### **MANGO**

Welding Procedure Qualification Test Reports

### CU ADOPTED - MANGO WELDING PROCEDURE No. 1:SMAW E6010

### Specification for Shielded Metal Arc Welding with Class E6010 electrodes

<u>Procedure Qualification Record No</u>s: MANGO 1104 1-1(04-25-00), MANGO 1104 1-2(04-25-00), MANGO 1104 1-3(04-26-00), MANGO 1104 1-4(04-26-00),

MANGO 1104 1-5(04-26-00), MANGO 1104 1-6(04-26-00), MANGO 1104 1-7(04-25-00), MANGO 1104 1-8(04-25-00), MANGO 1104 1-9(04-25-00) MANGO 1104 1-10(04-25-00), MANGO 1104 1-11(07-28-00), MANGO 1104 1-12(07-28-00), MANGO 1104 1-13(07-28-00)

<u>Application</u>: Use this procedure on all systems and pressures.

### Procedure:

- A. <u>PROCESS</u>: The welding shall be done with the Shielded Metal Arc Welding (SMAW) process.
- B. PARENT METALS: The materials to which the procedure applies are identified below:

Existing Unknown Steel (24,000psi)

ASTM: A53, A106

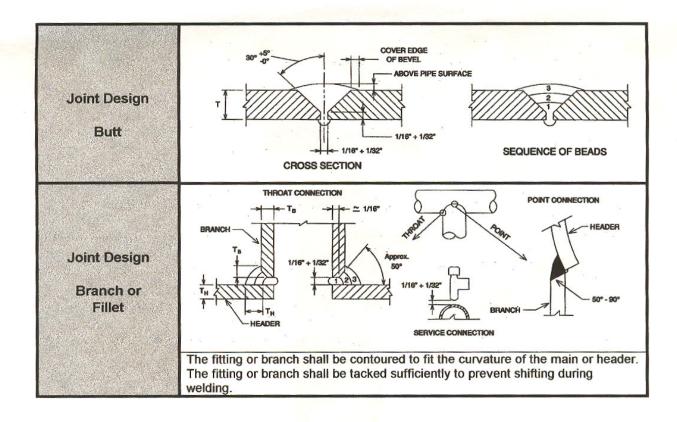
API 5L: Grade A25 through X56 (Note limit\* on less than 3/16" wall thickness)

which fall into the two following groups:

- Specified minimum yield strength less than or equal to 42,000 pounds per square inch.
- 2) Specified minimum yield strength greater than 42,000 pounds per square inch through 56,000 pounds per square inch.
- C. <u>DIAMETER AND WALL THICKNESS</u>: This procedure shall apply to all diameters through 48" and wall thicknesses identified in the following groups:
  - Nominal pipe wall thickness less than 3/16 inch.\*(Existing Unknown Steel, ASTM:A53, A106, API 5L: Grade A25 through X42 only)
  - Nominal pipe wall thickness from 3/16 inch through ¼ inch.

### D. JOINT DESIGN:

- BUTT: Bevel the welding ends to an angle of 30°, +5°, -0°, with a root face of 1/16", +/- 1/32". The bevel shall form a V groove with an included angle of 60°+10/-0. The root opening shall be 1/16", +/- 1/32".
- FILLET: Bevel the welding ends to an angle between 50° and 90° as required for various branch diameter ratios, with a root face of 1/16", +/- 1/32". The bevel shall form a V groove with an included angle of approximately 50°. The root opening shall be 1/16", +/- 1/32".



- E. FILLER METAL: The filler metal shall conform to AWS Classification E-6010.
- F. SIZE OF ELECTRODES AND NUMBER OF BEADS:

Wall Thickness	Electrode Siz	Minimum Number	
(Inches)	Stringer Bead		of Passes
	and Hot Pass	Fill and Cap	
0 - 0.186	3/32	1/8	3
0.187 - 0.249	1/8	5/32	3
0.250 - up	5/32	3/16	3

NOTE: For tie in welds only, the rod diameter may be increased or decreased by one size for up to one third (33%) of the weld length to accommodate varying bevel space at the weldor's election. Tie in welds are those welds made in their final service location or where one or both ends of the pipe to be welded are fixed (stiff).

G. ELECTRICAL CHARACTERISTICS: Use only DC reverse polarity (electrode positive) welding current.

Rod Diameter	Amperage	Voltage
3/32"	40-70	20-26
1/8"	65-130	22-28
5/32"	90-175	24-30
3/16"	140-200	24-30

