date: November 5, 2014  
Auth By: Tim Morris

Subject: Charpy Impact Testing per ASME Section VIII, Div 2, UG-84 (2013).

Identification: Procedure No: GM-FC-1.1-1.2-50CVN (GMAW/FCAW)  
Base Material: SA516-60/70 to SA516-60/70  
Heat No: 812A36440  
Electrode: Filler 1: ER-70S-6CF Plus/Heat X7910  
Filler 2: DW-A55ESR/Heat AW456A E71T-12MJ  
Welder: Mr. Marco Morenos/Stamp M2  
Position: 3G Uphill

## Results:

### CHARPY IMPACT TEST AT -50°F.

Weld Zone:	62	61	41	ft-lbs
Heat Affected Zone:	39	74	61	ft-lbs

End of Data

### TEST PARAMETERS

Type of Machine: Tinius Olsen 74	Available Impact: 264 ft-lbs
Serial No: 123871/Next Calibration 09-15	Method of Test: ASTM A370/E23
Impact Velocity: 17 ft/sec	Specimen Location: Per UG 84
Specimen Type: "V" notch	Specimen Size: 10mm x 8.7mm

Temperature Measurement: Kiethly RTD/MOC 868  
Serial No: 1481976/Next Calibration 12-14

SUN HEAT TREATING INC.  
Materials Testing Division

*Paul R. Secrest*  
Paul R. Secrest/President



P.O. Box 9921

Tulsa, Oklahoma 74157

(918) 227-2188

UCS  
Approved  
Date 3-9-13

**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name UNITED CONTRACTING SERVICES INC. By: Tim Morris Approved by: [Signature]  
 Welding Procedure Specification No. 5001-A Date 3-30-09 Supporting PQR No. 5001-A  
 Revision No. 3 Date 3-9-13  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW) Type(s) GTAW -manual  
 (Automatic, Manual, Machine, Semi-auto)

**Joints (QW-402)**

Details

Joint Design Single V or Bevel, Double V or Bevel \*1  
 Backing (Yes) Optional (No) GTAW-open root  
 Backing Material (type) Weld or base metal for double side weld  
 Retainers: None (Refer to both backing and retainers.)

Metal  Nonfusing Metal  
 Nonmetallic  Other

**Joint Designs page 3 of WPS**

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)

\*1 See shop drawings for optional joint designs used with this WPS. This WPS may be used in conjunction with other WPS' as indicated on shop drawings.

**\* BASE METALS (QW-403)**

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade Example: SA-240 Type 308L / 308 or 316L / 316

To Specification type and grade \_\_\_\_\_

OR

Chem. Analysis and Mech. Prop. \_\_\_\_\_

To Chem. Analysis and Mech. Prop. \_\_\_\_\_

Thickness Range:

Base Metal: Groove 3/16" - 0.864" Fillet Unlimited

Pipe Dia. Range: Groove All Diameters Fillet All Diameters

Other \_\_\_\_\_

**\* FILLER METALS (QW-404)**

**GTAW**

Spec. No. (SFA)	5.9	
AWS No. (Class)	ER308L, ER309L, ER316L *	
F-No.	6	
A-No.	8	
Size of Filler Metals	1/16", 3/32", 1/8"	
Weld Metal		
Thickness Range:		
Groove	0.864" maximum deposit	
Fillet	Unlimited	*ER308L with 304 or 304L base metals
Electrode-Flux (Class)	N/A	*ER316L with 316 or 316L base metal
Flux Trade Name	N/A	*ER309L with 310 to 304 or 304L base metals
Consumable Insert	None	
Other	Solid (bare) wire	
	Addition of flux: None	

\*Each base metal-filler metal combination should be recorded individually.

<b>POSITIONS (QW-405)</b> Positions(s) of Groove <u>All positions</u> Welding Progression: Up <u>Yes</u> Down _____ Position(s) of Fillet <u>All positions</u>	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature Range <u>As Welded</u> Time Range <u>N/A</u>																				
<b>PREHEAT (QW-406)</b> Preheat Temp. Min. <u>50° F</u> Interpass Temp. Max. <u>350°F</u> Preheat Maintenance <u>None</u> (Continuous or special heating where applicable should be recorded)	<b>GAS (QW-408)</b> <table style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Gas(es)</td> <td style="text-align: center;">Percent Composition</td> <td style="text-align: center;">Flow rate</td> </tr> <tr> <td><b>GTAW</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Shielding</td> <td><u>Argon</u></td> <td><u>99.995%</u></td> <td><u>20-40 CFH</u></td> </tr> <tr> <td>Trailing</td> <td><u>None</u></td> <td></td> <td></td> </tr> <tr> <td>Backing</td> <td><u>Argon</u></td> <td><u>99.995%</u></td> <td><u>**</u></td> </tr> </table>		Gas(es)	Percent Composition	Flow rate	<b>GTAW</b>				Shielding	<u>Argon</u>	<u>99.995%</u>	<u>20-40 CFH</u>	Trailing	<u>None</u>			Backing	<u>Argon</u>	<u>99.995%</u>	<u>**</u>
	Gas(es)	Percent Composition	Flow rate																		
<b>GTAW</b>																					
Shielding	<u>Argon</u>	<u>99.995%</u>	<u>20-40 CFH</u>																		
Trailing	<u>None</u>																				
Backing	<u>Argon</u>	<u>99.995%</u>	<u>**</u>																		

<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current AC or DC <u>Below</u> Polarity <u>Below</u> Amps (Range) <u>Below</u> Volts (Range) <u>Below</u>  (Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)  Tungsten Electrode Size and Type <u>EWTh-2 3/32" or 1/8"</u> (Pure Tungsten, 2% Thoriated, etc.)  Mode of Metal Transfer for GMAW <u>N/A</u> (Spray arc, short circuiting arc, etc.)  Electrode Wire feed speed range <u>N/A</u>	** Prior to welding, purge with 6 – 8 volume changes of Argon @ 20 – 40 CFH. During welding, continue to purge @ 10-20 CFH to minimize back pressure until weld is completed or a minimum of 1/4" weld is deposited. O2 < .5% in purge area.
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<b>TECHNIQUE (QW-410)</b> String or Weave Bead <u>GTAW- string or weave</u> Orifice or Gas Cup Size <u>GTAW: #4 - #12</u> Initial and Interpass Cleaning (Brushing, Grinding, etc.) <u>All deleterious materials shall be removed 2" both sides of weld joint by grinding or stainless steel wire brushing. Interpass cleaning with wire brush, chipping hammer or pneumatic scaling gun required.</u> Method of Back Gouging <u>N/A for GTAW single side open root stringer deposit. Back gouge and/or grind second side for double side weld using the GTAW process.</u> Contact to Tube Work Distance <u>N/A</u> Multiple or Single Pass (per side) <u>Multiple</u> Multiple or Single Electrodes <u>Single</u> Travel Speed (Range) <u>See Below</u> Peening <u>None</u> Other <u>Pulsing amps: None</u>	
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Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other
		Class	Dia.	Type Polar.	Amp Range			
Root Hot pass Fill	GTAW	See page 1 for AWS filler designation. Filler must match correct base metal.	1/16", 3/32" 1/8"	DC/SP DC/SP	80-200 120-250	12-25 18-25	Manual Manual	

**WELD PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)

WPS No.: 5001-A Date: 3-30-09 Rev. No.: 3 Date: 3-9-13

**JOINTS (QW-402)**

<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" - 3/16"</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>


<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>

<b>Double bevel groove: GTAW</b>	<b>Single J groove: 3/8" J GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

<b>Double V groove: GTAW</b>	<b>Single U groove: 1/4" U GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

**Single or double fillet weld: GTAW**  
 Backing: Base metal  
 Root opening: 3/16" Max.  
 Weld size: See drawings

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

Prepared By: <u>Tim Morris</u>	Approved By: 	Date: <u>3-9-13</u>
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**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES INC.

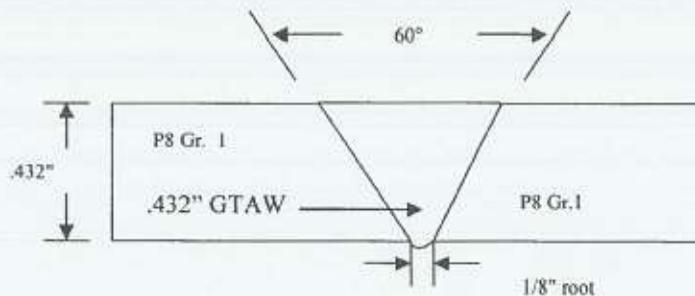
Procedure Qualification Record No. 5001-A Date 3-30-09

WPS No. 5001-A

Welding Processes(es) GAS TUNGSTEN ARC WELDING (GTAW)

Types (Manual, Automatic, Semi-auto.) Manual - Both processes

**JOINTS (QW-402)**



**Groove Design of Test Coupon**

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

**BASE METALS (QW-403)**

Material Spec. SA-312 to SA-312

Type or Grade 304 to 304

P No. P 8 Gr. 1 to P 8 Gr. 1

Thickness of Test Coupon .432"

Diameter of Test Coupon 6.625"

Other Qualifies T thk. 3/16" - 0.864"

Qualifies GTAW t thk. 0.864" max.

Max. bead thk. < 1/2"

**POSTWELD HEAT TREATMENT (QW-407)**

Temperature As Welded

Time N/A

Other \_\_\_\_\_

**GAS (QW-408)**

Percent Composition

	Gas(es)	(Mixture)	Flow rate
Shielding	<u>Argon</u>	<u>99.995%</u>	<u>40 CFH</u>
Trailing	<u>None</u>		
Backing	<u>Argon</u>	<u>99.995%</u>	<u>35 CFH</u>
Other			

**FILLER METALS (QW-404)**

SFA Specification \_\_\_\_\_

AWS Classification \_\_\_\_\_

Filler metal F-No. \_\_\_\_\_

Weld Metal Analysis A-No. \_\_\_\_\_

Size of Filler Metal \_\_\_\_\_

Other \_\_\_\_\_

Solid bare wire

No flux addition

Weld Metal Thickness \_\_\_\_\_

Consumable inserts- None

**GTAW**

5.9

ER308L

6

8

1/8"

0.432"

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current GTAW & SMAW: DC

Polarity GTAW- Straight

Amps GTAW- 110

Volts GTAW- 19

Tungsten Electrode Size EWTh-2 1/8" dia.

Pulsing Amps None

J/in. Qualified ( CVN's) \_\_\_\_\_

Other \_\_\_\_\_

**POSITION (QW-405)**

Position of Groove 6G

Weld Progression (Uphill, Downhill) Vertical up

Other \_\_\_\_\_

**TECHNIQUE (QW-410)**

Travel Speed 10 IPM

String or Weave Bead GTAW - Slight Weave

Oscillation None

Multipass or Single Pass (per side) Multipass

Single or Multiple Electrodes Single

Other \_\_\_\_\_

**PREHEAT (QW-406)**

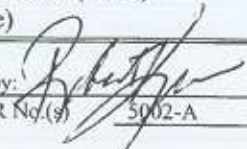
Preheat Temp. (min.) 55°F ambient temp.

Interpass Temp. (max.) 350°F

Other \_\_\_\_\_



**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
 (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name UNITED CONTRACTING SERVICES INC. By: Tim Morris Approved by:   
 Welding Procedure Specification No. 5002-A Date 3-20-09 Supporting PQR No. (9) 5002-A  
 Revision No. 1 Date 9-15-12  
 Welding Process(es) GAS METAL ARC WELDING (GMAW) & FLUX CORED ARC WELDING (FCAW) Type(s) Semi-automatic  
 (Automatic, Manual, Machine, Semi-auto)

**Joints (QW-402)**

Details

Joint Design Single V or Single Bevel, Fillet \*1  
 Backing (Yes) FCAW (No) GMAW  
 Backing Material (type) Weld metal or base metal  
 (Refer to both backing and retainers.)

Joint Designs page 3 of WPS

GMAW- Open root stringer

Metal (FCAW)  Nonfusing Metal  
 Nonmetallic  Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)

\*1 See shop drawings for optional joint designs used with this WPS. This WPS may be used in conjunction with other WPS' as indicated on shop drawings.

