



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
Spec. No. : 10087902-SP-50-03			
Class : C2			
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Compared with:	2	28 Feb 02	

Appr. by: L.SMITH

Issued for : E  
Issued by: T.WILLIAMSON

Checked by: T.WILLIAMSON

**Service:**  
PROCESS FLUIDS, (BLOWDOWN INTERMITTENT TO 850F)  
(FOR BRANCH CONNECTIONS SEE ATTACHMENT "A" )

<b>Gaskets :</b> SPIRAL WOUND GRAPHITE / S.S.304	<b>Rating/Facing :</b> CL300 RF	<b>Corrosion :</b> 0.125" (3.0MM) See Note 7	<b>Facing Finish :</b> ASME B16.5	<b>Block Valve Trim :</b> API TRIM No. 8	<b>Weld Quality Insp :</b> PER JOB SPEC -52A1	<b>Stress Relief :</b> NO (See Note 8)
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<b>Materials :</b> CARBON STEEL PIPING & VALVES (SEE GENERAL NOTES 1 THRU 27)	<b>Temp/Press Limits :</b> 386 PSIG AT 433F ( < 24" ) ; 218 PSIG AT 460F ; 135 PSIG AT 750F ; 65 PSIG AT 840F ; 419 PSIG AT 100F; FOR <10" : 537 PSIG AT 540F ; (See Note 9 & 10)
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Item Name	Range		Det	Rev
Unique/Client* Code	from	to		
<b>GATE VALVE</b> 512GQ0004	<b>1/2"</b>	<b>2"</b>	<b>GAT</b>	
Body Mat'l : ASTM A105 Codes : API 602 Body constr. : WELDED BONNET <b>Rating : 800#</b> <b>Ends : S.W.</b> Trim constr. : PLAIN SOLID WEDGE, O.S.& Y. Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS) Bolt Mat'l : PER API STANDARD 602. Packing : GRAPHITE PACKING . Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9 Operator : HANDWHEEL				
<b>GATE VALVE</b> 511GB0002	<b>3"</b>	<b>24"</b>	<b>GAT</b>	
Body Mat'l : ASTM A216 GR.WCB Codes : API 600 Body constr. : BOLTED BONNET <b>Rating : 300#</b> <b>Ends : RF</b> Face finish : ASME B16.5 Trim constr. : PLAIN OR FLEXIBLE SOLID WEDGE, O.S.& Y. Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS) Bolt Mat'l : PER API STANDARD 600. Gasket Mat'l : PER API STANDARD 600. Packing : GRAPHITE PACKING . Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9 Operator : HANDWHEEL				

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**GATE VALVE N**      8"      24"      **GATN**  
511GB0001

Body Mat'l : ASTM A216 GR.WCB  
Codes : API 600  
Body constr. : BOLTED BONNET  
**Rating : 300#**  
**Ends : RF**  
Face finish : ASME B16.5  
Trim constr. : PLAIN OR FLEXIBLE SOLID WEDGE, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 600.  
Gasket Mat'l : PER API STANDARD 600.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : GEAR OP (N) PINION SHAFT AT RIGHT ANGLE TO RUN OF VALVE.

**GATE V.FP**      1/2"      2"      **GAFP**  
512GB0002

Body Mat'l : ASTM A105  
Codes : API 602  
Body constr. : BOLTED BONNET, FULL PORT.  
**Rating : 300#**  
**Ends : RF**  
Face finish : ASME B16.5  
Trim constr. : PLAIN SOLID WEDGE, FULL PORT, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Gasket Mat'l : PER API STANDARD 602.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : HANDWHEEL

**GATE V.FP**      1/2"      2"      **GAFPS**  
512GQ0003

Body Mat'l : ASTM A105  
Codes : API 602  
Body constr. : WELDED BONNET, FULL PORT.  
**Rating : 800#**  
**Ends : S.W.**  
Trim constr. : PLAIN SOLID WEDGE, FULL PORT, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : HANDWHEEL

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**DR/VE VALVE**      1/2"      2"      **GAD**  
 512EQ0007

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : EXTENDED BODY, WELDED BONNET.  
**Rating : 800#**  
**Ends : MALE PE x FEMALE NPT**  
 Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.  
 Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
 Bolt Mat'l : PER API STANDARD 602.  
 Packing : GRAPHITE PACKING .  
 Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
 Operator : HANDWHEEL