- H. DIRECTION OF WELDING: Welding shall proceed downward from the top center, or any point on the side to the bottom center.
- I. NUMBER OF WELDORS: When the nominal diameter is less than 16", one weldor may be used to complete the root pass and all successive passes. When the nominal diameter is 16" or larger, two weldors are required to complete the root pass. One weldor may complete all successive passes. However, the Company reserves the right to require additional weldors for the root pass. It is the opinion of the Company that additional weldors will be required if there exists any danger of stringer bead cracking or if slow progress is experienced.
- J. SPEED OF TRAVEL: The speed of travel for all passes shall be within the range of 5 to 15 inches per minute, inclusive.
- K. TIME LAPSE BETWEEN PASSES: The second pass shall follow the first pass within five minutes, except when unavoidable circumstances prevail which make this requirement impractical. If 5 minutes are exceeded, follow the preheat requirements listed in O. of this procedure. Complete all welds on the same day they are started.
- L. TYPE OF LINE UP CLAMP: For nominal diameters less than 12", external line up clamps may be used. For 12" and larger nominal diameters on contract jobs, internal line up clamps should be used for all but tie in welds. For small jobs on 12" and larger pipe, external clamps may be used.
- M. REMOVAL OF LINE UP CLAMP: For nominal diameters less than 12", the line up clamps may be removed when the joint has been tack welded sufficiently to maintain root space and to prevent development of hi-low. For nominal diameters 12" and larger, the line up clamp may be removed after 50% of the root pass (stringer bead) is completed. At no time may the line up clamp be removed while welding is in progress or while the weld metal is above 400°F. The Company may require that the line up clamp be left in place until 100% of the stringer bead is completed.
- N. CLEANING: All rust, dirt and foreign matter shall be removed from the bevel surface before welding. The bevel surface includes that area on the inside and outside of the pipe in the immediate proximity of the pipe end. Slag shall be removed from the weld bead surface before the next bead is applied. Stringer beads shall be ground and cleaned with power tools. Grind out all holes. The finished weld and adjacent outside surface of the pipe shall be cleaned of all flux, smoke and weld spatter.
- O. PREHEAT: Preheat shall be required when the ambient or parent metal temperature is below 40°F. The pipe shall be preheated evenly around the pipe circumference. The preheat temperature shall be 250°F for 3" on both sides of the weld. The preheat temperature shall be monitored and controlled before and during welding using a temperature indicating crayon or pyrometer or equivalent device. If moisture is present on the parent metal, it shall be driven off by preheating to a temperature at which it will not re-form before welding is completed.
- P. POSTHEAT: Postheat is not required.
- Q. POSITION: The welding position may be fixed or rolled.

Weldor: Pau Pipe Grade: TYPE OF W WELD POSI WELDING P LINEUP CLA JOINT DESIGNED FILLER MET SHIELDING	n: Sedalia, Mid Mitchell X42 ELD: Butt I TION: Roll I ROCESS: Arc MP: External GN: Bevel And TAL: Class E GAS: Nonel FLUX: None	O.D.: 2 Fillet Position Oxy Interna gle 30° +5 6010 Type	Welding .375" PREHE ☑ D Fuel Ga I□ Non S°-0°, I	Time: Wall T AT TEM IRECTI IS□ E⊠ Root Fa	6 minut hicknes IP.:. nor ON OF Man B/	es s: 0.1 ne °F TRAV ual⊠ ACKIN 6±1/32 Nam	Weather: 154	sunny, 7 Manufactu N/A inch □ Downh □ Auto□ Yes□ oot openin	75°F lirer: _unk lies each si hill⊠ ] No⊠ No⊠ ng _1/16±1	ide of weld			
Bead number			1	2	T	3	4	5	6	7			
	DCSPD I	CREIX	85	83		75	70	3	0	<del></del>			
Size of Electro		CKFL	1/32	1/32		/8	1/8						
	ectrodes Used		2	2	17.0	2	2			-			
Speed of Travel, in./min. 9.3 14.9 11.1 9.5													
	ween Passes.	Min.		5	1	_	1						
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Test Specimen	Test Specimen Stencil Mark (wt, w) Sq. In.)  Orig. Size Orig. Area. Maximum Tensile Remarks Load Strength (Include location and character of failure)												
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3													
4													
			NI NI	ICK BRE	AK TES	Te							
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2	4	Clean											
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				BEND	TESTS								
Specimen	Stencil Mark	Туре		Rei	narks (	Include	e location a	nd characte	er of failure)				
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2	3	Root	No F	ailure									
3							16.0	<u> </u>					
4													
5													
6													
7													
8 Additional qua	I alification requi	I rements:											
The above We		e Qualificati	on Test v					NPI 1104 re	quirements				
Weldor: Paul	Mitchell			Supervi	_					7			
Approved by:	Bruce Beatty			Signatu	re: 13r	wa	Bealt	2	Date: 8/2	2/00			

Weldor: Pau PIPE: Grade TYPE OF WI WELD POSI WELDING P LINEUP CLA JOINT DESIG FILLER MET SHIELDING	GN: Bevel An AL: Class <u>E6</u> GAS: Nonel	O.D.: control of the	We 12.7 PR n⊠ sy Fu al□ 5-0	elding 5 EHE/ D el Ga None	Time: _ Wall T AT TEM IRECTION S□ e⊠ Root Fac	47 min. hickness: 0 IP.: none °F ON OF TRA Manual⊠ BACKI ce 1/16±1/3 Flo	Weather 250 Width I VEL: Uphill Semi-aut NG STRIP in., Ro me Fleetw W Rate	Sunny, Manufac N/A inc Dowr Down Auto Yes□ ot openir eld 5P+	turer: _unk_ches each sonhill⊠  No⊠  1/16±1/3	ide of weld					
SHIELDING	FLUX: None	ELLI TYPE				SIZ	.e								
Bead number				1	2	3	4	5	T 6	7					
	DOODEL I	DCDD[V]		42	137		+	5	6	/					
Size of Electro	DCSPU I	DCRPIA		32	5/32	3/16	-			-					
	ectrodes Used			4	6	8	-								
Speed of Travel, in./min. 10.3 10.8 8.1															
Max Time Between Passes. Min. 5 3															
IVIAX TIME BEL	ween Fasses.	IVIIII.			<u> </u>	3				See seal case					
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2	6	Clean													
3															
4	<u> </u>														
						TESTS									
Specimen	Stencil Mark					marks (Inclu	de location a	ind charac	cter of failure	)					
1	3	Roo		No Fa											
2	7	Roo		No Fa											
3	4	Face		No Fa											
4	8	Face	)	No Fa	ailure										
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6							1								
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Additional qua	alification requi	rements:													
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The above We	Iding Procedur	e Qualifica	ation	Test w	vas perfo	rmed in acco	rdance with	API 1104	requirements	j.					
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Weldor Paul I	Mitchell				Supervi	sed by Lisa	Ulrich								
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Approved by _	Bruce Beatty				Signatu	re Bru	2/20	ly	Date 8/	22/00					