**\* BASE METALS (QW-403)**

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade Example: SA-240 Type 308L / 308 or 316L / 316

To Specification type and grade

OR

Chem. Analysis and Mech. Prop. See P-No. above.

To Chem. Analysis and Mech. Prop. See P-No. above.

Thickness Range:

Base Metal: Groove 3/16" - 0.864" Fillet Unlimited

Pipe Dia. Range: Groove 3/4" Min. Fillet Unlimited

Other

**\* FILLER METALS (QW-404)**

Spec. No. (SFA)

FCAW

GMAW

AWS No. (Class)

5.22

5.9

F-No.

E308LT1-4 or E316LT1-4 \*

ER308L or ER316L \*

A-No.

6

6

Size of Filler Metals

.045", 1/16"

.035", .045"

Weld Metal

\*ER308L with 304 or 304L base metals

\*ER308L with 304 or 304L base metals

Thickness Range:

\*ER316L with 316 or 316L base metal

\*ER316L with 316 or 316L base metal

Groove

0.614" max. deposit

0.137" max. deposit

Fillet

Unlimited

Unlimited

Electrode-Flux (Class)

NA

N/A

Flux Trade Name

NA

N/A

Consumable Insert

NA

N/A

Other

Max. pass thk. <3/8"

Max. pass thk.: 1/8"

Product form: Flux cored wire

Product form: Bare wire

Supplemental filler metal: None

Supplemental filler metal: None

Alloy elements: None

Alloy elements: None

\*Each base metal-filler metal combination should be recorded individually.

UCS  
 QC Approved  
 Date 

9-17-12

<b>POSITIONS (QW-405)</b> Positions(s) of Groove <u>All positions</u> Welding Progression: Up <u>Yes</u> Down <u>N/A</u> Position(s) of Fillet <u>All positions</u>	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature Range <u>As Welded condition</u> Time Range _____  <p style="text-align: center;"><b>10 HOURS MAX. HOLD TIME</b></p> <b>GAS (QW-408)</b> Percent Composition Shielding Gas(es) Mixture Flow rate FCAW <u>Argon/CO2</u> <u>75%/25%</u> <u>30-50 CFH</u> GMAW <u>Argon</u> <u>99.995%</u> <u>25-45 CFH</u> Backing <u>Argon</u> <u>99.995%</u> <u>**</u> Trailing <u>None</u>
<b>PREHEAT (QW-406)</b> Preheat Temp. Min. <u>50°F</u> Interpass Temp. Max. <u>350°F max.</u> Preheat Maintenance <u>None after welding</u> (Continuous or special heating where applicable should be recorded)	

<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current AC or DC <u>DC</u> Polarity <u>Reverse</u> Amps (Range) <u>Below</u> Volts (Range) <u>Below</u>  (Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)  Tungsten Electrode Size and Type <u>NA</u> (Pure Tungsten, 2% Thoriated, etc.)  Mode of Metal Transfer for GMAW <u>FCAW: globular transfer</u> GMAW: <u>Short arc</u> (Spray arc, short circuiting arc, etc.)  Electrode Wire feed speed range <u>Not recorded</u>	** Prior to welding, purge with 6 – 8 volume changes of Argon @ 20 – 40 CFH. During welding, continue to purge @ 10-20 CFH to minimize back pressure until weld is completed or a minimum of 1/4" weld is deposited. O2 < .5% in purge area.
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<b>TECHNIQUE (QW-410)</b>	
String or Weave Bead	<u>GMAW- string or weave bead FCAW- String bead (3/4" max.)</u>
Orifice or Gas Cup Size	<u>5/16" or 3/8" I.D.</u>
Initial and Interpass Cleaning (Brushing, Grinding, etc.)	<u>All deleterious materials shall be removed 1" both sides of weld joint by grinding or wire brushing. Interpass cleaning with wire brush, chipping hammer or pneumatic scaling gun required for FCAW. GMAW root pass shall be wire brushed prior to welding with FCAW. Use stainless steel brushes for cleaning.</u>
Method of Back Gouging	<u>NA for single side welding w/out access to back side of joint. Grinding optional if back side is accessible. FCAW may be used for double sided weld with second side backgouged, ground to bright metal and welded with FCAW.</u>
Contact to Tube Work Distance	<u>1/2" to 1 1/4"</u>
Multiple or Single Pass (per side)	<u>Multiple</u>
Multiple or Single Electrodes	<u>Single</u>
Travel Speed (Range)	<u>Manual</u>
Peening	<u>None</u>
Other	<u>Oscillation: None</u>

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other (e.g. Remarks Comments Technique)
		Class	Dia.	Type Polar.	Amp Range			
Root .137" max.	GMAW	ER308L or ER316L	.035"	DC/RP	80-160	18-23	Manual	
Balance (fill & cap) (Fillet) .614" max.	FCAW	E308LT1-4 or	.045"	DC/RP	140-200	22-29	Manual	
	FCAW	E316LT1-4	1/16"	DC/RP	210-250	22-32	Manual	

UCS  
QC Approved  
By RA  
Date 9-12-12

**WELD PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)

WPS No.: 5002-A      Date: 3-20-09      Rev. No.: 1      Date: 9-15-12

**JOINTS (QW-402)**

<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" - 3/16"</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>

<b>Single-V groove: GMAW/FCAW</b>	<b>Single bevel groove: GMAW/FCAW</b>
Backing: <u>Backgouged&amp; welded</u>	Backing: <u>Backgouged&amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>

<b>Double bevel groove: GMAW/FCAW</b>	<b>Single J groove: 3/8" JGMAW/FCAW</b>
Backing: <u>Backgouged&amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

<b>Double V groove: GMAW/FCAW</b>	<b>Single U groove: 1/4" UGMAW/FCAW</b>
Backing: <u>Backgouged&amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>


**Single or double fillet weld: GMAW/FCAW**

Backing: Base metal

Root opening: 3/16" Max.

Weld size: See drawings

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, taking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

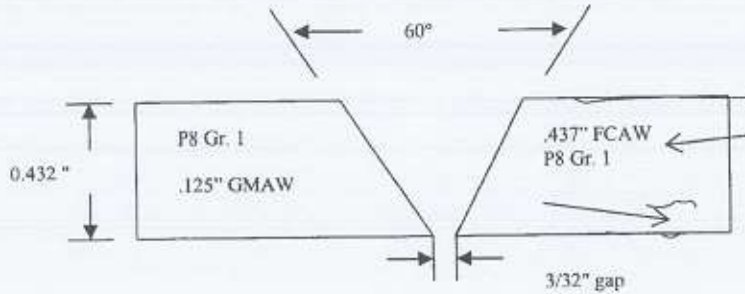
Prepared By: <u>Tim Morris</u>	Approved By: 	Date: <u>9-17-12</u>
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UCS  
QC Approved  
By: PK  
Date: 9-17-12

**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES INC.  
 Procedure Qualification Record No. 5002-A Date 3-20-09  
 WPS No. 5002-A  
 Welding Process(es) GAS METAL ARC WELDING (GMAW) & FLUX CORED ARC WELDING (FCAW)  
 Types (Manual, Automatic, Semi-auto.) Semi-automatic both processes

**JOINTS (QW-402)**



**Groove Design of Test Coupon**

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

**BASE METALS (QW-403)**

Material Spec. SA-312 to SA-312  
 Type or Grade 304 to 304  
 P No. P8 Gr.1 to P8 Gr.1  
 Thickness of Test Coupon 0.432"  
 Diameter of Test Coupon 6.625"

**Other**

Qualifies T thk. 3/16" - 0.864"  
Qualifies t thk. GMAW: Sec. IX 0.137" max.  
Qualifies t thk. FCAW: Sec. IX 0.614" max.  
Max. pass thk: GMAW-1/8" FCAW- 3/8"

**POSTWELD HEAT TREATMENT (QW-407)**

Temperature As Welded  
 Time \_\_\_\_\_  
 Other \_\_\_\_\_

**GAS (QW-408)**

GMAW & FCAW process		Percent Composition		Flow rate
FCAW	Gas(es)	(Mixture)		
Shielding	<u>Ar/CO2</u>	<u>75%/25%</u>		<u>40 CFH</u>
Trailing	<u>None</u>			
Backing	<u>Argon</u>	<u>99.995%</u>		<u>35 CFH</u>
GMAW	<u>Argon</u>	<u>99.995%</u>		<u>30 CFH</u>

**FILLER METALS (QW-404)**

	GMAW	FCAW
SFA Specification	<u>5.9</u>	<u>5.22</u>
AWS Classification	<u>ER308L</u>	<u>E308LT1-4</u>
Filler metal F-No.	<u>6</u>	<u>6</u>
Weld Metal Analysis A-No.	<u>8</u>	<u>8</u>
Size of Filler Metal	<u>.035"</u>	<u>.045"</u>
Other	<u>Supplemental filler: None</u>	
	<u>FCAW - flux cored wire GMAW-Bare</u>	
Weld Metal Thickness	<u>1/8"</u>	<u>0.307"</u>
Alloy elements:	<u>None</u>	

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current GMAW - DC FCAW - DC  
 Polarity GMAW - Reverse FCAW- Reverse  
 Amps GMAW- 80 FCAW- 140  
 Volts GMAW- 20 FCAW- 23  
 Tungsten Electrode Size N/A  
 Pulsing Amps None  
 J/in. Qualified ( CVN's) \_\_\_\_\_  
 Other Mode of transfer: FCAW- Globular transfer  
GMAW- Short Arc

**POSITION (QW-405)**

Position of Groove 6 G  
 Weld Progression (Uphill, Downhill) Uphill  
 Other \_\_\_\_\_

**TECHNIQUE (QW-410)**

Travel Speed GMAW- 12 IPM FCAW- 12 IPM  
 String or Weave Bead GMAW -String FCAW- String  
 Oscillation None  
 Multipass or Single Pass (per side) Multiple  
 Single or Multiple Electrodes Single  
 Other \_\_\_\_\_

**PREHEAT (QW-406)**

Preheat Temp. (min.) 70°F Ambient temp.  
 Interpass Temp. (max.) 550°F  
 Other \_\_\_\_\_

UCS  
 QC Approved  
 By pr  
 Date 9-17-12

QW-483 (Back)

PQR No. 5002-A

Tensile Test (QW-150)

Specimen No.	Width (in)	Thickness (in)	Area (sq. in)	Ultimate Total Load lb	Ultimate Unit Stress Psi	Type of Failure & Location
Tensile A	0.759	0.411	0.3119	24,335	78,021	Base-ductile
Tensile B	0.752	0.416	0.3128	23,826	76,170	Base-ductile

Guided-Bend Tests (QW-160)

Type and Figure No. QW-462.2a	Result
#1 Top & Bottom Transverse Side Bends	Satisfactory
#2 Top & Bottom Transverse Side Bend	Satisfactory
#3 Top & Bottom Transverse Side Bend	Satisfactory
#4 Top & Bottom Transverse Side Bend	Satisfactory

Toughness Tests (QW-170) Specimen size: 10mm X 10mm

Specimen No.	Notch Location	Notch Type	Test Temp. °F	Impact Values	Lateral Expansion		Drop Weight	
					% Shear	Mils	Break	No Break
		"V"						
		"V"						
			10mmX10mm specimen					


Other Tests

Type of Test \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Welders Name EloyGrajeda Clock No. \_\_\_\_\_ Stamp No. EG  
 Test conducted by: Tulsa Gamma Ray, Inc Laboratory Test No. 102127501

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the Requirements of Section IX of the ASME Code. Updated on new form 9-15-12

Manufacturer UNITED CONTRACTING SERVICES INC.

Date 3-20-09 By Tim Morris Approved by: 

UCS  
 OC Approved  
 By \_\_\_\_\_  
 Date 9.12.12

**QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)**  
 (See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name UNITED CONTRACTING SERVICES INC. By: Tim Morris Approved by:   
 Welding Procedure Specification No. 5007-A Date 3-30-09 Supporting PQR No(s) 5007-A  
 Revision No. 3 Date 9-7-12  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW) Type(s) GTAW -manual  
 (Automatic, Manual, Machine, Semi-auto)

**Joints (QW-402)**

Details

Joint Design Single V or Bevel , Double V or Bevel \*1  
 Backing (Yes) Optional (No) GTAW-open root  
 Backing Material (type) Weld or base metal for double side weld  
 Retainers: None (Refer to both backing and retainers.)