**INSTR. VALVE**      1/2"      3/4"      **GAI**  
 512EQ0009

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : EXTENDED BODY, WELDED BONNET.  
**Rating : 800#**  
**Ends : MALE NPT x FEMALE NPT**  
 Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.  
 Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
 Bolt Mat'l : PER API STANDARD 602.  
 Packing : GRAPHITE PACKING .  
 Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
 Operator : HANDWHEEL

**GATE V.SWxTH**      1/2"      2"      **GATST**  
 512GQ0002

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : WELDED BONNET  
**Rating : 800#**  
**Ends : S.W. x THDD**  
 Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.  
 Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
 Bolt Mat'l : PER API STANDARD 602.  
 Packing : GRAPHITE PACKING .  
 Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
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GATE V. FLG. 1/2" 2" GAF  
512GB0005

Body Mat'l : ASTM A105  
Codes : API 602  
Body constr. : BOLTED BONNET  
Rating : 300#  
Ends : RF  
Face finish : ASME B16.5  
Trim constr. : PLAIN SOLID WEDGE, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Gasket Mat'l : PER API STANDARD 602.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : HANDWHEEL

GLOBE VALVE 1/2" 2" GLO  
512DQ0005

Body Mat'l : ASTM A105  
Codes : API 602 / ASME B16.34  
Body constr. : WELDED BONNET  
Rating : 800#  
Ends : S.W.  
Trim constr. : LOOSE DISC, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : HANDWHEEL

GLOBE VALVE 3" 8" GLO  
511DB0001

Body Mat'l : ASTM A216 GR.WCB  
Codes : API 600 / ASME B16.34  
Body constr. : BOLTED BONNET  
Rating : 300#  
Ends : RF  
Face finish : ASME B16.5  
Trim constr. : PLUG DISC TYPE, O.S. & Y.  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 600.  
Gasket Mat'l : PER API STANDARD 600.  
Packing : GRAPHITE PACKING .  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9  
Operator : HANDWHEEL

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CHECK VALVE 1/2" 2" CHE

512CQ0003

Body Mat'l : ASTM A105  
Codes : API 602 / ASME B16.34  
Body constr. : BOLTED CAP  
Rating : 800#  
Ends : S.W.  
Trim constr. : PISTON TYPE,T-BODY,HORIZONTAL INSTALLATION  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Gasket Mat'l : PER API STANDARD 602.  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9

CHECK VALVE 3" 24" CHE

511CB0001

Body Mat'l : ASTM A216 GR.WCB  
Codes : API 600 / ASME B16.34  
Body constr. : BOLTED CAP  
Rating : 300#  
Ends : RF  
Face finish : ASME B16.5  
Trim constr. : SWING TYPE, HORIZONTAL & VERTICAL INSTALLATION  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 600.  
Gasket Mat'l : PER API STANDARD 600.  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9

CHECK V. FLG 1/2" 2" CHEFL

512CB0001

Body Mat'l : ASTM A105  
Codes : API 602 / ASME B16.34  
Body constr. : BOLTED CAP  
Rating : 300#  
Ends : RF  
Face finish : ASME B16.5  
Trim constr. : PISTON TYPE,T-BODY,HORIZONTAL INSTALLATION  
Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)  
Bolt Mat'l : PER API STANDARD 602.  
Gasket Mat'l : PER API STANDARD 602.  
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9

PIPE A/G 1/2" 1-1/2" SCH. 160 PIP

541SG0003

Material : KILLED C.S. ASTM A106 GR.B  
Manufact. : SMLS  
Codes : ASME B36.10  
Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2  
Ends : P.E.

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PIPE A/G	2"	2"	SCH. XS	PIP
541SG0001				
			Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : P.E.	
PIPE A/G	3"	20"	SCH. STD	PIP
541SG0002				
			Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : B.E.	
PIPE A/G	24"	24"	CALC	PIP
			Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : B.E.	
PIPE A/G	30"	36"	CALC	PIP
			Material : C.S. ASTM A672 GR.C70 CL.12 Manufact. : E.F.W. Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : B.E.	
PIPE A/G	3"	20"	SCH. STD	PIP2
541SGAAAC				
			Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Coating : PAINTING SYSTEM NO. 2, PER VALERO JOB SPEC NO. SP-80-02. Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : B.E.	