### WEL IG PROCEDURE QUALIFICATION TO TREPORT

Location of Test: Sedalia, MO  Test Date: 4/26/2000  Test No.: MANGO 1104 1-3  Weldor: Jim Heim  Welding Time: 1 hour  Weather: sunny, 75°F  PIPE: Grade: X56  O.D.: 12.75"  Wall Thickness: 0.375"  Manufacturer: unk  TYPE OF WELD: Butt⊠ Fillet□ PREHEAT TEMP::none °F Width N/A inches each side of weld  WELD POSITION: Roll□ Position⊠ DIRECTION OF TRAVEL: Uphill□ Downhill⊠  WELDING PROCESS: Arc⊠ Oxy Fuel Gas□ Manual⊠ Semi-auto□ Auto□  LINEUP CLAMP: External□ Internal□ None⊠ BACKING STRIP: Yes□ No⊠  JOINT DESIGN: Bevel Angle 30 +5 -0 °, Root Face 1/16"±1/32 in., Root opening 1/16"±1/32 in.  FILLER METAL: Class E6010  Test No.: MANGO 1104 1-3  Manufacturer: unk  Manufacturer: unk  Manufacturer: unk  Manufacturer: unk  PREHEAT TEMP::none °F Width N/A inches each side of weld  WELDING PROCESS: Arc⊠ Oxy Fuel Gas□ Manual⊠ Semi-auto□ Auto□  LINEUP CLAMP: External□ Internal□ None⊠ BACKING STRIP: Yes□ No⊠  JOINT DESIGN: Bevel Angle 30 +5 -0 °, Root Face 1/16"±1/32 in., Root opening 1/16"±1/32 in.  FILLER METAL: Class E6010  Name Fleetweld 5P+												
SHIELDING	GAS: Nonel FLUX: None					Flow	Rate					
Bead number			1	2	3		4	5	6	7		
	DCSPD [	CRPI	135	130	14		145					
Size of Electro			5/32 6	5/32	3/1		3/16 12					
Number of Electrodes Used         6         8         12           Speed of Travel, in./min.         7.6         8.6         6.9         5.5												
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Specimen	Stencil Mark	(wt, w)	S	q. ln.)	Lb.		PSI	ch	aracter of fa	ailure)		
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2	5	0.376 x 1.0	14 (	0.381	2779	6	72958	Failed in	n pipe			
3												
4												
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Specimen	Stencil Mark		F	Remarks	(Include	ocatio	on and charac	ter of fail	ure)			
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2	7	Root		ailure								
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4	8	Face		ailure								
5						-						
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7												
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Additional qu	alification requi	rements:										
	bead was allow re-heating), wit					ut 1 h	nour), ground a	and hot p	assed witho	out any		
The above We	elding Procedur	e Qualification	on Test	was perfo	rmed in a	ccord	dance with AP	l 1104 re	quirements			
Weldor Jim H	leim		*		sed by E							
Approved by _	Bruce Beatty			Signatu	re Br	uce	Broth	<u></u> 1	Date 8/2	2/00		

### MANGO (Missour soc. of Natural Gas Operators)

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Weldor: Pau PIPE: Grade TYPE OF W WELD POSI WELDING P LINEUP CLA JOINT DESIG FILLER MET SHIELDING	Test: Sedalia,  Il Micthell  : X42 x X42  ELD: Butt□  TION: Roll□  ROCESS: Arc  MP: External  GN: Bevel An  TAL: Class E6  GAS: Nonel  FLUX: None	O.D.: _ Fillet⊠□ Position C⊠ Ox □ Intern gle 30 +6 6010 ☑ Type _	We 2.37 ] PR i⊠ y Fue al□ 5 -0	EHEA EHEA DI el Gas None	Time: _ Wall T AT TEM IRECTION SID SEXI	6 min hickno P.:_ ON O Ma	ess: 0. F TRA\ nual⊠ BACKIN 16 ±1/3 Nan Flow	Weather 154 Width _ /EL: Uphil Semi-aut NG STRIP 2_in., Ro ne _Fleetw w Rate	Man  I [ [ o [ o [ o cot oped 5]	nny, 7 ufactuinch Downh Auto cs  beening	/5°F lrer: _u les eac hill⊠ ] No⊠   _1/16	nk ch side ±1/32	of weld
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	ectrodes Used			3	3		3		-			_	
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	ween Passes.	Min.			5	2	280			1			25
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Test Specimen	Orig. Size Orig. Area. Maximum Tensile Remarks Inches (wt. X w = Load Strength (Include location and Stencil Mark (wt, w) Sq. In.) Lb. PSI character of failure)												
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The above We	lding Procedur	e Qualifica	ition T	Test w	as perfo	rmed	n accord	dance with	API 1	104 re	quirem	ents.	
Weldor Paul I	Mitchell				Supervi								-
Approved by _I	Bruce Beatty				Signatu	re L	mes	Bea	g His	2	Date _o	0/20	100