Metal  Nonfusing Metal  
 Nonmetallic  Other

**Joint Designs page 3 of WPS**

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process, procedures, etc.)

\*1 See shop drawings for optional joint designs used with this WPS. This WPS may be used in conjunction with other WPS' as indicated on shop drawings.

**\* BASE METALS (QW-403)**

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade Example: SA-240 Type 308L / 308 or 316L /316

To Specification type and grade \_\_\_\_\_

OR

Chem. Analysis and Mech. Prop. \_\_\_\_\_

To Chem. Analysis and Mech. Prop. \_\_\_\_\_

Thickness Range:


Base Metal: Groove 1/16" - 0.294" Fillet Unlimited  
 Pipe Dia. Range: Groove All Diameters Fillet All Diameters

Other \_\_\_\_\_

**\* FILLER METALS (QW-404)**

	GTAW	
Spec. No. (SFA)	5.9	
AWS No. (Class)	ER308L *	ER316L*
F-No.	6	
A-No.	8	
Size of Filler Metals	1/16", 3/32", 1/8"	
Weld Metal		
Thickness Range:		
Groove	0.294" maximum deposit	
Fillet	Unlimited	
Electrode-Flux (Class)	N/A	*ER308L with 304 or 304L base metals
Flux Trade Name	N/A	*ER316L with 316 or 316L base metal
Consumable Insert	None	
Other	Solid wire	
	Addition of flux: None	

\*Each base metal-filler metal combination should be recorded individually.

UCS  
QC Approved  
By   
Date 9-17-12

<b>POSITIONS (QW-405)</b> Positions(s) of Groove <u>All positions</u> Welding Progression: Up <u>Yes</u> Down _____ Position(s) of Fillet <u>All positions</u>	<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature Range <u>As Welded</u> Time Range <u>N/A</u>																				
<b>PREHEAT (QW-406)</b> Preheat Temp. Min. <u>50° F</u> Interpass Temp. Max. <u>350°F</u> Preheat Maintenance <u>None</u> (Continuous or special heating where applicable should be recorded)	<b>GAS (QW-408)</b> <table style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Gas(es)</td> <td style="text-align: center;">Percent Composition Mixture</td> <td style="text-align: center;">Flow rate</td> </tr> <tr> <td>GTAW</td> <td style="text-align: center;">Argon</td> <td style="text-align: center;">99.995%</td> <td style="text-align: center;">20-40 CFH</td> </tr> <tr> <td>Shielding</td> <td style="text-align: center;">None</td> <td></td> <td></td> </tr> <tr> <td>Trailing</td> <td style="text-align: center;">None</td> <td></td> <td></td> </tr> <tr> <td>Backing</td> <td style="text-align: center;">Argon</td> <td style="text-align: center;">99.995%</td> <td style="text-align: center;">**</td> </tr> </table>		Gas(es)	Percent Composition Mixture	Flow rate	GTAW	Argon	99.995%	20-40 CFH	Shielding	None			Trailing	None			Backing	Argon	99.995%	**
	Gas(es)	Percent Composition Mixture	Flow rate																		
GTAW	Argon	99.995%	20-40 CFH																		
Shielding	None																				
Trailing	None																				
Backing	Argon	99.995%	**																		

<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current AC or DC <u>Below</u> Polarity <u>Below</u> Amps (Range) <u>Below</u> Volts (Range) <u>Below</u>  (Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)  Tungsten Electrode Size and Type <u>EWTh-2 3/32" or 1/8"</u> Mode of Metal Transfer for GMAW <u>N/A</u> Electrode Wire feed speed range <u>N/A</u>	** Prior to welding, purge with 6 – 8 volume changes of Argon @ 20 – 40 CFH. During welding, continue to purge @ 10-20 CFH to minimize back pressure until weld is completed or a minimum of 1/4" weld is deposited. O2 < .5% in purge area.  (Pure Tungsten, 2% Thoriated, etc.)  (Spray arc, short circuiting arc, etc.)
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<b>TECHNIQUE (QW-410)</b> String or Weave Bead <u>GTAW- string or weave</u> Orifice or Gas Cup Size <u>GTAW: #4 - #12</u> Initial and Interpass Cleaning (Brushing, Grinding, etc.) <u>All deleterious materials shall be removed 2" both sides of weld joint by grinding or stainless steel wire brushing. Interpass cleaning with wire brush, chipping hammer or pneumatic scaling gun required.</u> Method of Back Gouging <u>N/A for GTAW single side open root stringer deposit. Back gouge and/or grind second side for double side weld using the GTAW process. Use stainless steel brushes for cleaning.</u> Contact to Tube Work Distance <u>N/A</u> Multiple or Single Pass (per side) <u>Multiple</u> Multiple or Single Electrodes <u>Single</u> Travel Speed (Range) <u>See Below</u> Peening <u>None</u> Other <u>Pulsing amps: None</u>	
--	--

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other Max. J/in.
		Class	Dia.	Type Polar.	Amp Range			
Root	GTAW	ER308L	1/16", 3/32"	DC/SP	80-200	12-25	Manual	
Hot pass			1/8"	DC/SP	120-250	18-25	Manual	
Fill								

UCS Approved  
 Date 9/17/12

**WELD PROCEDURE SPECIFICATION (WPS) JOINT DESIGNS**  
(Page 3 of 3)

WPS No.: 5007-A Date: 3-30-09 Rev. No.: 3 Date: 9-7-12

**JOINTS (QW-402)**

<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>No backing</u>	Backing: <u>No backing</u>
Root opening: <u>3/32" - 3/16"</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>1/8" Max</u>	Root face: <u>1/8" Max</u>

<b>Single-V groove: GTAW</b>	<b>Single bevel groove: GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>Backgouged &amp; welded</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>1/4" Max.</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>45 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>3/16" Max.</u>

<b>Double bevel groove: GTAW</b>	<b>Single J groove: 3/8" J GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>50 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>

<b>Double V groove: GTAW</b>	<b>Single U groove: 3/4" U GTAW</b>
Backing: <u>Backgouged &amp; welded</u>	Backing: <u>No backing</u>
Root opening: <u>1/4" Max.</u>	Root opening: <u>3/32" - 3/16"</u>
Groove angle: <u>45 deg. Min. included</u>	Groove angle: <u>15 deg. Min. included</u>
Root face: <u>3/16" Max.</u>	Root face: <u>1/8" Max</u>


**Single or double fillet weld: GTAW**

Backing: Base metal

Root opening: 3/16" Max.

Weld size: See drawings

- 1) Alternate weld joint designs may be shown on the drawings or engineering specifications and will take precedence.
- 2) Initial and interpass cleaning is shown on page 2 of the WPS.
- 3) Preheat shall be maintained during all thermal cutting, tacking and backgouging operations as shown on the WPS.
- 4) Welds shall be cleaned as required on page 2 of the WPS.

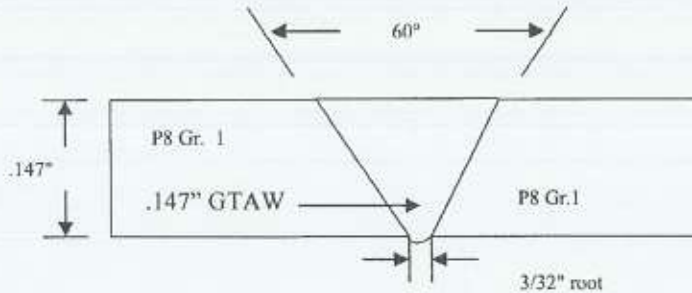
Prepared By: <u>Tim Morris</u>	Approved By: 	Date: <u>9-17-12</u>
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UCS  
QC Approved  
By: RH  
Date: 9-17-12

**QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)**  
 (See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)  
 Record Actual Conditions Used to Weld Test Coupon.

Company Name UNITED CONTRACTING SERVICES INC.  
 Procedure Qualification Record No. 5007-A Date 10-1-10  
 WPS No. 5007-A  
 Welding Process(es) GAS TUNGSTEN ARC WELDING (GTAW)  
 Types (Manual, Automatic, Semi-auto.) Manual - Both processes

**JOINTS (QW-402)**



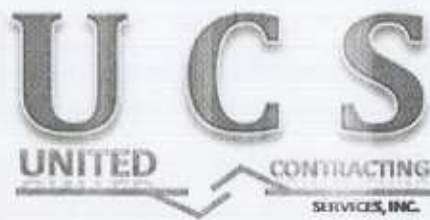
Groove Design of Test Coupon

\*(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

<b>BASE METALS (QW-403)</b> Material Spec. <u>SA-312 to SA-312</u> Type or Grade <u>304 to 304</u> P No. <u>P 8 Gr. 1 to P 8 Gr. 1</u> Thickness of Test Coupon <u>.147"</u> Diameter of Test Coupon <u>0.840"</u> Other <u>Qualifies T thk. 1/16" - 0.294"</u>  <u>Qualifies GTAW t thk. 0.294" max.</u> <u>Max. bead thk. &lt; 1/2"</u>		<b>POSTWELD HEAT TREATMENT (QW-407)</b> Temperature <u>As Welded</u> Time <u>N/A</u> Other _____  <b>GAS (QW-408)</b> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th align="center" colspan="2">Percent Composition</th> <th></th> </tr> <tr> <th></th> <th align="center">Gas(es)</th> <th align="center">(Mixture)</th> <th align="center">Flow rate</th> </tr> </thead> <tbody> <tr> <td>Shielding</td> <td align="center"><u>Argon</u></td> <td align="center"><u>99.995%</u></td> <td align="center"><u>30 CFH</u></td> </tr> <tr> <td>Trailing</td> <td align="center"><u>None</u></td> <td></td> <td></td> </tr> <tr> <td>Backing</td> <td align="center"><u>Argon</u></td> <td align="center"><u>99.995%</u></td> <td align="center"><u>25 CFH</u></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Percent Composition				Gas(es)	(Mixture)	Flow rate	Shielding	<u>Argon</u>	<u>99.995%</u>	<u>30 CFH</u>	Trailing	<u>None</u>			Backing	<u>Argon</u>	<u>99.995%</u>	<u>25 CFH</u>	Other			
	Percent Composition																										
	Gas(es)	(Mixture)	Flow rate																								
Shielding	<u>Argon</u>	<u>99.995%</u>	<u>30 CFH</u>																								
Trailing	<u>None</u>																										
Backing	<u>Argon</u>	<u>99.995%</u>	<u>25 CFH</u>																								
Other																											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;"></th> <th style="width:70%;">GTAW</th> </tr> </thead> <tbody> <tr> <td>SFA Specification</td> <td align="center"><u>5.9</u></td> </tr> <tr> <td>AWS Classification</td> <td align="center"><u>ER308L</u></td> </tr> <tr> <td>Filler metal F-No.</td> <td align="center"><u>6</u></td> </tr> <tr> <td>Weld Metal Analysis A-No.</td> <td align="center"><u>8</u></td> </tr> <tr> <td>Size of Filler Metal</td> <td align="center"><u>1/8"</u></td> </tr> <tr> <td>Other</td> <td></td> </tr> <tr> <td></td> <td align="center"><u>Solid bare wire</u></td> </tr> <tr> <td></td> <td align="center"><u>No flux addition</u></td> </tr> <tr> <td>Weld Metal Thickness</td> <td align="center"><u>0.147"</u></td> </tr> <tr> <td></td> <td align="center"><u>Consumable inserts- None</u></td> </tr> </tbody> </table>			GTAW	SFA Specification	<u>5.9</u>	AWS Classification	<u>ER308L</u>	Filler metal F-No.	<u>6</u>	Weld Metal Analysis A-No.	<u>8</u>	Size of Filler Metal	<u>1/8"</u>	Other			<u>Solid bare wire</u>		<u>No flux addition</u>	Weld Metal Thickness	<u>0.147"</u>		<u>Consumable inserts- None</u>	<b>ELECTRICAL CHARACTERISTICS (QW-409)</b> Current <u>GTAW &amp; SMAW: DC</u> Polarity <u>GTAW- Straight</u> Amps <u>GTAW- 112</u> Volts <u>GTAW- 19</u> Tungsten Electrode Size <u>EWTh-2 1/8" dia.</u> Pulsing Amps <u>None</u> J/in. Qualified ( CVN's) _____ Other _____			
	GTAW																										
SFA Specification	<u>5.9</u>																										
AWS Classification	<u>ER308L</u>																										
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Weld Metal Thickness	<u>0.147"</u>																										
	<u>Consumable inserts- None</u>																										
<b>POSITION (QW-405)</b> Position of Groove <u>6G</u> Weld Progression (Uphill, Downhill) <u>Vertical up</u> Other _____		<b>TECHNIQUE (QW-410)</b> Travel Speed <u>10 IPM</u> String or Weave Bead <u>GTAW - Slight Weave</u> Oscillation <u>None</u> Multipass or Single Pass (per side) <u>Multipass</u> Single or Multiple Electrodes <u>Single</u> Other _____																									
<b>PREHEAT (QW-406)</b> Preheat Temp. (min.) <u>60°F ambient temp.</u> Interpass Temp. (max.) <u>350°F</u> Other _____																											