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<b>PIPE A/G</b> 541SGAAAB	<b>3"</b>	<b>20"</b>	<b>SCH. STD</b>	<b>PIP3</b>
Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Coating : PAINTING SYSTEM NO. 3, PER VALERO JOB SPEC NO. SP-80-02. Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : <b>B.E.</b>				
<b>PIPE A/G</b> 541SGAAAE	<b>3"</b>	<b>20"</b>	<b>SCH. STD</b>	<b>PIP8</b>
Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Coating : PAINTING SYSTEM NO. 8, PER VALERO JOB SPEC NO. SP-80-02. Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : <b>B.E.</b>				
<b><u>PIPE A/G</u></b> <u>541SG0002</u>	<b><u>24"</u></b>	<b><u>24"</u></b>	<b>SCH. STD</b>	<b>PIPF</b> [*]
Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : <b>B.E.</b>				
<b>PIPE A/G</b> 541Wd0001	<b>30"</b>	<b>36"</b>	<b>SCH. STD</b>	<b>PIPF</b>
Material : C.S. ASTM A672 GR.C70 CL.12 Manufact. : E.F.W. Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : <b>B.E.</b>				
<b>PIPE A/G</b> 541SG0003	<b>2"</b>	<b>2"</b>	<b>SCH. 160</b>	<b>PIPP</b>
Material : KILLED C.S. ASTM A106 GR.B Manufact. : SMLS Codes : ASME B36.10 Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2 Ends : <b>P.E.</b>				

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<b>NIPPLES</b> 551NC0002	1/2"	2"	<b>SCH. XXS</b>	<b>NIP</b>
Material : C.S. ASTM A106 GR.B Codes : ASME B36.10 Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2 Ends : T.O.E.				
<b>FLANGE</b> 561NB0006	1/2"	1-1/2"	<b>SCH. 160</b>	<b>FLG</b>
Type : S.W. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE</b> 561NB0005	2"	2"	<b>SCH. XS</b>	<b>FLG</b>
Type : S.W. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE</b> 561WB0005	3"	20"	<b>SCH. STD</b>	<b>FLG</b>
Type : W.N. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE</b>	24"	24"	<b>CALC</b>	<b>FLG</b>
Type : W.N. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				

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<b>FLANGE</b> 561WB0005	<b>24"</b>	<b>24"</b>	<b>SCH. STD</b>	<b>FLGF</b> [*]	[*] [*] [*] [*] [*] [*]
Type : W.N. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2					
<b>FLANGE W.N.</b>	<b>30"</b>	<b>36"</b>	<b>CALC</b>	<b>FWN7A</b>	
Type : W.N. Material : ASTM A105 Codes : ASME B16.47 "A" ( EX MSS-SP44 ) Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2					
<b>FLANGE W.N.</b>	<b>30"</b>	<b>36"</b>	<b>CALC</b>	<b>FWN7B</b>	
Type : W.N. Material : ASTM A105 Codes : ASME B16.47 "B" ( EX API-605 ) Rating : <b>300#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2					
<b>FLANGE</b> 561NB0011	<b>1/2"</b>	<b>1-1/2"</b>	<b>SCH. 160</b>	<b>FL1</b>	
Type : S.W. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>600#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2					
<b>FLANGE</b> 561NB0009	<b>2"</b>	<b>2"</b>	<b>SCH. XS</b>	<b>FL1</b>	
Type : S.W. Material : ASTM A105 Codes : ASME B16.5 Rating : <b>600#</b> Ends : <b>RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2					

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FLANGE F.F.      24"      24"      CALC      FLGFF

Type : W.N.  
 Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **300#**  
 Ends : **FF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

FLANGE W.N.      30"      36"      SCH. STD      FWF

561WB0014

Type : W.N.  
 Material : ASTM A105  
 Codes : ASME B16.47 "B" ( EX API-605 )  
 Rating : **300#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

BLIND FLANGE      1/2"      24"      FBL

561BB0004

Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **300#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

BLIND F.47/A      30"      36"      FBL7A

561BB0006

Material : ASTM A105  
 Codes : ASME B16.47 "A" ( EX MSS-SP44 )  
 Rating : **300#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

BLIND F.47/B      30"      36"      FBL7B

561BB0005

Material : ASTM A105  
 Codes : ASME B16.47 "B" ( EX API-605 )  
 Rating : **300#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

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ORIFICE FLG 2" 2" SCH. XS 561CB0007 FTR

Material : ASTM A105
Component : ORIFICE FLANGE SET, WELD NECK TYPE
Codes : ASME B16.36
Rating : 300#
Ends : RF
Hole Tape : N.2 HOLES 180 DEGREES 1/2" S.W.
Note : WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