Weldor: Jim PIPE: Grade TYPE OF W WELD POSI WELDING P LINEUP CLA JOINT DESIGNED SHIELDING	Fest: Sedalia Heim  : X42 x X42  ELD: Butt□  TION: Roll□  ROCESS: Ard  MP: External  GN: Bevel And  GAL: Class E6  GAS: Nonel  FLUX: None	O.D.: Fillet  Position C  Ox Interr gle 45 +5- 3010	We 12.75 PR n⊠ xy Fue nal□	elding 5" EHE, D el Ga None	Time: _ Wall T AT TEM IRECTI s□ e⊠ Root Fa	53 r hick IP.:_ ON N	nin. ness: _0 none °F OF TRA flanual⊠ BACK 1/16±1/3 Na Flo	VE VE INC	Weat  O  Widt  L: Up  Gemi-a  G STF  in.,  Flee  Rate	her: s Ma h N/A hill⊡ auto⊡ RIP: Y Root o	unny, nufactu inch Downh Auto[ es□ opening	75°F urer: nes e nill⊠ J No⊠	unk each si d 16±1/3	de of welc
Bead number				1	2	T	3	T	4		5	T	6	7
	C DCSP	DCDDIVI	-	25	140		150	+	125	_	5		ь	7
		DURPLO			5/32		3/16	+						
Size of Electrode, in         5/32         5/32         3/16         5/32           Number of Electrodes Used         8         9         8         10														
Number of Electrodes Used 8 9 8 10  Speed of Travel, in./min. 8.3 8.8 6.0 7.0														
	ween Passes.	B Air	.0.		5			广						Fit Assessment
Max Time bet	ween Passes.	IVIIII.	-		5	3		3						
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	alification requi													
The above We		e Qualifica	ation <sup>-</sup>	Test w			d in acco by <u>Bruc</u>				1104 re	equire	ements.	
Approved by I	Bruce Reatty						Bru				4	Data	8/2	2/100

TYPE OF WI WELD POSI WELDING PI LINEUP CLA JOINT DESIGN FILLER MET SHIELDING	Test: Sedalia, al Mitchell : X56 x X56 ELD: Butt TION: Roll ROCESS: Arc MP: External GN: Bevel An TAL: Class EGAS: Nonel FLUX: None	Fillet S Position S OX Intern gle 45 +5- 5010 S Type	PRE PRE S y Fuel al l	HEA DI I Gas None	VVali i AT TEM IRECTI s□ e⊠ Root Fa	IP.:_ ON M	ness: <u>0.:</u> none °F OF TRA\ fanual⊠ BACKIN 1/16±1/32 Nan Flov	Width VEL: Upl Semi-a NG STR 2_in., I me_Flee w Rate_	Mai n N/A nill□ uto□ IP: Y Root o	nufacturinche Downhi Auto□ es□ N ppening 5P+	er: <u>unk</u> es each si II⊠□ No⊠ 1/16±1/3	de of weld
Bead number			1		2	T	3	4		5	6	7
	DCSPD I	CBBIAI	133	-	137		140	121				
		JUNEI				_						
Size of Electro			5/3		5/32		3/16	5/32				
Number of Electrodes Used 8 10 10 12												
Speed of Travel, in./min.         8.3         7.0         6.1         7.6												
Max Time Bet	ween Passes.	Min.			5	3	jaja.	3				
		Orig. Si			UCTIVE TENSIL . Area.	E TE	T RESUL	TS Tens		26 7	Remark	Section Sectio
Test		Inches	7 4.50		Xw=		Load	Strer		(Inc	lude location	
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2	2	Clean										
3	3	Clean	-									
4	4	Clean				-						
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Specimen	Stencil Mark	Typo				-		la lacati-	n ond	obere-t-	r of fall	
Specimen	Sterior Wark	Туре			Ke	rialf	o (IIICIUO	ie iocatio	n and	инагасте	r of failure)	
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Additional qua	alification requi	rements:		-								
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The above We	lding Procedur	e Qualifica	tion Te	est w	as perfo	rme	d in accord	dance wi	h API	1104 rec	quirements.	
Weldor Paul I	Mitchell			-			by Bruce	/	7		-	
Approved by I	Bruce Beatty				Signatu	re 🖊	Bru	a/3	200	19 c	Date P/2	2/00