UCS  
QC Approved  
By [Signature]  
Date 9-17-12





UCS JOB NO. S-4248

## Section 6

Welder Qualification Records

JOB: S-4248-02

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**  
(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name Jorge Pando JR

Identification No. JP

**TEST DESCRIPTION**

Identification of WPS followed 5011-A  
Specification of base metal(s) SA106B

Test Coupon  Production Weld  
Thickness 0.322"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)		Actual values	Range Qualified
Welding Process(es)		GMAW/FCAW	GMAW/FCAW
Type (i.e.: manual, semi-auto) used		SEMI-AUTO	SEMI-AUTO
Backing (metal, weld metal, double-welded, etc.)		NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)		8.625"	2 5/8" AND GREATER
Base metal P or S-Number to P- or S Number		P1	P1 thru P11 & P4X
Filler metal or electrode specification(s) (SFA) (info only)		5.18/5.20	
Filler metal or electrode classification(s) (info only)		ER70S-6/E71T-1M	
Filler metal F-Numbers		F6	F6
Consumable Insert (GTAW or PAW)		NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)		SOLID	SOLID
Deposit thickness for each process		-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		0.125"	0.250" MAX
Process 2: <u>FCAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		0.200"	.644" MAX
Position qualified (2G, 6G, 3F, etc.)		6G	ALL
Vertical progression (uphill or downhill)		3G	3G/1G
Type of fuel gas (OFW)		N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)		N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)		GLOBULAR	GLOBULAR
GTAW current type/polarity (AC, DCEP, DCEN)		DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

- Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5 (b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
 Macro examination (QW-184) N/A Fillet size (in.) x Concavity/convexity (in.) N/A  
 Other Tests N/A

Film or Specimens evaluated by Tyler Warrington Company American piping inspectors, Inc  
 Mechanical tests conducted by \_\_\_\_\_ Laboratory Tests 53834  
 Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 7/06/12

Certified by Robert Kirk

UCS  
QC Approved  
By \_\_\_\_\_  
Date 7/6/12

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name ERNESTO MERCADO

Identification No. EM

**TEST DESCRIPTION**

Identification of WPS followed SA-1-1  Test Coupon  Production Weld  
Specification of base metal(s) SA36 Thickness 0.5"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	SAW	SAW
Type (i.e.: manual, semi-auto) used	AUTO	AUTO
Backing (metal, weld metal, double-welded, etc.)	DOUBLE WELDED	WITH
<input checked="" type="checkbox"/> Plate <input type="checkbox"/> Pipe (enter diameter if pipe or tube)	0.5"	MAX TO BE WELDED
Base metal P or S-Number to P- or S Number	P1	P1 thru P15F, P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.17	
Filler metal or electrode classification(s) (info only)	EH11K	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process	-----	-----
Process 1: <u>SAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.5"	MAX TO BE WELDED
Process 2: _____ 3 layers minimum <input type="checkbox"/> yes <input type="checkbox"/> no	-----	-----
Position qualified (2G, 6G, 3F, etc.)	1G	1G
Vertical progression (uphill or downhill)	-----	-----
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	N/A	N/A
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
Macro examination (QW-184) N/A Fillet size (in.)    x    Concavity/convexity (in.) N/A  
Other Tests N/A

Film or Specimens evaluated by KEVIN JOHNSTON Company AMERICAN PIPING INSP.  
Mechanical tests conducted by \_\_\_\_\_ Laboratory Tests 145616  
Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 08/23/2014

Certified by JUSTON W. DAVIS

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**  
(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name ERNESTO MERCADO

Identification No. EM

**TEST DESCRIPTION**

Identification of WPS followed 5011-A  Test Coupon  Production Weld  
Specification of base metal(s) SA106B Thickness 0.280"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GMAW/FCAW	GMAW/FCAW
Type (i.e.: manual, semi-auto) used	SEMI-AUTO	SEMI-AUTO
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	6"	2 7/8" AND GREATER
Base metal P or S-Number to P- or S Number	P1	P1 thru P15F,P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18/5.17	
Filler metal or electrode classification(s) ( info only)	ER70S-6/E71-T	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID/CORED	SOLID/CORED
Deposit thickness for each process	-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	0.125"	0.25" MAX
Process 2: <u>FCAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.375"	0.75" MAX
Position qualified (2G, 6G, 3F, etc.)	6G	ALL POSITIONS
Vertical progression (uphill or downhill)	UPHILL	UPHILL
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	GLOB.	GLOB.
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

- Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5 (b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld – fracture test (QW-180) N/A Length and percent of defects N/A  
 Macro examination (QW-184) N/A Fillet size (in.)    x    Concavity/convexity (in.) N/A  
 Other Tests N/A

Film or Specimens evaluated by JACK HENSON Company API, INC.  
 Mechanical tests conducted by N/A Laboratory Tests 140594  
 Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 08/12/2015

Certified by JUSTON DAVIS

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name ERNESTO MERCADO

Identification No. EM

**TEST DESCRIPTION**

Identification of WPS followed 5012A  Test Coupon  Production Weld  
Specification of base metal(s) SA106B Thickness 0.322"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GTAW	GTAW
Type (i.e.: manual, semi-auto) used	MANUAL	MANUAL
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	8"	2 7/8" AND GREATER
Base metal P or S-Number to P- or S Number	P1	P1 thru P15F,P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18	
Filler metal or electrode classification(s) ( info only)	ER70S6	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process	-----	----
Process 1: <u>GTAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.322"	0.644" MAX
Process 2: _____ 3 layers minimum <input type="checkbox"/> yes <input type="checkbox"/> no	----	----
Position qualified (2G, 6G, 3F, etc.)	6G	ALL POSITIONS
Vertical progression (uphill or downhill)	UPHILL	UPHILL
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	N/A	N/A
GTAW current type/polarity (AC, DCEP, DCEN)	DCEN	DCEN

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

Bend Test  Transverse Root and Face [QW-462.5(a)]  Longitudinal Root and Face [QW-462.5(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5 (b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
Macro examination (QW-184) N/A Fillet size (in.)    x    Concavity/convexity (in.) N/A  
Other Tests N/A

Film or Specimens evaluated by JACK LLOYD Company API, INC.  
Mechanical tests conducted by \_\_\_\_\_ Laboratory Tests 148769  
Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 09/10/2015

Certified by JUSTON DAVIS 

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name Saul Medina

Identification No. SM

**TEST DESCRIPTION**

Identification of WPS followed 5008-A  
Specification of base metal(s) SA106B

Test Coupon  Production Weld  
Thickness 0.109"

**TESTING CONDITIONS & QUALIFICATIONS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GTAW	GTAW
Type (i.e.: manual, semi-auto) used	MANUAL	MANUAL
Backing (metal, weld metal, double-welded, etc.)	NONE	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	0.840"	0.840" & GREATER
Base metal P or S-Number to P- or S Number	P1	P1-P15E, P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18	
Filler metal or electrode classification(s) ( info only)	ER70S-6	
Filler metal F-Numbers	6	6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process		
Process 1: <u>GTAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.109"	0.218" MAX
Process 2: <u>---</u> 3 layers minimum <input type="checkbox"/> yes <input type="checkbox"/> no	N.A.	N.A.
Position qualified (2G, 6G, 3F, etc.)	6G	ALL
Vertical progression (uphill or downhill)	UPHILL	UPHILL
Type of fuel gas (OFW)	N.A.	N.A.
Inert gas backing (GTAW, PAW, GMAW)	N.A.	N.A.
Transfer mode (spray/globular or pulse to short circuit-GMAW)	N.A.	N.A.
GTAW current type/polarity (AC, DCEP, DCEN)	DCEN	DCEN

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result
FACE	ACCEPTABLE	FACE	ACCEPTABLE		
ROOT	ACCEPTABLE	ROOT	ACCEPTABLE		

Alternative radiographic examination results (QW-191) N/A

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A

Macro examination (QW-184) N/A Fillet size (in.)     x     Concavity/convexity (in.) N/A

Other Tests N/A

Film or Specimens evaluated by John Phillips Company Tulsa Gamma Ray, Inc.

Mechanical tests conducted by John Phillips Laboratory Tests 102129137

Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Date 11/10/10

Organization UNITED CONTRACTING SERVICES

By [Signature]

UCS  
QC Approved  
By [Signature]  
Date 11/10/10

# United Contracting Services INC.

2716 E Apache ST  
PH 918.551-7659

Tulsa OK, 74110  
FX 918.561-6027

## QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPO)

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name Saul Media

Identification No. SM

### TEST DESCRIPTION

Identification of WPS followed 5006-A  Test Coupon  Production Weld  
Specification of base metal(s) SA106B to SA312 304  
Thickness .462

### TESTING VARIABLES & QUALIFICATION LIMITS

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GTAW	GTAW
Type (i.e.: manual, semi-auto) used	MANUAL	MANUAL
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	3.5"	2 7/8" AND GREATER
Base metal P or S-Number to P- or S Number	P1 TO P8	P1 thru P15F, P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.9	
Filler metal or electrode classification(s) ( info only)	309	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process	-----	----
Process 1: <u>GTAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.432"	0.864" MAX
Process 2: _____ 3 layers minimum <input type="checkbox"/> yes <input type="checkbox"/> no	----	----
Position qualified (2G, 6G, 3F, etc.)	6G	ALL POSITIONS
Vertical progression (uphill or downhill)	UPHILL	UPHILL
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	N/A	N/A
GTAW current type/polarity (AC, DCEP, DCEN)	DCEN	DCEN

### RESULTS

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result
SIDE	ACCEPTABLE	SIDE	ACCEPTABLE		
SIDE	ACCEPTABLE	SIDE	ACCEPTABLE		

Alternative radiographic examination results (QW-191) N/A

Fillet weld - fracture test (QW-180) N/A

Length and percent of defects N/A

Macro examination (QW-184) N/A

Fillet size (in.) \_\_\_\_\_ x \_\_\_\_\_

Concavity/convexity (in.) N/A

Other Tests N/A

Film or Specimens evaluated by JOHN PHILLIPS

Company TULSA GAMMA RAY, Inc.