ORIFICE FLG 3" 16" SCH. STD 561CB0008 FTR

Material : ASTM A105
Component : ORIFICE FLANGE SET, WELD NECK TYPE
Codes : ASME B16.36
Rating : 300#
Ends : RF
Hole Tape : N.2 HOLES 180 DEGREES 1/2" S.W.
Note : WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

ORIFICE FLG 2" 2" SCH. XS 561CB0009 FTR

Material : ASTM A105
Component : ORIFICE FLANGE SET, WELD NECK TYPE
Codes : ASME B16.36
Rating : 300#
Ends : RF
Hole Tape : N.4 HOLES 90 DEGREES 1/2" S.W.
Note : USE ONLY FOR SPECIAL INSTR. CONNECTIONS. WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

ORIFICE FLG 3" 16" SCH. STD 561CB0010 FTR

Material : ASTM A105
Component : ORIFICE FLANGE SET, WELD NECK TYPE
Codes : ASME B16.36
Rating : 300#
Ends : RF
Hole Tape : N.4 HOLES 90 DEGREES 1/2" S.W.
Note : USE ONLY FOR SPECIAL INSTR. CONNECTIONS. WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

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<b>90 ELBOW</b> 551EF0001	<b>24"</b>	<b>24"</b>	<b>SCH. STD</b>	<b>90EF</b>	[*]
Material : C.S. ASTM A234 WPB					[*]
Component : 90 DEGREES LONG RADIUS					[*]
Codes : ASME B16.9					[*]
Manufact. : SMLS					[*]
Ends : <b>B.W.</b>					[*]
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2					[*]
<b>90 ELBOW</b> 551EF0002	<b>30"</b>	<b>36"</b>	<b>SCH. STD</b>	<b>90EF</b>	
Material : C.S. ASTM A234 WPB					
Component : 90 DEGREES LONG RADIUS					
Codes : ASME B16.9					
Manufact. : WELDED					
Ends : <b>B.W.</b>					
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2					
<b>45 ELBOW</b> 551HB0011	<b>1/2"</b>	<b>1-1/2"</b>		<b>45E</b>	
Material : C.S. ASTM A105					
Component : 45 DEGREES ELBOWS					
Codes : ASME B16.11					
Rating : <b>6000#</b>					
Ends : <b>S.W.</b>					
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2					
<b>45 ELBOW</b> 551HB0002	<b>2"</b>	<b>2"</b>		<b>45E</b>	
Material : C.S. ASTM A105					
Component : 45 DEGREES ELBOWS					
Codes : ASME B16.11					
Rating : <b>3000#</b>					
Ends : <b>S.W.</b>					
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2					
<b>45 ELBOW</b> 551EF0003	<b>3"</b>	<b>20"</b>	<b>SCH. STD</b>	<b>45E</b>	
Material : C.S. ASTM A234 WPB					
Component : 45 DEGREES LONG RADIUS					
Codes : ASME B16.9					
Manufact. : SMLS					
Ends : <b>B.W.</b>					
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2					

\* Client codes only, not including sizes



Contract N.: 1310087902  
Client: Valero Refining Company - Texas  
Location: Texas City, Texas  
Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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45 ELBOW      24"    24"    CALC      45E

Material : C.S. ASTM A234 WPB  
Component : 45 DEGREES LONG RADIUS  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

45 ELBOW      30"    36"    CALC      45E

Material : C.S. ASTM A234 WPB  
Component : 45 DEGREES LONG RADIUS  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CAP      1/2"    1-1/2"      CAP

551HB0012

Material : C.S. ASTM A105  
Component : CAP  
Codes : ASME B16.11  
Rating : **6000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CAP      2"    2"      CAP

551HB0003

Material : C.S. ASTM A105  
Component : CAP  
Codes : ASME B16.11  
Rating : **3000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CAP      3"    20"    SCH. STD      CAP

551EF0006

Material : C.S. ASTM A234 WPB  
Component : CAP  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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<b>CAP</b>	<b>24"</b>	<b>24"</b>	<b>CALC</b>		<b>CAP</b>
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Material : C.S. ASTM A234 WPB  
Component : CAP  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

<b>CAP</b>	<b>30"</b>	<b>36"</b>	<b>CALC</b>		<b>CAP</b>
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Material : C.S. ASTM A234 WPB  
Component : CAP  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

<b>PLUG</b>	<b>1/2"</b>	<b>2"</b>			<b>ROU</b>
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551HB0004