Weldor: Jim PIPE: Grade TYPE OF WI WELD POSI WELDING P LINEUP CLA JOINT DESIG	est: Sedalia, Heim : B x X42 ELD: Butt□ TION: Roll□ ROCESS: Arc MP: External GN: Bevel And TAL: Class Ecounty GAS: None	O.D.: Fillet⊠ Position C⊠ Oxy □ Internigle 60 S010 ⊠ Type _	We  3/4 x PR  □⊠ y Fue al□	elding 12 EHEA DI el Gas None	Time: _ Wall TI AT TEM IRECTIONSI EXI Root Fac	6 min nickne P.: no ON O Ma	ess: 0.7 ne °F F TRAV nual BACKIN 16 ±1/3 Nan Flow	Weather: 133 x 0.250 Width No Fel: UphillE Semi-autol NG STRIP: 2_in., Room ne Fleetwel v Rate	sunny, 7 Manufa /A inch Downh Auto□ Yes□ t opening	/5°F cturer: _unk les each sid lill⊠ ] No⊠ j 1/16 ±1/32	de of weld			
Bead number				1	2		3	4	5	6	7			
	DCSPD (	CRDIXI		35	85		85	7		U				
Size of Electro		JUNIE		32	3/32		1/8							
	ectrodes Used			2	2		1							
Speed of Travel, in./min. 5.1 3.1 3.3														
	ween Passes.	Min.		-	5	2								
					TENSIL	E TES	TS							
Total		Orig. Si			. Area.		dmum	Tensile		Remarks				
Test Specimen	Stencil Mark	Inches (wt, w		200	X w = . ln.)		oad _b.	Strength PSI		clude location	Contract Contract			
1	Oterion wark	(001, 00	<del>'</del>		)			101	CI	iaracter or ia	ilure)			
2														
3					15000									
4		V			THE SECOND	100								
				NI	CK BRE	AK TI	STS	1						
Specimen	Stencil Mark			Re	emarks	(Inclu	de locati	on and chara	cter of fai	lure)				
1														
2														
3														
4														
	To: 114 1				BEND									
Specimen	Stencil Mark	Туре	-		and the second s	_		le location an	d characte	er of failure)				
1	entire weld	hammer b	pena	pipe n	proke aw	ay froi	n weld							
3														
4														
5								<u> </u>						
6					******									
7														
8														
Additional qui	alification requi	rements:			***************************************									
	-													
The above We	elding Procedur	e Qualifica	tion '	Test w	as perfo	rmed i	n accord	dance with Al	PI 1104 re	quirements.				
Weldor Jim H	leim				Supervi	sed by	Bill Bu	urnett						
Approved by _	Bruce Beatty				Signatu	re/	ruce	Bear		Date \$\frac{9}{2}	2/00			

Location of 3	Test: Sedalia	MO		T	est Date	· 4/2	5/2000			Toot N	lo · MA	NCO	1104 1 0
Weldor: lim	Heim	, IVIO	۱۸/۵	Idina	Time:	1 hou	r	10/0	athor	CHADIN	7EOE	NGO	1104 1-8
PIPE Grade	Heim : A	OD:	12 7	5	Wall T	hickn	es. U	410	M	Surific	, /5°F	ınk	
TYPE OF W	ELD: Butt⊠	Fillet 🗆	PR	EHE/	AT TEM	D · n/	one °E	10/	idth N	/A in	choo co	ah ai	do of
WELD POSI	TION: Roll	Position	N N	רוובי	RECT	ON O	E TDAY	/⊑I · I	Inhill	A III	ches ea	ich si	ae of weld
WELDINGP	ROCESS: Ar	CEI OV	v Fue	al Gas	e $\Box$	Ma	nual 🔯	Som	opriliic				
LINEUDCIA	ROCESS: Ar	□ Intern	عالتا	None		IVIC	BACKI	NG S	II-autoi TDID:	Yoo D	No E		
	GN: Bevel An AL: Class E											±1/3	<u>2</u> in.
							_ Nan	ne r	ieetwei	d 5P+			
SHIELDING	GAS: Nonel	I Type					_ FIOV	w Kat	e				
SHIELDING	FLUX: None	i i ype					_ 5126	<del></del>					
Bead number	***************************************		1	1	2		3	T .	4	5	1	3	7
Amperage: A0	C DCSP	DCRP区	12	21	140		160	_	60	160			
Size of Electro			5/3	32	5/32		3/16		116	3/16			
Number of Electrodes Used 6 8 10 10 12													
Speed of Trav	el, in./min.		9.	.5	9.5		6.7	6	.7	6.7			
Max Time Bet	ween Passes.	Min.			5	3	72,	3	3			1	
					100								
			DE	ESTR	UCTIVE	TEST	RESUL	TS					
					TENSIL		-						
		Orig. Si			. Area.		ximum		ensile			marks	
Test	Ctonoil Mark	Inches			Xw=	L	C 9 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	S	trength		(Include		
Specimen	Stencil Mark	(wt, w			. In.)	0		-	PSI	_	characte		ilure)
2	5	0.416 x 1	_	0.			5231	_	56633		d in pipe		
3	3	0.410 X 1	010	0.	420		0231	-	50074	Falle	ed in pipe		
4			-+	_			7.95	-		+			
				NI	CK BRE	AK T	ESTS						
Specimen	Stencil Mark			-	emarks			ion an	d chara	cter of	failure)		
1	2	Clean											
2	6	Clean											
3													
4													
		·			BEND		_						
Specimen	Stencil Mark	Туре				marks	(Includ	le loca	ation an	d chara	cter of fa	ilure)	
1	2	Root		No Fa									
2	7	Root		No Fa									
3	4	Face		No Fa									
4	8	Face		No Fa	allure								
5 6			_										
7		-											
8		-											
	I alification requi	rements:											
Additional qu	amication requi	rements.											1
The above We	elding Procedur	e Qualifica	tion 7	Test w	as perfo	rmed	in accord	dance	with AF	PI 1104	requiren	nents.	
Weldor Jim H	łeim						Bruce						
Ammanua di la coll	Drugo Dooth				Ciar-4	/	3111	-0 1	3.	10		Da	2/1
Approved by	Bruce Beatty				Signatu	ie 🖊	/ ~	1	190		Date 6	140	7/1/