Mechanical tests conducted by JOHN PHILLIPS

Laboratory Tests 1028905

Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 7/30/10

Certified by Robert Kirk

UCS  
QC Approved  
By \_\_\_\_\_  
Date 7/29-10

## QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name Saul Medina

Identification No. SM

### TEST DESCRIPTION

Identification of WPS followed 5011A-HT (PQR)  
 Specification of base metal(s) SA-516-60/70

Test Coupon  Production Weld  
 Thickness 0.75"

### TESTING VARIABLES & QUALIFICATION LIMITS

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GMAW/FCAW	GMAW/FCAW
Type (i.e.: manual, semi-auto) used	SEMI-AUTO	SEMI-AUTO
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input checked="" type="checkbox"/> Plate <input type="checkbox"/> Pipe (enter diameter if pipe or tube)	N/A	2 7/8" AND GREATER
Base metal P or S-Number to P- or S Number	P1	P1 thru P11 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.20 / 5.18	
Filler metal or electrode classification(s) ( info only)	ER70S-6 / E71T-1M	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID/TUBULAR	SOLID/TUBULAR
Deposit thickness for each process	-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	0.125"	0.1625" MAX
Process 2: <u>FCAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.625"	MAX to be Welded
Position qualified (2G, 6G, 3F, etc.)	6G	ALL
Vertical progression (uphill or downhill)	UPHILL	UPHILL
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	GLOB.	GLOB.
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

### RESULTS

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result
SIDE	ACCEPTABLE	SIDE	ACCEPTABLE		
SIDE	ACCEPTABLE	SIDE	ACCEPTABLE		

Alternative radiographic examination results (QW-191) N/A

Fillet weld - fracture test (QW-180) N/A

Macro examination (QW-184) N/A Fillet size (in.)        x        Length and percent of defects N/A

Other Tests N/A Concavity/convexity (in.) N/A

Film or Specimens evaluated by JOHN PHILLIPS

Company API, Inc.

Mechanical tests conducted by JOHN PHILLIPS

Laboratory Tests M150928-1B

Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 09/30/2015

Certified by Juston Davis

**United Contracting Services INC.**

2716 E Apache ST  
PH 918.551-7659

Tulsa OK, 74110  
FX 918.561-6027

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**  
(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name SAUL MEDENA

Identification No. SM

**TEST DESCRIPTION**

Identification of WPS followed 5010-A  
Specification of base metal(s) SA-106 GR.B

Test Coupon  Production Weld  
Thickness 0.75"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GMAW/SAW	GMAW/SAW
Type (i.e.: manual, semi-auto) used	MANUAL	MANUAL
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	14"	2 7/8" & GREATER
Base metal P or S-Number to P- or S Number	P1	P1 thru P15F, P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18/5.17	
Filler metal or electrode classification(s) (info only)	ER70S-6/EH11K	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process	-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	0.25"	0.5" MAX
Process 2: <u>SAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.50"	MAX TO BE WELDED
Position qualified (2G, 6G, 3F, etc.)	1G/1G	1G, 1G
Vertical progression (uphill or downhill)	-----	-----
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	GLOB.	GLOB.
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

- Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
 Macro examination (QW-184) N/A Fillet size (in.)    x    Concavity/convexity (in.) N/A  
 Other Tests N/A

Film or Specimens evaluated by KENNITH NIXON Company AMERICAN PIPING INSP.  
 Mechanical tests conducted by    Laboratory Tests 131006  
 Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 03-14-2015

Certified by JUSTON W. DAVIS

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name JOSE A. GALVAN

Identification No. JG

**TEST DESCRIPTION**

Identification of WPS followed 5011-A  Test Coupon  Production Weld  
Specification of base metal(s) SA-106 Gr. B Thickness 0.5"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GMAW/FCAW	GMAW/FCAW
Type (i.e.: manual, semi-auto) used	MANUAL	MANUAL
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	8"	2-7/8" and Greater
Base metal P or S-Number to P- or S Number	P1	P1-P11F & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18/5.17	
Filler metal or electrode classification(s) ( info only)	ER70S-6/E71-T-1M	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID	SOLID
Deposit thickness for each process	-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	0.062"	0.125" MAX
Process 2: <u>FCAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.438"	Max to be Welded
Position qualified (2G, 6G, 3F, etc.)	3G	1,2,3G
Vertical progression (uphill or downhill)	GM-DOWN/FC-UP	GM-DOWN/FC-UP
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	GLOB./SPRAY	GLOB./SPRAY
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

- Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
 Macro examination (QW-184) N/A Fillet size (in.) x Concavity/convexity (in.) N/A  
 Other Tests N/A

Film or Specimens evaluated by JACK LLOYD Company AMERICAN PIPING INSP.  
 Mechanical tests conducted by   Laboratory Tests 149189  
 Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 09/25/2015

Certified by JUSTON W. DAVIS

**QW-484A SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)**

(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name AARON SNATIAGO

Identification No. AS

**TEST DESCRIPTION**

Identification of WPS followed 5011-A  Test Coupon  Production Weld  
Specification of base metal(s) SA36 Thickness 0.375"

**TESTING VARIABLES & QUALIFICATION LIMITS**

Welding Variables (QW-350)	Actual values	Range Qualified
Welding Process(es)	GMAW/FCAW	GMAW/FCAW
Type (i.e.: manual, semi-auto) used	SEMI-AUTO	SEMI-AUTO
Backing (metal, weld metal, double-welded, etc.)	NO BACKING	WITH or WITHOUT
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	5" OD	2 7/8" AND GREATER
Base metal P or S-Number to P- or S Number	P1	P1 thru P15F, P34 & P4X
Filler metal or electrode specification(s) (SFA) (info only)	5.18/5.17	
Filler metal or electrode classification(s) ( info only)	ER70S-6/E71-T	
Filler metal F-Numbers	F6	F6
Consumable Insert (GTAW or PAW)	NONE	NONE
Filler type (solid/metal or flux cored/powdered) (GTAW or PAW)	SOLID/CORED	SOLID/CORED
Deposit thickness for each process	-----	-----
Process 1: <u>GMAW</u> 3 layers minimum <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	0.062"	0.125" MAX
Process 2: <u>FCAW</u> 3 layers minimum <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	0.313"	0.626" MAX
Position qualified (2G, 6G, 3F, etc.)	2G	1G, 2G
Vertical progression (uphill or downhill)	N/A	N/A
Type of fuel gas (OFW)	N/A	N/A
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	GLOB.	GLOB.
GTAW current type/polarity (AC, DCEP, DCEN)	DCEP	DCEP

**RESULTS**

Visual Examination of Completed Weld (QW-302.4) ACCEPTABLE

- Bend Test  Transverse Root and Face [QW-462.3(a)]  Longitudinal Root and Face [QW-462.3(b)]  Side [QW-462.2]  
 Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]  Plate bend specimen, corrosion resistant overlay [QW-462.5(d)]  
 Macro test fusion [QW-462.5(b)]  Macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result

Alternative radiographic examination results (QW-191) ACCEPTABLE

Fillet weld - fracture test (QW-180) N/A Length and percent of defects N/A  
 Macro examination (QW-184) N/A Fillet size (in.)    x    Concavity/convexity (in.) N/A  
 Other Tests N/A

Film or Specimens evaluated by Jack Henson Company API, INC.  
 Mechanical tests conducted by N/A Laboratory Tests 140594  
 Welding supervised by UNITED CONTRACTING SERVICES

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer or Contractor UNITED CONTRACTING SERVICES

Date 08/12/2015

Certified by JUSTIN DAVIS





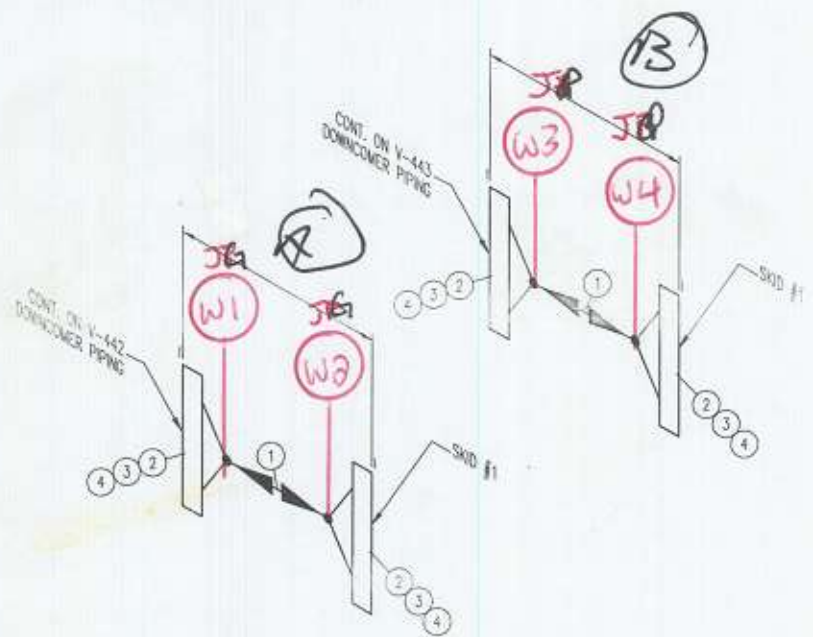
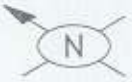
UCS JOB NO. S-4248

## Section 7

# NDE RECORDS & TRACEABILITY RECORDS

(WID, HT, & NDE Maps)

JOB: S-4248-02



BILL OF MATERIAL				
MARK	QTY	SIZE	DESCRIPTION	LENGTH
1	2		PIPE, XH SMLS, A-106-B 103560	
2	4		FLD, RFWN 600LB XH, A-105 1328	
			<del>FLD, RFWN 600LB XH, A-105</del>	
			<del>FLD, RFWN 600LB XH, A-105</del>	

J-447  
12/16/16  
IFC

**FIELD NOTE**  
PRESSURE TEST PER ASME B31.3  
IN FIELD BY OTHERS

\*\*\* = JOB #

Oct 22, 2013 - 10:57am Z:\100 - Jobs\SC6\_60MM Cryo\17.0 Drawings\REV\_A\17.4 Piping\SP00LS\Dehy Interconnect\

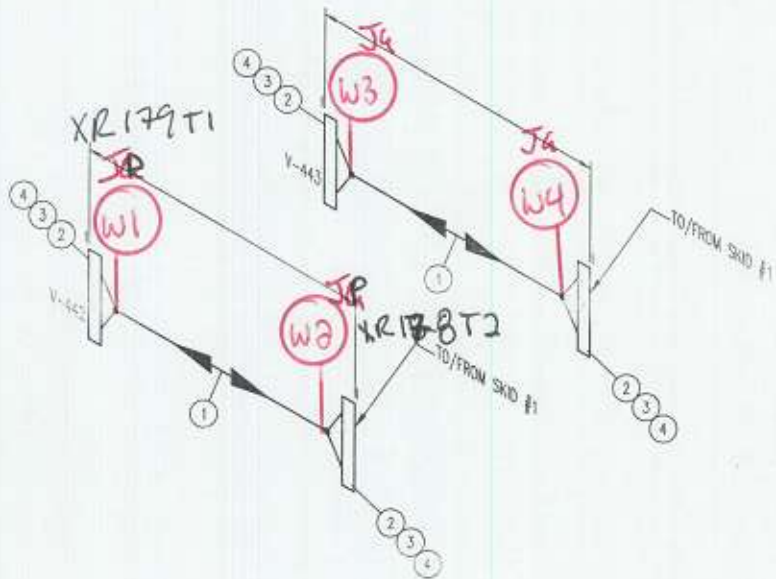
DESIGN PRESS.	1095 Psig	FAB. LOCATION	SHOP					
DESIGN TEMP.	800°F	SPOOL LOCATION	DEHY AREA					
OPER. PRESS.	910 Psig							
OPER. TEMP.	400°F	CORR. ALLOW.	.0625"					
STRESS RELIEVE	NO	INSULATION	3"H	0	ISSUE FOR CONSTRUCTION	05/03/11	PLO	LH
RADIOGRAPHY	15% NORMAL	PAINT	TRCo SYSTEM #2	NO.	REVISION	DATE	BY	APR

**CONFIDENTIAL STATEMENT**  
THIS DRAWING IS THE PROPERTY OF THE THOMAS RUSSELL CO. AND IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.

**FABRICATION NOTES:**  
ALL UNITS ARE BASED UNLESS NOTED.  
ALL FITTING MAKE-UP & CUT LENGTHS FOR BW PIPE DO NOT INCLUDE WELD GAPS.  
SHOP TO MAKE ADJUSTMENTS FOR WELD GAPS.  
ALL PIPE SEAMLESS UNLESS NOTED OTHERWISE.  
ALL COUPLING TO BE SHOULDER ON.