Material : C.S. ASTM A105  
Component : PLUG ROUND BAR STOCK L=75 MM (3")  
Codes : ASME B16.11  
Ends : **SCRD**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

<b>PLUG ORI</b>	<b>1/2"</b>	<b>1/2"</b>			<b>ROUO</b>
-----------------	-------------	-------------	--	--	-------------

551HB0005

Material : C.S. ASTM A105  
Component : PLUG ROUND BAR STOCK L=75 MM (3")  
Codes : ASME B16.11  
Ends : **P.E.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

<b>CONC. RED.</b>	<b>3"</b>	<b>20"</b>	<b>SCH. STD</b>		<b>CRE</b>
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551RF0001

Material : C.S. ASTM A234 WPB  
Component : CONCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

\* Client codes only, not including sizes





Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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CONC. RED.      24"      24"      CALC      CRE

Material : C.S. ASTM A234 WPB  
Component : CONCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CONC. RED.      30"      36"      CALC      CRE

Material : C.S. ASTM A234 WPB  
Component : CONCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CONC. RED.      24"      24"      SCH. STD      CREF

551RF0001

Material : C.S. ASTM A234 WPB  
Component : CONCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CONC. RED.      24"      36"      SCH. STD      CREFF [\*]

551RF0002

Material : C.S. ASTM A234 WPB  
Component : CONCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

ECC.RED.      3"      20"      SCH. STD      ERE

551RF0003

Material : C.S. ASTM A234 WPB  
Component : ECCENTRIC REDUCER  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

\* Client codes only, not including sizes





Contract N.: 1310087902  
Client: Valero Refining Company - Texas  
Location: Texas City, Texas  
Project: Valero Refinery Reconfiguration (TCRR)

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TEE 24" 24" CALC TEE

Material : C.S. ASTM A234 WPB  
Component : TEE  
Codes : ASME B16.9  
Manufact. : SMLS  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

TEE 30" 36" CALC TEE

Material : C.S. ASTM A234 WPB  
Component : TEE  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

TEE 30" 36" SCH. STD TEEF

551EF0008

Material : C.S. ASTM A234 WPB  
Component : TEE  
Codes : ASME B16.9  
Manufact. : WELDED  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

RED.TEE 1/2" 1-1/2" TER

551FB0006

Material : C.S. ASTM A105  
Component : REDUCER TEE  
Codes : ASME B16.11  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **6000#**

RED.TEE 2" 2" TER

551FB0004

Material : C.S. ASTM A105  
Component : REDUCER TEE  
Codes : ASME B16.11  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **3000#**

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

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**CONC.SWAGE**      1/2"      2"      **SCH. 160**      **CSA**  
551SC0008

Material : C.S. ASTM A106 GR.B  
Component : CONCENTRIC SWAGE  
Codes : MANUFACTURED TO ASTM A234  
Manufact. : SMLS  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Ends : **P.E.**

**CONC.SWAGE**      1/2"      4"      **SCH. 160**      **CSC**  
551SC0009

Material : C.S. ASTM A106 GR.B  
Component : CONCENTRIC SWAGE  
Codes : MANUFACTURED TO ASTM A234  
Manufact. : SMLS  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Ends : **LEB-SEP**

**ECC.SWAGE**      1/2"      2"      **SCH. 160**      **ESA**  
551SC0031

Material : C.S. ASTM A106 GR.B  
Component : ECCENTRIC SWAGE  
Codes : MANUFACTURED TO ASTM A234  
Manufact. : SMLS  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Ends : **P.E.**

**ECC.SWAGE**      1/2"      4"      **SCH. 160**      **ESC**  
551SC0011

Material : C.S. ASTM A106 GR.B  
Component : ECCENTRIC SWAGE  
Codes : MANUFACTURED TO ASTM A234  
Manufact. : SMLS  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Ends : **LEB-SEP**

**ELBOLET BW**      3"      8"      **SCH. STD**      **ELBBW**  
551WB0001

Material : C.S. ASTM A105  
Component : ELBOLET  
Codes : MSS SP97  
Ends : **B.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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**ELBOLET SW**      **1/2"**      **36"**      **ELBS**  
551LB0017

Material : C.S. ASTM A105  
Component : ELBOLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **6000#**

**ELBOLET SW**      **2"**      **36"**      **ELBS1**  
551LB0010

Material : C.S. ASTM A105  
Component : ELBOLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **3000#**