Location of T Weldor: Pau PIPE: Grade TYPE OF WE WELD POSI WELDING PI LINEUP CLA JOINT DESIG FILLER MET SHIELDING	Il Mitchell : B  ELD: Butt⊠  TION: Roll□  ROCESS: Arc  MP: External  GN: Bevel Ang  AL: Class <u>E6</u> GAS: None	O.D.: _ Fillet□ Position c⊠ Ox; □ Interni gle 30 +5 6010 ☑ Type _	Wel 1.315 PRE ⊠ y Fue al□ □	EHE/ D I Ga None	Time: _{ Wall Th AT TEM IRECTIONSID EXI	o min nickne P.: nc DN O Ma	ess: 0.1 one °F F TRAV nual BACKIN 16 ±1/32 Nam Flow	Weather  133 I Width N  EL: Uphill Semi-auto IG STRIP: In., Roome Fleetwer  Rate	sunny, 7 Manufactu N/A inch Downh D Auto□ Yes□ I Dt opening	/5°F  rer:_unk  es each si  ill⊠  }  No⊠  _1/16 ±1/3	de of weld		
Bead number			1	,	2		3	4	5	6	7		
	DCSPD (	CRPIX	78	3	50		50						
Size of Electro			3/3		3/32		1/8						
			2		2		2						
Number of Electrodes Used 2 2 2 Speed of Travel, in./min. 12.2 8.1 8.7													
	ween Passes.	Min	12.	-	5	2	0.7		<u> </u>	L			
Iviax Time Bet	ween Passes.	WIII 1.			3								
A MARKET		Orig. Si			UCTIVE TENSILI . Area.	ETES	TS	TS Tensile		4. (4)			
Test		Inches			X w =			Strength		Remark clude locati			
Specimen	Stencil Mark	(wt, w			i. ln.)		h	PSI		naracter of f			
1	Oterica wark	(401, 00	<del>-</del> +	- 00	. 111.)		LU.	131	- CI	iaracter or i	allure)		
2			-+										
3													
4													
4	L			NII.	OK DDE	ALC T	-OTO						
	lo: "144 t	r		-	CK BRE								
	Stencil Mark	01		Re	emarks	(Inclu	ie locati	on and char	acter of fail	lure)			
1	1	Clean											
2													
3													
4													
					BEND	TEST	S						
Specimen	Stencil Mark	Туре	7		Rer	narks	(Includ	e location a	nd characte	er of failure)			
1								(					
2													
3													
4													
5													
6			-										
7													
8			-										
	alification requi		ation T	est w	vas perfo	rmed	in accord	dance with A	API 1104 re	equirements			
Weldor Paul	Mitchell	- 33411100			Supervi	sed by	Bill Bu	rnett		Date 8/2			

Weldor: Pau PIPE: Grade TYPE OF WI WELD POSI' WELDING P LINEUP CLA JOINT DESIG FILLER MET SHIELDING	Test: Sedalia,  If Mitchell  : B  ELD: Butt⊠  TION: Roll□  ROCESS: Arc  MP: Externall  GN: Bevel Anc  AL: Class <u>E6</u> GAS: None	O.D.: _ Fillet□ Position S Ox □ Intern gle 30 +5 010 ▼ Type	We 1.31: PR i⊠ y Fue al□ 5 -0	elding 5 EHEA DI el Gas None	Time: _ Wall TI AT TEM IRECTION S□ E⊠ Root Fac	5 min nickna P.: no DN O Ma	ess: 0.1 one °F F TRAN nual⊠ BACKIN 16 ±1/3 Nan Flov	Weather  133 I Width 1 /EL: Uphill Semi-auto NG STRIP: 2 in., Roone Fleetwood	: sunny, 7 Manufactu N/A inch □ Downh □ Auto □ Yes □ ot opening eld 5P+	/5°F urer: _unk_ ues each si nill⊠ ] No⊠ ] _1/16 ±1/3	ide of weld		
Bead number				1	2		3	4	5	6	7		
Amperage: AC	DCSPD D	CRPIX	8	5	60	50							
Size of Electro			3/	32	3/32		1/8						
	ectrodes Used			2	2		2						
Speed of Trav				2.2	11.6		7.9		<	10.0			
	ween Passes. I	Min	- 12		5	2	1.5	<u> </u>					
IVIAX TITLE DEL	Weeli Fasses. I	VIII.		<u> </u>	<u> </u>								
Bear and Art Art		4 70	n	ССТО	HOTIVE	TEOT	DECLU	TO	50 STEP	1313775131	Complete St.		
4 A			ע					10	祖 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		44 St. (		
		0 : 0:		-	TENSIL			T					
		Orig. Si Inche			. Area.			Tensile		Remarks			
Test	01	900	•		Load Lb.		Strengtl		(Include location and				
Specimen	Stencil Mark	(wt, w	)	Sq	լ. ln.)		LD.	PSI	CI	naracter of f	ailure)		
1													
2													
3													
4													
			No.	NI	CK BRE	AK T	ESTS						
Specimen	Stencil Mark			Re	emarks	(Inclu	de locati	on and cha	racter of fa	lure)			
1.													
2													
3													
4									***************************************				
					BEND	TEST	S						
Specimen	Stencil Mark	Type	,					le location a	nd charact	er of failure			
1	2	Roof		No Fa		Harrio	(moide	ic rocation c	ina charact	er or landre			
2		11001		14012	anuic								
3									···········				
4													
5					-								
6				-									
7	ļ												
8													
	alification requi		ation	Test w	vas perfo	rmed	in accor	dance with	API 1104 re	equirements			
Weldor Paul	Mitchell						y <u>Bill Bu</u>	urnett B2	\H.	Data 5/2	andro		