**Thomas Russell Co.**  
7050 S. Yale, Suite 210  
Tulsa, Oklahoma 74136  
PH: 918-481-0682

LINE NO.	104-01-CS-8" 3"H		
ASSEMBLY DRAWING	SC6-411		
FIELD DRAWING	***-222		
DRAWN BY	PLO	DATE DRAWN	04/27/11
JOB NO.	SC6	SPOOL LOC. NO.	DEHY-001
REV.			0



BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION	LENGTH
1	2		PIPE, XH-SMLS, A-106-B 103969	
2	4		FLG, RFWN 600LB XH, A-105 202742, 1328	
3	4		[REDACTED]	
4	4		[REDACTED]	

J-447  
12/16/16  
IFC

**FIELD NOTE**  
PRESSURE TEST PER ASME B31.3  
IN FIELD BY OTHERS

\*\*\* = JOB #

Oct 22, 2013 - 10:57am Z:\100 - Job\SC6\_60MM Dry\17.0 Drawings\REV\_A\17.4 Piping\SPHOOLS\Dehy Interconnect\

DESIGN PRESS.	1095 Psig	FAB. LOCATION	SHOP					
DESIGN TEMP.	600°F	SPOOL LOCATION	DEHY AREA					
OPER. PRESS.	895 Psig							
OPER. TEMP.	450°F	CORR. ALLOW.	.0625"					
STRESS RELIEVE	NO	INSULATION	3"H	0	ISSUE FOR CONSTRUCTION	05/03/11	PLO	LH
RADIOGRAPHY	15% NORMAL	PAINT	TRCo SYSTEM #2	NO.	REVISION	DATE	BY	APR

**CONFIDENTIAL STATEMENT**  
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**FABRICATION NOTES:**  
ALL UNDESIRABLE WELD FACE UNLESS NOTED.  
ALL FITTING WING-UP & OLE LENGTHS FOR SW PIPE DO NOT INCLUDE WELD GAPS.  
SHOP TO MAKE ADJUSTMENTS FOR WELD GAPS.  
ALL PIPE SEAMLESS UNLESS NOTED OTHERWISE.  
ALL COUPLING TO BE SHROUDED ON.

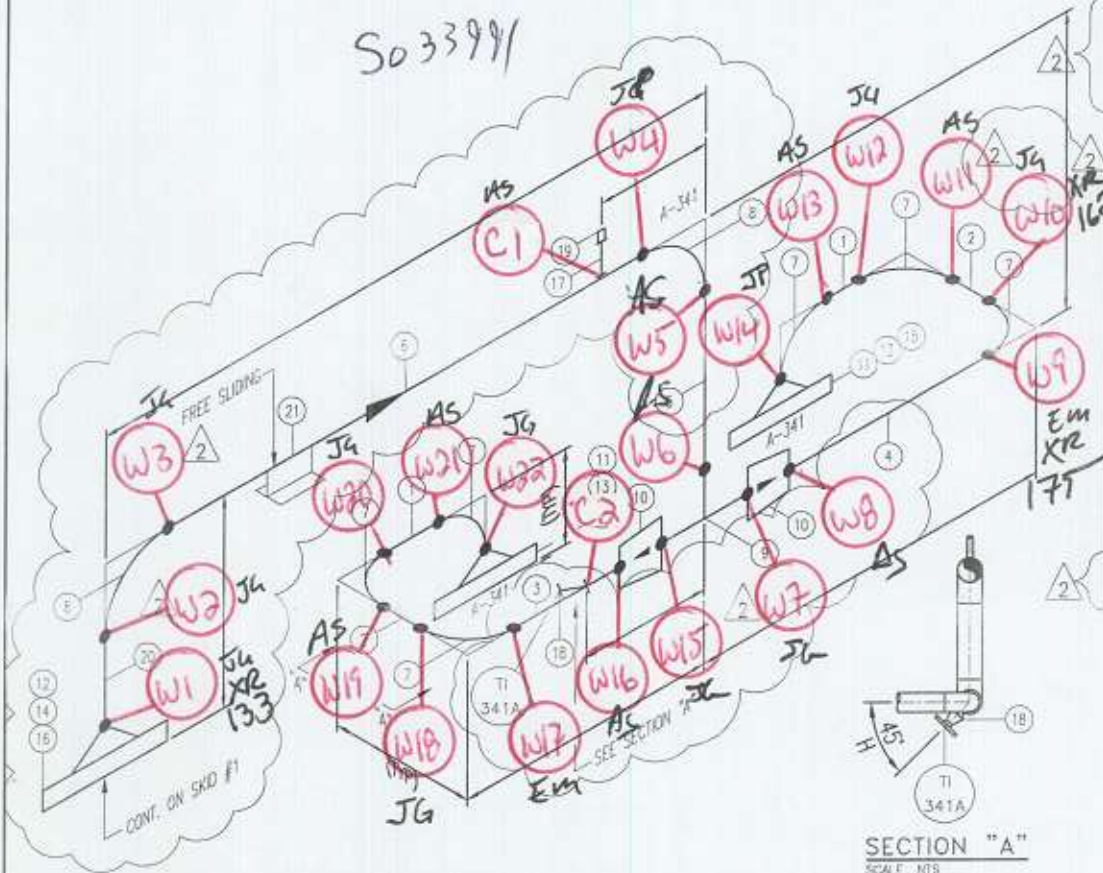
**Thomas Russell Co.**  
7050 S. Yale, Suite 210  
Tulsa, Oklahoma 74136  
PH: 918-481-5882

LINE NO.	105-D1-CS-8" 3"H
ASSEMBLY DRAWING	SC6-411
FAB DRAWING	***-222
DESIGN BY	PLO
DATE DRAWN	04/27/11
JOB No.	SC6
SPPOOL ID. No.	DEHY-002
REV.	0

SAR C47D/362 / SRI 803



S03399/



BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION	LENGTH
1	2		PIPE, XH SMLS, A-106-B 40221170	
2	2		PIPE, XH SMLS, A-106-B 40221170	
3	1		PIPE, XH SMLS, A-106-B 40221170	
4	1		PIPE, XH SMLS, A-106-B 40221170	
5	1		PIPE, XH SMLS, A-106-B 18609	
6	1		PIPE, XH SMLS, A-106-B 48789	
7	6		ELL, 90 LR XH, A-234-WPB C47D, R6306, P202	
8	2		ELL, 90 LR XH, A-234-WPB SRM220	
9	1		TEE, STR, XH, A-234-WPB JT819	
10	2		REDUCER, CONC, XH, A-234-WPB RH710C	
11	2		FLG, RTWN 600LB XH, A-105 02/04/07	
12	1		FLG, RTWN 600LB XH, A-105 080	
13	1		[REDACTED]	
14	1		[REDACTED]	
15	1		[REDACTED]	
16	1		[REDACTED]	
17	1		[REDACTED]	
18	1		CPLG, TOE x 3 1/2" LG, 3000LB FS, A-105 735K	
19	1		CPLG, TOE x 3 1/2" LG, 3000LB FS, A-105 33K	
20	1		[REDACTED]	
21	1		[REDACTED]	
22	1		[REDACTED]	
23	1		[REDACTED]	
24	1		[REDACTED]	
25	1		[REDACTED]	
26	1		[REDACTED]	
27	1		[REDACTED]	
28	1		[REDACTED]	
29	1		[REDACTED]	
30	1		[REDACTED]	

J-447  
12/16/16  
IFC

**FIELD NOTE**  
PRESSURE TEST PER ASME B31.3  
IN FIELD BY OTHERS

\*\*\* = JOB #

Dec 13, 2016 - 10:15am 2:400 - Drafting\001-PROJECTS\445-DEHY DRAWINGS\400-Piping\SPOOLS\DEHY\_AREA\_PIPING\

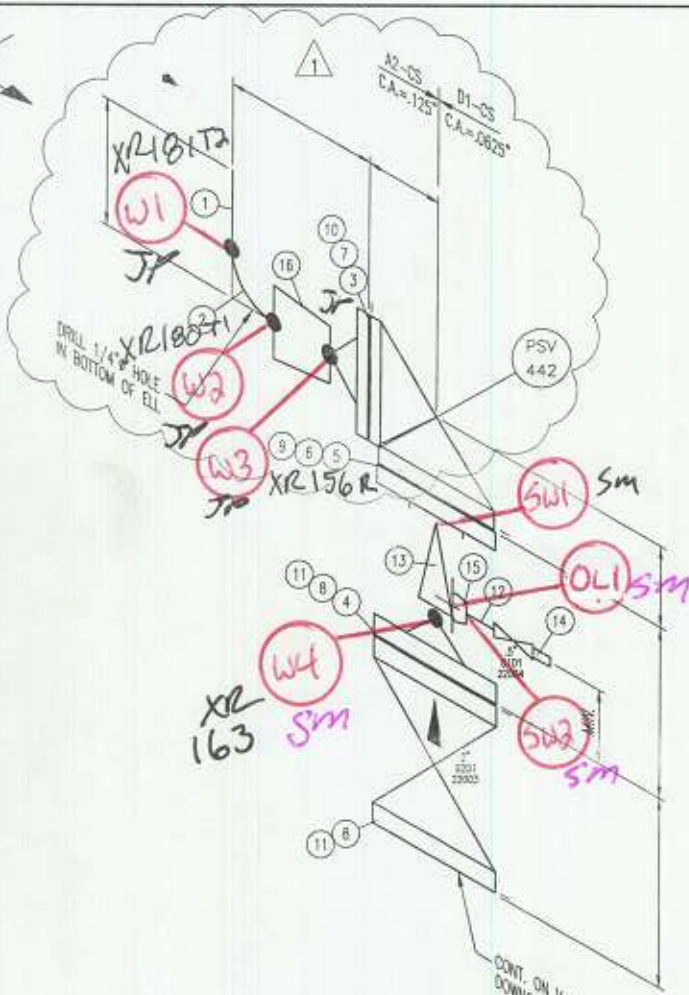
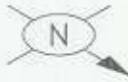
DESIGN PRESS.	1095 Psig	FAB. LOCATION	SHOP				
DESIGN TEMP.	600°F	SPOOL LOCATION	DEHY AREA				
OPER. PRESS.	937 Psig			2	REVISED TO MOVE PIPING FOR ACCESS TO A-341	12/13/16	MSD LH
OPER. TEMP.	450°F	CORR. ALLOW.	.0625"	1	REVISED TO EDIT ITEM #2 & #5	10/27/14	DV BL
STRESS RELIEVE	NO	INSULATION	3"H	0	ISSUE FOR CONSTRUCTION	05/03/11	PLO LH
RADIOGRAPHY	15% NORMAL	PAINT	TRCo SYSTEM #2	NO.	REVISION	DATE	BY

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THIS DRAWING IS THE PROPERTY OF THE THOMAS RUSSELL CO. AND IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.  
**FABRICATION NOTES:**  
ALL VALUES ARE ROUNDED UP UNLESS NOTED.  
ALL FITTING MAKE-UP & CUT LENGTHS FOR END PIPE DO NOT INCLUDE WELD GAPS.  
SHOP TO MAKE ADJUSTMENTS FOR WELD GAPS.  
ALL PIPE SEAMLESS UNLESS NOTED OTHERWISE.  
ALL COUPLING TO BE SHIPPER ON.