**SOCKOLET**      **1/2"**      **36"**      **SOL**  
551LB0018

Material : C.S. ASTM A105  
Component : SOCKOLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **6000#**

**SOCKOLET**      **2"**      **36"**      **SOL1**  
551LB0011

Material : C.S. ASTM A105  
Component : SOCKOLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **3000#**

**FLAT SOL**      **1/2"**      **36"**      **SOF**  
551LB0027

Material : C.S. ASTM A105  
Component : FLAT SOCKOLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **6000#**

\* Client codes only, not including sizes





Contract N.: 1310087902  
Client: Valero Refining Company - Texas  
Location: Texas City, Texas  
Project: Valero Refinery Reconfiguration (TCRR)

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**LATROLET SW**      **1/2"**    **36"**      **LATS**  
551LB0016

Material : C.S. ASTM A105  
Component : LATROLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **6000#**

**LATROLET SW**      **2"**      **36"**      **LATS1**  
551LB0012

Material : C.S. ASTM A105  
Component : LATROLET  
Codes : MSS SP97  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2  
Rating : **3000#**

**FULL CPLG.**      **1/2"**    **1-1/2"**      **CPL**  
551HB0014

Material : C.S. ASTM A105  
Component : FULL COUPLING  
Codes : ASME B16.11  
Rating : **6000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

**FULL CPLG.**      **2"**      **2"**      **CPL**  
551HB0007

Material : C.S. ASTM A105  
Component : FULL COUPLING  
Codes : ASME B16.11  
Rating : **3000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

**UNION**      **1/2"**    **1-1/2"**      **GRO**  
551HB0008

Material : C.S. ASTM A105  
Component : UNION, GROUND JOINT, INTEGRAL CS SEATS  
Codes : MSS SP83  
Rating : **6000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

\* Client codes only, not including sizes



Contract N.: 1310087902  
Client: Valero Refining Company - Texas  
Location: Texas City, Texas  
Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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<b>UNION</b> 551HB0009	2"	2"	<b>GRO</b>
Material : C.S. ASTM A105 Component : UNION, GROUND JOINT, INTEGRAL CS SEATS Codes : MSS SP83 Rating : <b>3000#</b> Ends : <b>S.W.</b> Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2			

<b>Y STRAINER</b> 592YA0012	1/2"	2"	<b>YST</b>
Body Mat'l : ASTM A216 GR.WCB Codes : ACCORDING TO MANUFACTURER'S STD Body constr. : BOLTED CAP Rating : <b>600#</b> Ends : <b>S.W.</b> Screen Mat'l : S.S.304, .033" PERFORATION Bolt Mat'l : BODY BOLTING AND GLAND BOLTING PER MANUFACTURER'S STANDARD Gasket Mat'l : SPIRAL WOUND SS.304/GRAPHITE Note : TO BE SUPPLIED WITH S.W. BLOW-OFF CONNECTION.			

<b>TEMP. CONIC.</b> 592TE0003	2"	24"	<b>TCS</b>
Rating : <b>300#</b> Codes : ASME B16.5 Ends : <b>RF</b> Material : C.S. CONICAL SCREEN. Mesh size : 14 GA PERFORATED PLATE WITH 1/8" DIA. HOLES ON 3/16" CENTERS, 200% OPEN AREA.			

<b>TEMP. CONIC.</b> 592TE0004	30"	36"	<b>TCS</b>
Rating : <b>300#</b> Codes : ASME B16.47 "B" ( EX API-605 ) Ends : <b>RF</b> Material : C.S. CONICAL SCREEN. Mesh size : 14 GA PERFORATED PLATE WITH 1/8" DIA. HOLES ON 3/16" CENTERS, 200% OPEN AREA.			

\* Client codes only, not including sizes





Contract N.: 1310087902
Client: Valero Refining Company - Texas
Location: Texas City, Texas
Project: Valero Refinery Reconfiguration (TCRR)

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FIGURE 8 4" 12" F8F [\*]
561FP0003
Material: ASTM A516 GR.70
Codes: ASME B16.48
Rating: 300#
Ends: RF
Face finish: ASME B16.5
Note: FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

PADDLE BLIND 1" 4" PBL
561PP0005
Material: ASTM A516 GR.70
Codes: ASME B16.48
Rating: 300#
Ends: RF
Face finish: ASME B16.5
Note: FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

PADDLE BLIND 14" 24" PBL
561PP0005
Material: ASTM A516 GR.70
Codes: ASME B16.48
Rating: 300#
Ends: RF
Face finish: ASME B16.5
Note: FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