### UTILICORP UNITED

### WELDING PROCEDURE QUALIFICATION TEST REPORT

Weldor Trace PIPE: Grade TYPE OF WI WELD POSI WELDING PI LINEUP CLA JOINT DESIGNED SHIELDING	Test Wichita, by Gaylord  X56  ELD: Butt  TION: Roll  ROCESS: Arc MP: External GN: Bevel And TAL: Class  GAS: Nonel FLUX: None	O.D Fillet□ Position C⊠ Ox Signature Signat	We 12.75 PR n□ ry Fu nal□ +5, -0	elding 5" REHE, D el Ga None	Time 3 Wall T AT TEM IRECTION SI eCO Root Face	B5 n hick IPI ON N	nin. kness <u>0.</u> none °F OF TRA Manual BACK 1/16±1/3 Na Flo	37: VE INC 2ir	Weather  Width  L: Uph  Semi-au  STRII  n., Roce  Linco  Rate  Rate	er C Mai non iill□ ito□ P: Y ot op In 5F	oudy, 8 nufactur e_inche Downhi Auto□ es□ N ening 1	o°F rer <u>U</u> es ea ill⊠ I No⊠	NK ch sid	de of weld
<u></u>					3-2-1-1-1-1									
Bead number				1	2		3		4		5	6		7
	C DCSP I	DCRP区		45	145		140		140					
Size of Electro			5/	/32	5/32		3/16		3/16					
Number of Ele	ectrodes Used			4	4		9		4					
Speed of Trav	el, in./min.		•	17	17		12		11					
Max Time Bet	ween Passes.	Min.		T	5	E		5						
3 1945 - i	<b>经国际外外</b>	- 12 TE	D	ESTR	UCTIVE	TE:	ST RESU	LI	Siz All	1.02	17		1 1997	
100		1		Control of the Contro	TENSIL	_			edinar Sil	- 615		o late and the late	, i en	
	T	Orig. S	ize	-	. Area.	-	Maximum	T	Tens	اما		Po	marks	
Test		Orig. Size Orig. Area. Maximum Tensile Remarks Inches (wt. X w = Load Strength (Include location												
Specimen	Stencil Mark	(wt, w) Sq. In.) Lb. PSI character of failure)												
1	1	0.368X1.089									ilure)			
2	5	0.371X1.115												
3	-	0.07 17(1	. 1 10	-	. 7 1 7	-	30332	+	7471	<u> </u>	aneu	ii bibe		
4								+			-			
4	<u></u>			NI NI	ICK BRE	AL	TECTO							
-	L Oten ell Mante	1				-								
Specimen	Stencil Mark	01		R	ernarks	(Inc	lude loca	TIOI	n and cr	aract	er of fail	ure)		
1	2	Clean												
2	6	Clean												
3														
4														
					BEND	TE	STS					20000		
Specimen	Stencil Mark	Туре	9		Re	mar	ks (Inclu	ide	location	and	characte	er of fa	ilure)	
1	3	Root B		No F	ailure									
2	4	Face B	end	No Fa	ailure					100				
3	7	Root B	end	No F	ailure									
4	8	Face B	end	No F	ailure									
5						Secretary.								
6														
7										-				
8														
	alification requi	rements:		1			-							
7 danional qu	amouter requi	romonto.												
The above We	elding Procedur	e Qualific	ation	Test v	vas perfo	rme	ed in acco	rda	ance witl	1 API	1104 re	quiren	nents	
Weldor Tracy							by Lisa					,		
	Bruce Beatty			-			Bru	2000	1	its		Date <u>/</u>	8/06	z foo