**Thomas Russell Co.**  
7050 S. Yale, Suite 210  
Tulsa, Oklahoma 74136  
PH: 918-461-5682

LINE NO.	128-D1-CS-4" 3"H
ASSEMBLY DRAWING	SC6-411
FIELD DRAWING	***-223
DRAWN BY	PLO
DATE DRAWN	04/27/11
JOB NO.	SC6
SPOOL ID. NO.	DEHY-003
REV.	2





BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION	LENGTH
1	1		PIPE, STD SMLS, A-106-B 351762	
2	1		ELL, 90 LR STD, A-234-WPB E406	
3	1		FLG, RFWN 150LB STD, A-105	
4	1		FLG, RFWN 600LB XH, A-105 492	
5	1		FLG, RFSW 600LB S/160, A-105 937	
6	1		FLG, RFSW 600LB S/160, A-105 102T	
7	1		[REDACTED]	
8	1		[REDACTED]	
9	1		[REDACTED]	
10	1		[REDACTED]	
11	1		[REDACTED]	
12	1		[REDACTED]	
13	1		NPPLE, S/160 SMLS, A-106-B POE-TQE 07407	
14	1		SWAGE, CONC, XH-S/160, A-106-B BLE-PSE 7437	
15	1		SDL, 3000LB FS, A-105 59983	
16	1		REDUCER, CONC STD, A-234-WPB 5702C	

J-447  
12/16/16  
IFC

**FIELD NOTE**  
PRESSURE TEST PER ASME B31.3  
IN FIELD BY OTHERS

\*\*\* = JOB #

Oct 22, 2013 - 10:57am Z:\100 - Jobs\SC6\_80MM Dyo\17.0 Drawings\REV\_A\17.4 Piping\SPOOL5\Dehy Interconnect

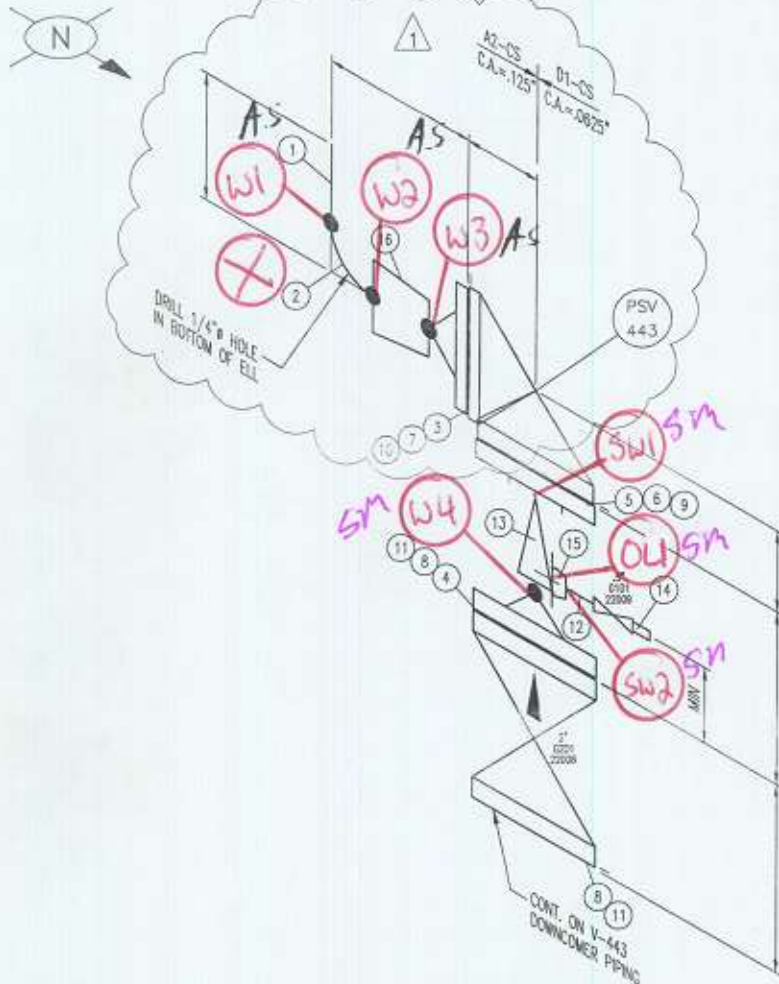
DESIGN PRESS.	1095 Psig	FAB. LOCATION	SHOP					
DESIGN TEMP.	600°F	SPOOL LOCATION	DEHY AREA					
OPER. PRESS.	910 Psia							
OPER. TEMP.	400°F	CORR. ALLOW.	NOTED	1	REV. PSV OUTLET PIPING	10/21/13	MSD	KK
STRESS RELIEVE	NO	INSULATION	3"H	0	ISSUE FOR CONSTRUCTION	05/03/11	PLD	LH
RADIOGRAPHY	15% NORMAL	PAINT	TRCo SYSTEM #2	NO.	REVISION	DATE	BY	APR

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**FABRICATION NOTES:**  
ALL WELDS ARE TACKLE UNLESS NOTED.  
ALL FITTING MAKE-UP & CUT LENGTHS FOR ON PIPE DO NOT INCLUDE WELD GAPS.  
SHOP TO MAKE ADJUSTMENTS FOR WELD GAPS.  
ALL PIPE SEAMLESS UNLESS NOTED OTHERWISE.  
ALL COMPANIES TO BE SHOPPED ON.

**Thomas Russell Co.**  
7050 S. Yale, Suite 210  
Tulsa, Oklahoma 74136  
PH: 918-461-5682

LINE No.	PSV-442
ASSEMBLY DRAWING	SC6-411
PIC# DRAWING	***-222
DRAWN BY	PLD
DATE DRAWN	04/29/11
JOB No.	SC6
SPOOL LINE No.	DEHY-005
REV.	1



BILL OF MATERIAL				
MARK	QTY	SIZE	DESCRIPTION	LENGTH
1	1		PIPE, STD SMLS, A-106-B H # 357762	
2	1		ELL, 90 LR STD, A-234-WPB E406	
3	1		FLG, RFWN 150LB STD, A-105	
4	1		FLG, RFWN 600LB XH, A-105 556	
5	1		FLG, RFSW 600LB S/160, A-105 580	
6	1		[REDACTED]	
7	1		[REDACTED]	
8	1		[REDACTED]	
9	1		[REDACTED]	
10	1		[REDACTED]	
11	1		[REDACTED]	
12	1		[REDACTED]	
13	1		NIPPLE, S/160 SMLS, A-106-B PCE-TCE 07407	
14	1		SWAGE, CONC, XH-S/160, A-106-B BLE-PSE 74136	
15	1		SOL, 3000LB FS, A-105 59983	
16	1		REDUCER, CONC STD, A-234-WPB 5702C	

J-447  
12/16/16  
IFC

**FIELD NOTE**  
PRESSURE TEST PER ASME B31.3  
IN FIELD BY OTHERS

\*\*\* = JOB #

Oct 22, 2013 - 10:57am Z:\100 - Jobs\SC6\_60MM Cryo\17.0 Drawings\REV\_A\17.4 Piping\SP00LS\Dehy Interconnect\

DESIGN PRESS.	1095 Psig	FAB. LOCATION	SHOP					
DESIGN TEMP.	600 °F	SPOOL LOCATION	DEHY AREA					
OPER. PRESS.	910 Psia							
OPER. TEMP.	400 °F	CORR. ALLOW.	NOTED	1	REV. PSV OUTLET PIPING	10/21/13	MSD	KK
STRESS RELIEVE	NO	INSULATION	3"H	0	ISSUE FOR CONSTRUCTION	05/03/11	PLD	LH
RADIOGRAPHY	15% NORMAL	PAINT	TRCo SYSTEM #2	NO.	REVISION	DATE	BY	APR

**CONFIDENTIAL STATEMENT**  
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**FABRICATION NOTES:**  
ALL WELDS ARE BEADED FACE UNLESS NOTED.  
ALL FITTING MAKE-UP & CUT LENGTHS FOR SW PIPE DO NOT INCLUDE WELD GAPS.  
SHOP TO MAKE ADJUSTMENTS FOR WELD GAPS.  
ALL PIPE SEAMLESS UNLESS NOTED OTHERWISE.  
ALL COUPLING TO BE SABLED ON.

**Thomas Russell Co.**  
7050 S. Yale, Suite 210  
Tulsa, Oklahoma 74136  
PH: 918-481-5662

LIN. NO.	PSV-443
ASSEMBLY DRAWING	SC6-411
P&ID DRAWING	***-222
DRAWN BY	PLD
DATE DRAWN	04/29/11
JOB NO.	SC6
SPOOL L.S. NO.	DEHY-006
REV.	1

Gamma Type: Ir192 Film Brand: Agfa Client: UCS Date: 3-23-17  
 Curies: 50 Film Type: D3 Job #: 4248, J447 DEHY IRISNDT #: \_\_\_\_\_  
 EFSS: 14 #Film/cassette: 1 Location: Tulsa P.O. #: \_\_\_\_\_  
 Code: B31.3 Item Inspected: \_\_\_\_\_  
 Material: \_\_\_\_\_

Film ID	Interval	Size, Thickness	Welder ID	IQI	S.O.D. Inches	O.F.D. Inches	Density	Technique	Type and Location of Discontinuities (rejectable discontinuities in square brackets [ ])	(A)cept (R)ject
XR-133	T 2 2 3 3 T	4" .337	JG	1SF	4 1/2"	337	2.4	RT3		A
XR-142	T 2 2 3 3 T		JB							
XR-149	T 2 2 3 3 T	4" .237	JP	1SF		.237				
XR-156	T 2 2 3 3 T	3.5 .216	JP		3 1/2"	216				
XR-162	T 2 2 3 3 T	3" .300	JG	1SF		.300				
XR-163	T 2 2 3 3 T	2" .216	SM	1SF	2 3/4"	216				
XR-173	T 2 2 3 3 T	4" .237	JP		4 1/2"	237		P		R A
XR-175	T 2 2 3 3 T	3" .300	FM	1SF	3 1/2"	.300		P		R A
XR-176	T 2 2 3 3 T		AS							

RT Techniques: Exposure Viewing Technique S.O.D. = Source-to-object distance O.F.D. = Distance from source side of object to film  
 S.W.E S.W.V 1, 2, 2A, 6, 7  
 D.W.E S.W.V 3, 3A  
 D.W.E D.W.V 4, 5, 8  
 AB - Arc Burns BT - Burn Through CK - Crack EP - Excessive Penetration P - Porosity EI - Elongated Indication  
 EUC - External Undercut IUC - Internal Undercut HB - Hollow Bead IP - Incomplete Penetration S - Slag  
 IC - Internal Concavity LF - Lack of Fusion LC - Low Cover MA - Misalignment TI - Tungsten Inclusion

Unit: 700 Miles: \_\_\_\_\_  
 In: \_\_\_\_\_ Out: \_\_\_\_\_ Hrs: \_\_\_\_\_  
 In: \_\_\_\_\_ Out: \_\_\_\_\_ Hrs: \_\_\_\_\_  
 Personnel: Chris Ceb  
Don Loh  
 Film Quantity:  
 3 1/2 x 8 1/2 /10 \_\_\_\_\_  
 3 1/2 x 17 \_\_\_\_\_  
 4 1/2 x 8 1/2 /10 \_\_\_\_\_  
 4 1/2 x 17 \_\_\_\_\_  
 7 x 17 \_\_\_\_\_  
 14 x 17 \_\_\_\_\_  
 8 x 10 \_\_\_\_\_  
 Interpretation by: Chris Ceb SNF-TC-1A II  
 (Print) ASNT II  
 (Level) CERT # 1044  
 Client Representative: JWD  
 (Print) I am in full agreement with report contents (Sign) JWD

Gamma Type: TH92 Film Brand: Agfa Fu 1  
 Series: 609 Film Type: DB 80  
 EFSS: 14 #Film/cassette: 4  
 Code: B31.3  
 Material: \_\_\_\_\_

Client: UCS Date: 3-30-17  
 Job #: 4248 - JH47 DEHY IRISNDT #: 1403  
 Location: Tulsa P.O. #: \_\_\_\_\_  
 Item Inspected: \_\_\_\_\_

Film ID	Interval	Size, Thickness	Welder ID	IQI	S.O.D. Inches	O.F.D. Inches	Density	Technique	Type and Location of Discontinuities (rejectable discontinuities in square brackets [ ])	(A)cept (R)reject
<u>KR156R</u>	<u>8-T</u>	<u>3" 216</u>	<u>JP</u>	<u>12F</u>	<u>36"</u>	<u>216</u>	<u>2.4</u>	<u>T3</u>		<u>A</u>
<u>KR173E</u>	<u>2</u>	<u>4" 237</u>	<u>JP</u>	<u>11</u>	<u>46"</u>	<u>237</u>			<u>SL</u>	<u>R</u>
	<u>3</u>									
	<u>3</u>									
<u>KR170E1</u>	<u>2</u>	<u>8" 500</u>	<u>JP</u>	<u>RF</u>	<u>97%</u>	<u>500</u>				
	<u>3</u>									
	<u>3</u>									
<u>KR179T2</u>	<u>2</u>		<u>JP</u>							
	<u>3</u>									
	<u>3</u>									
<u>KR180T1</u>	<u>2</u>	<u>4" 237</u>	<u>JP</u>	<u>12F</u>	<u>46"</u>	<u>237</u>				<u>R</u>
	<u>3</u>							<u>LF</u>		<u>R</u>
	<u>3</u>							<u>LF</u>		<u>R</u>
<u>KR181T2</u>	<u>2</u>		<u>JP</u>							<u>R</u>
	<u>3</u>									<u>A</u>
	<u>3</u>							<u>LF</u>		<u>R</u>
<u>KR149</u>	<u>2</u>		<u>JP</u>							<u>A</u>
	<u>3</u>									
	<u>3</u>									
<u>KR163</u>	<u>2</u>	<u>2" 218</u>	<u>Sm</u>		<u>27%</u>	<u>218</u>				
<u>KR176</u>	<u>3-T</u>	<u>3" 300</u>	<u>AS</u>		<u>36"</u>	<u>300</u>				