PAD.B16.47/B 30" 36" PAD7B
561PP0012
Material: ASTM A516 GR.70
Codes: ASME B16.47 "B" ( EX API-605 )
Rating: 300#
Ends: RF
Note: FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

DRIP RING 1" 12" DRI
561DP0009
Material: ASTM A516 GR.70
Codes: ASME B16.48
Rating: 300#
Ends: RF
Face finish: ASME B16.5
Hole on body: HOLE 3/4" SOCKET WELD
Note: FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

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**SPACER RING**      1"      4"      SPA

561RP0005

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 300#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**SPACER RING**      14"      24"      SPA

561RP0005

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 300#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**SPA.R.47/B**      30"      36"      SPA7B

561RP0012

Material : ASTM A516 GR.70  
 Codes : ASME B16.47 "B" ( EX API-605 )  
**Rating : 300#**  
**Ends : RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**STUD BOLTS**      1/2"      4"      STU

572SC0002

Material : ASTM A193 GR.B7 / WITH (2) HEAVY HEX NUTS ASTM A194 GR.2H  
 Thr'd Code : ANSI B18.2.1 & B18.2.2  
 Note : BOLTING SHALL COMPLY WITH JOB SPEC 52A3

**GASK.16.47/B**      30"      36"      GA1

574SC0010

Material : SPIRAL WOUND SS.304/GRAPHITE  
 Codes : GASKET DIMENSIONS PER ASME B16.20 ; FLANGES DIMENSIONS PER ASME B16.47 "B" (API-605)  
 Thickness : 3.2 MM (1/8")  
**Rating : 300#**  
 Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING / INNER SS.304 RING  
 Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

\* Client codes only, not including sizes



Contract N.: 1310087902  
Client: Valero Refining Company - Texas  
Location: Texas City, Texas  
Project: Valero Refinery Reconfiguration (TCRR)

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**GASK.16.47/A**      **30"**    **36"**      **GA2**  
574SC0009

Material : SPIRAL WOUND SS.304/GRAPHITE  
Codes : GASKET DIMENSIONS PER ASME B16.20 ; FLANGES DIMENSIONS PER ASME B16.47 "A" (MSS-SP44)  
Thickness : 3.2 MM (1/8")  
**Rating : 300#**  
Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING / INNER SS.304 RING  
Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

**GASKET**      **1/2"**    **24"**      **GAS**  
574SA0002

Material : SPIRAL WOUND SS.304/GRAPHITE  
Codes : DIMENSIONS PER ASME B16.20  
Thickness : 3.2 MM (1/8")  
**Rating : 300#**  
Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING  
Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

**GASKET**      **1/2"**    **24"**      **GAS1**  
574SA0003

Material : SPIRAL WOUND SS.304/GRAPHITE  
Codes : DIMENSIONS PER ASME B16.20  
Thickness : 3.2 MM (1/8")  
**Rating : 600#**  
Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING  
Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902  
 Client: Valero Refining Company - Texas  
 Location: Texas City, Texas  
 Project: Valero Refinery Reconfiguration (TCRR)

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**GASK.16.47/A**      30"    36"      **GAS1A**  
 574SC0011

Material : SPIRAL WOUND SS.304/GRAPHITE  
 Codes : GASKET DIMENSIONS PER ASME B16.20 ; FLANGES DIMENSIONS PER ASME B16.47 "A" (MSS-SP44)  
 Thickness : 3.2 MM (1/8")  
**Rating : 600#**  
 Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING / INNER SS.304 RING  
 Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

**GASK.16.47/B**      30"    36"      **GAS1B**  
 574SC0012

Material : SPIRAL WOUND SS.304/GRAPHITE  
 Codes : GASKET DIMENSIONS PER ASME B16.20 ; FLANGES DIMENSIONS PER ASME B16.47 "B" (API-605)  
 Thickness : 3.2 MM (1/8")  
**Rating : 600#**  
 Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING / INNER SS.304 RING  
 Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.  
**Ends : RF**

**GASKET FF**      1/2"    24"      **GASFF**  
 574Cy0004

Material : FLEXIBLE GRAPHITE ENCAPSULATED GASKET. CORR-A-SEAL / GRAPHONICS  
 Codes : DIMENSIONS PER ASME B16.21  
 Thickness : 1.6 MM (1/16")  
**Rating : 300#**  
 Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3  
**Ends : FF**