# WELDING PROCEDURE QUALIFICATION TEST REPORT

	- C. VA P. 1.10	140													
Location of	Test Wichita,	KS		:	Test D	ate	e 7/28/20	000	)		Tes	t No.	IAM	VGO	1104 1-12
vveidor Ira	cy Gaylord e X42	0.0	_ W	elding	I Time	15	min -	_ :	Wea	ather	Clo	udy, 8	30°F		
PIPE: Grade	E X42	O.D	6.62	5"	Wall I	hic	kness 0.	.25	0"	1	Manı	ufactu	rer_	UNK	
TYPE OF W	/ELD: Butt⊠	Fillet□	PI	REHE	AT TEN	1P.	none °	F	Wid	dth r	one	_inch	es e	ach s	ide of weld
WELD POS	ITION: Roll 🗵	Positio	n∐	D	IRECTI	OV	OF TRA	VVE	EL: U	lphill		ownh	ill⊠		
WELDING F	PROCESS: Ar	CIXI O	ky Ft	uel Ga	ıs∐		Manual⊠	3 5	Semi	-auto		AutoE			
LINEUP CL	AMP: Externa	ıı≥ı interr	าลเป	Non	eLl		BACK	INC	3 ST	RIP:	Yes	s I	Nox		
JOINT DESI	IGN: Bevel Ar														in.
	TAL: Class E						Na	ame	Lir	rcoln	Flee	etwelo	5P+		
SHIELDING	GAS: None	⊠ lype _		-		-	Flo	WC	Rate	·					
SHIELDING	FLUX: None	e⊠ Type	∍				Siz	ze_							
Bead number	г			1	2		3	Т	4			5			
	C DCSP	DCRPIXI		130	125	-	130	+	13			5		6	7
Size of Electr		DOM ES		1/8	1/8		5/32	+	5/3						
	ectrodes Used			3	4		4		4						
Speed of Trav				12	17	· ·	15	+	13						
Max Time Be	tween Passes.	Min.		T	5		5	5				T		T	
							e de la composition della comp								
10 To	<b>经营业</b>		· · E				ST RESU	LTS	<b>S</b>	edia esteni		16. H.		100	
				-	TENSIL	ET	ESTS								
Tool	Orig. Size Orig. Area. Maximum Tensile									Remarks					
Test Specimen	Stencil Mark	Inches (wt. X w = Load Strength (Include													
1	1	1	character of failure)										ailure)		
2	5	0.213X1				-	16480 16472	_		656		ailed i			
3	<u> </u>	0.213/1	.043		222	-	10472	+	12	198	-	ailed i	n pipe	9	
4							-				-				
				NI	CK BRE	AK	TESTS								
Specimen	Stencil Mark	Remarks	(In	clude l	ocation a	and	character	of	failur	e)					
1	2	Clean													
2	6	Clean													
3															
4															
					BEND										
Specimen	Stencil Mark	Туре				cluc	de location	an	d cha	aracte	er of f	failure)	)		
1	3	Root Be		No Fa											
3	7	Face Be		No Fa											
4	8	Root Be		No Fa											
5	0	Face Be	ena	No Fa	llure										
6															
7															
8								-							
Additional qua	alification requi	rements:							-						
The above We	lding Procedure	e Qualifica	tion	Test w	as perfo	rme	ed in accor	rdaı	nce v	vith A	PI 11	04 rec	uirer	nents.	
Weldor Tracy	Gaylord				Supervis	sed	by Lisa	Ulri	ch						
Approved by _E	Bruce Beatty				Signatur	01	Breve	1	30	1	0	_		0/2	1/00
hb. oven by T	z. acc beatty				orginatul	C.C.	- wee	1	196	200		C	Jate 2	100	700

WE NG PROCEDURE QUALIFICATION ST REPORT

Weldor Trace PIPE: Grade TYPE OF W WELD POSI WELDING F LINEUP CLA JOINT DESI FILLER MET SHIELDING	Test Wichita, cy Gaylord  E X42  ELD: Butt II  FROCESS: Ar  AMP: External  GN: Bevel An  FAL: Class EG  GAS: None  FLUX: None	O.D. 4 Fillet□ Position c⊠ Oxy I⊠ Internated and 10 Sign of the control of the co	W 1.5" Pf i□ y Fu al□ 5°-0	relding REHEA DI uel Gas None	Time Wall T AT TEM RECTI SD eD Root Fac	hickr IP. n ON C M	ness <u>0.1</u> one °F DF TRA\ anual⊠ BACKII /16±1/32 Nar	Weathe 156 Width VEL: Uphil Semi-aut NG STRIP 2 in., Roome Lincology Weate	Mai non l⊠ co□ t open Fle	oudy, 8 nufactu e_inch Downh Auto es	80°F rer <u>UNK</u> es each s ill⊡ J No⊠ I/16±1/32	ide of weld
Bead number		T		1	2	T	3	4	T	5	6	7
-	C DCSP	DCRPIXI		85	85	86		-+		3	0	-
Size of Electro		DOIN ES		/32	3/32				-			
	ectrodes Used			4	4	4			+			
Speed of Trav	/el, in./min.			15	14	1	8		1			
Max Time Bet	tween Passes.	Min.		1 8	5	5	75.7					1.5%
JARCARIA (A. C.)				-	TENSIL	ETE	STS	TS				
Test Specimen	Stencil Mark	Orig. Size Inches (wt, w)		Orig. Area. (wt. X w = Sq. In.)				Tensile Strength PSI		Remarks (Include location and character of failure)		
1												
2												
3												
4	L			NII	OK DDE	A 17.7	FOTO					
Specimen	Stencil Mark	T			CK BRE	-						
1	2	Clean		Ke	marks	(Incit	ide locati	on and cha	racte	er of failt	ure)	
2	4	Clean										
3												
4												
					BEND	TEST	rs					
Specimen	Stencil Mark	Туре			Rer	narks	(Includ	e location a	and c	characte	r of failure)	
1	1	Root Be	nd	No Fa	ilure							
2	3	Root Bei	nd	No Fai	ilure							
3												
4												
5 6												
7												
8												
	alification requi	rements:										
The above We	lding Procedure	e Qualificat	tion	Test wa	as perfo	med	in accord	lance with	API '	1104 rec	uirements.	
Weldor <u>Tracy</u>	Gaylord						y <u>Lisa U</u>					
Approved by _E	Bruce Beatty				Signatur	e/	3ruca	Bra	H	<u> </u>	ate 8/22	2/ce)