RT Techniques: Exposure Viewing Technique S.O.D. = Source-to-object distance O.F.D. = Distance from source side of object to film

AB - Arc Burns BT - Burn Through CK - Crack EP - Excessive Penetration P - Porosity EI - Elongated Indication

EUC - External Undercut IUC - Internal Undercut HB - Hollow Bead IP - Incomplete Penetration S - Slag

IC - Internal Concavity LF - Lack of Fusion LC - Low Cover MA - Misalignment TI - Tungsten Inclusion

Unit: \_\_\_\_\_ Miles: \_\_\_\_\_  
 In: \_\_\_\_\_ Out: \_\_\_\_\_ Hrs: \_\_\_\_\_  
 Personnel: \_\_\_\_\_

Film Quantity:  
 3 1/2 x 8 1/2 /10 \_\_\_\_\_  
 3 1/2 x 17 \_\_\_\_\_  
 4 1/2 x 8 1/2 /10 \_\_\_\_\_  
 4 1/2 x 17 \_\_\_\_\_  
 7 x 17 \_\_\_\_\_  
 14 x 17 \_\_\_\_\_  
 8 x 10 \_\_\_\_\_

Interpretation by: Chris Couz SNT-TC-1A II  
 (Print) ASNT II (Level)  
 CERT # 1014  
 Client Representative: JWD  
 (Print) I am in full agreement with report contents (Sign) [Signature]



# Radiographic Inspection Report

Customer: <u>United Contracting Services</u>	Location: <u></u>	Date: <u>4/5/2017</u>
Job: <u>S-4248</u>	P.O. #: <u></u>	W.O. #: <u></u>
AFE: <u></u>	Material: <u>CS/SS</u>	Code: <u>ASME B31.3 N</u>
		FJT#: <u>1704051118</u>
		Code: <u>ASME B31.3 N</u>

### TESTING VARIABLES

IR192 <input type="checkbox"/>	CO60 <input type="checkbox"/>	SE75 <input type="checkbox"/>	X-Ray <input type="checkbox"/>	Single Film <input checked="" type="checkbox"/>	Composite Film <input type="checkbox"/>	Digital Image <input type="checkbox"/>
Exposure Technique	DWE/SWV <input checked="" type="checkbox"/>	DWE/DWV <input type="checkbox"/>	SWE/SWV <input type="checkbox"/>	Type: <u></u> / <u></u>	Class: <u></u> / <u></u>	
Film Usage	70mm: <u></u>	3 1/2 x 8 1/2: <u>7</u>	3 1/2 x 10: <u></u>	3 1/2 x 17: <u>6</u>	4 1/2 x 8 1/2: <u></u>	4 1/2 x 10: <u></u>
		8 x 10: <u></u>	14 x 17: <u></u>	7 x 17: <u></u>	4 1/2 x 17: <u></u>	

Film I.D.	Film Interval	I.Q.I.	O.D. (Inches)	Material Thickness	Welder Stamp	Density	Accept Reject	Comments and Remarks
1 XR-173R	T-2	1BF	4.500	0.237		2.0-3.8	A	
2 XR-182T	100%	1BF	8.625	0.322		2.0-3.8	A	
3 XR-183T	100%	1BF	8.625	0.322		2.0-3.8	A	
4 XR-184T	100%	1BF	4.500	0.237		2.0-3.8	A	
5 XR-185T	100%	1BF	4.500	0.237		2.0-3.8	A	
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
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23								
24								
25								
26								
27								
28								
29								
30								

### Terms and Abbreviations:

AB - Arc Burns	EUC - External Undercut	HB - Hollow Bead	LC - Low Cover	P - Porosity
BT - Burn Through	IUC - Internal Undercut	IP - Incomplete Penetration	MA -	S - Slag
CK - Crack	EP - Excessive Penetration	IC - Internal Concavity	LF - Lack of	RS - Round Seam
LS - Long Seam	IQI - Image Quality Indicator (Penetrant)			

Vehicle #: <u></u>	Interpretation by
Miles Driven: <u></u> Hours: <u></u>	SNT-TC-1A: <u></u> Lance Graffenstein
Personnel: <u></u>	(print)
<u></u>	CERT. #: <u></u>
<u></u>	(signature)
<u></u>	Accepted: 4/5/2017 11:22:50 AM
<u></u>	I am in full agreement with report contents:
	(print)
	Client Representative:
	(signature)



UCS JOB NO. S-4248

## Section 12

DRAWINGS, CALCULATIONS, &  
SPECIFICATIONS

JOB: S-4248-02

CONTRACTOR: UCS  
JOB NUMBER: S-4248

CUSTOMER: UOP  
CUSTOMER JOB NO.: J-477-JM48

NOTES: UOP-PO-4500757656  
DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES 713.00  
COMPLETED WELD INCHS 0.00  
TOTAL % COMPLETE 0.00

Welder ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID.	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-004	W1		5/8		SW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-004	W2		5/8		SW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-004	W3				SW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-004	W4				SW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-004	W5		5/8		SW	4"	14.00	/	XH	0.15		PIP	3-10	N/A	N/A				
DEHY-004	W6		5/8		SW	4"	14.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W7		5/8		SW	3"	11.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W8		5/8		SW	3"	11.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W9				SW	4"	14.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W10		5/8		SW	4"	14.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W11		5/8		SW	4"	14.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W12		5/8		SW	3"	11.00	/	XH	0.15		↓	↓	N/A	N/A				
DEHY-004	W13		5/8		SW	3"	11.00	/	XH	0.15		↓	↓	N/A	N/A				

SRM 240

CONTRACTOR: UCS  
 JOB NUMBER: S-4248

CUSTOMER: UOP  
 CUSTOMER JOB NO.: J-477-J/448

NOTES: UOP-PO-4500757656  
 DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES 713.00  
 COMPLETED WELD INCHS 0.00  
 TOTAL % COMPLETE 0.00

Welder ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID.	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-005	W1		JP			BW 4"	14.00	1	STD	0.15		APP 3-08		N/A	N/A				
DEHY-005	W2		JP			BW 4"	14.00		STD	0.15		↓	↓	N/A	N/A				
DEHY-005	W3	1/150	JP			BW 3"	11.00	1	STD	0.15				N/A	N/A				
DEHY-005	W4		JP			BW 2"	7.00		XH	0.15				N/A	N/A				
DEHY-005	OL1		SM			OL .5"	2.00		3#	N/A				N/A	N/A				
DEHY-005	SW1		SM			SW 1.5"	6.00		S160	N/A				N/A	N/A				
DEHY-005	SW2		SM			SW .5"	2.00		S160	N/A				N/A	N/A				

CONTRACTOR: UCS  
 JOB NUMBER: S-4248

CUSTOMER: UOP  
 CUSTOMER JOB NO.: J-477-J/448

NOTES: UOP-PO-4500757856  
 DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES 769.00  
 COMPLETED WELD INCHS 0.00  
 TOTAL % COMPLETE 0.00

Welder ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID.	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-006	W1		42		BW	4"	14.00	/	STD	0.15				N/A	N/A				
DEHY-006	W2		42		BW	4"	14.00	/	STD	0.15				N/A	N/A				
DEHY-006	W3		42		BW	3"	11.00	/	STD	0.15				N/A	N/A				
DEHY-006	W4		42		BW	2"	7.00		XH	0.15				N/A	N/A				
DEHY-006	OL1		42		OL	.5"	2.00		3x#	N/A				N/A	N/A				
DEHY-006	SW1		42		SW	1.5"	6.00		S160	N/A				N/A	N/A				
DEHY-006	SW2		42		SW	.6"	2.00		S160	N/A				N/A	N/A				

CONTRACTOR: UCS  
 JOB NUMBER: S-4248

CUSTOMER: UOP  
 CUSTOMER JOB NO.: J-477-J/448  
 NOTES: UOP-PO-4500757556  
 DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES 713.00  
 COMPLETED WELD INCHS 0.00  
 TOTAL % COMPLETE 0.00

Welder ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID.	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-002	W1					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W2					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W3					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W4					BW 8"	27.00		XH	0.15				N/A	N/A				

J6  
 J4  
 J6

CONTRACTOR: UCS  
 JOB NUMBER: S-4248

CUSTOMER: UOP  
 CUSTOMER JOB NO.: J-477-J/448  
 NOTES: UOP-PO-4500757556  
 DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES 713.00  
 COMPLETED WELD INCHS 0.00  
 TOTAL % COMPLETE 0.00

Welder ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID.	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-002	W1					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W2					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W3					BW 8"	27.00		XH	0.15				N/A	N/A				
DEHY-002	W4					BW 8"	27.00		XH	0.15				N/A	N/A				

CONTRACTOR: UCS  
JOB NUMBER: S-4248

CUSTOMER: UOP  
CUSTOMER JOB NO.: J-477-J448

NOTES: UOP-PO-4500757856  
DEHY PIPE SPOOLS

LEGEND FOR W-T COLUMN	
BW	BUTT WELD
CP	COUPLING TO PIPE
OL	OLET TO PIPE
SW	SOCKET WELD

TOTAL WELD INCHES: 713.00  
COMPLETED WELD INCHS: 0.00  
TOTAL % COMPLETE: 0.00

Weider ID	# of Butt Welds	# of X-Rays	ACC.	REJ.	REPAIR RATE
A1	0	0	0.00	0.00	#DIV/0!
JP	0	0	0.00	0.00	#DIV/0!
JD	0	0	0.00	0.00	#DIV/0!
EM	0	0	0.00	0.00	#DIV/0!
SM	0	0	0.00	0.00	#DIV/0!
JG	0	0	0.00	0.00	#DIV/0!
LG	0	0	0.00	0.00	#DIV/0!
LF	0	0	0.00	0.00	#DIV/0!

SPOOL ID	Weld #	X-Ray #	W ID	W ID	W T	Pipe Size	Weld Inch	Comp. Inch	Pipe Sch	NDT %	FITUP INSP.	VISUAL INSP.	DIM. INSP.	MT INSP.	PMI INSP.	WPS, WIRE HT. NO.	NDT PASS	NDT FAIL	NDT COMMENTS
DEHY-003	W1		36		BW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-003	W2		36		BW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-003	W3		36		BW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-003	W4		36		BW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-003	W5		36		BW	4"	14.00		XH	0.15				N/A	N/A				
DEHY-003	W6		36		BW	4"	14.00	1	XH	0.15			Page 3-10	N/A	N/A				
DEHY-003	W7		36		BW	4"	14.00	1	XH	0.15				N/A	N/A				
DEHY-003	W8		36		BW	3"	11.00	1	XH	0.15				N/A	N/A				
DEHY-003	W9		36		BW	3"	11.00	1	XH	0.15				N/A	N/A				
DEHY-003	W10		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W11		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W12		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W13		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W14		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W15		36		BW	4"	14.00	1	XH	0.15			Page 5-10	N/A	N/A				
DEHY-003	W16		36		BW	3"	11.00	1	XH	0.15				N/A	N/A				
DEHY-003	W17		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W18		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W19		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W20		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W21		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	W22		36		BW	3"	11.00		XH	0.15				N/A	N/A				
DEHY-003	C1				CP	5"	2.00		3K#	N/A				N/A	N/A				
DEHY-003	C2				CP	76"	3.00		3K#	N/A				N/A	N/A				