**General Notes:**

- 1.) Use Extended Body Gate Valves, Threaded Outlet, For Branches Not In Process Flow (Such As Vent, Drain, PI, Orifice Taps Etc. Connections). Piping Downstream, If Any, Shall Usually Be In Accord With The Applicable Instrument Piping Material Specification. If No Piping, Insert A Plug In The Threaded Outlet. Other Valves, Such As SW x T Should Only Be Used When Spaced Restrictions Are Encountered.
- 2.) Det 'GATST' To Be Use Only Where Extended Body Valves Do Not Fit The Design Situation.
- 3.) Dets 'GAF' And 'GAF1' Are To Be Used At Flanged Equipment Or When Required At Instrument.
- 4.) Globe Valves Shall Be Sized Such That Its Minimum % Open Is Not Less Than 20%. These Valves Shall Not Be Subject To Pressure Differential Greater Than 30% Of Its Cold Working Pressure.

\* Client codes only, not including sizes

Continue....



Contract N.: 1310087902
Client: Valero Refining Company - Texas
Location: Texas City, Texas
Project: Valero Refinery Reconfiguration (TCRR)

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- 5.) Check Valves When Installed In The Horizontal Position Shall Be Bonnet Cover Up & Those Install In The Vertical Position Shall Be Flow Up Only.
6.) Gear Operated Valves Shall Be Used When Indicated On The EFD'S.
7.) A Minimum Of 0.10" Corrosion Allowance May Be Used To Substantiate Wall Schedule Selection For Boderline Cases. Such Cases Must Be Approved By The Project Engineering Manager And A Remark Added To The Line List.
8.) Heat Treatment Noted Is For General Fabrication. Weld Size For Fillet And/Or Branch Connection Shall Govern Per ASME B31.3 Para. 331.1.3. Heat Treatment For Bends Shall Be Per ASME B31.3 Para. 332.4.1 & 332.4.2 And Specs 52A5 And 52A6 Accordingly.
9.) Where Pipe Schedule Is Shown, It Is Adequate For The Full Flange Rating. Where "CALC" Is Shown, The Pressure Limit May Be Lower Than Flange Rating. See The Project Line List And Applicable Piping Drawing For Details.
10.) Typical Hydrotest Limiting Factor Is 1.5 x ASME Class Rating Cold Working Pressure Exception To This Include:
\* 1.1 x CWP For Closed Valves (Test Against Seat. This Method Is Not Preferred.)
\* Check Manufactures Data For Ball Valves.
11.) Pipe And Components > 1/2" Thickness May Require Impact Tested Materials When The Minimum Design Metal Temperature Is Below 100F Per ASME B31.3 Para. 323.2.2.
12.) All Fabrication Shall Comply With 52A1.
13.) Pipe Support And Spring Hangers Shall Comply With 59A2 And 59A3 Respectively.
14.) 'BEP' Nipples Shall Be Cut From Pipe.
15.) Det 'PIPP' To Be Used With SW x T Valves Only.
16.) The Crotch Thickness Of The Branch Outlet Of Buttweld Tees Shall Be Shall Be No Less Than 150% Of The Nominal Wall Thickness Of The Tee. The Crotch Radius Of The Branch Outlet Of Buttweld Tees Shall Be No Less Than 12.5% Of The Branch Outlet OD.
17.) Use Union Or Coupling To Join Pipe. Flanged Joint To Be Used Only Where Indicated On EFD'S.
18.) Couplings Shall Not Be Used For Branch Connections Use Inline Only.
19.) Use Flat Face Valve, Flange & Full Face Gasket To Mate With Flat Face Nozzles Only.
20.) Flanges Shall Not Be Insulated.
21.) Temperature Instrument Connection Shall Be NPS 1-1/2" Flanged.
22.) Pressure Instrument Connection Shall Be NPS 3/4" Socket-weld.
23.) In Sizes Above NPS 24", Flanges In Accord With ASME B16.47 Series B (API-605) Preferred. Where Required To Match Equipment Or Wafer Style VALves, Flanges Per ASME B16.47 Series A (MSS-SP44) May Be Used.
24.) Branch Connections Should Follow The Guidelines Of Job Spec 52B2 And The Attachment Unless Specifically Overriden By The Pipe Stress Engineer.
25.) CORR-A-SEAL / GRAPHONICS Gaskets Shall Be Used For Flat Face Flanges.
26.) Concentric & Eccentric Reducers Are Limited To 2 Nominal Diameter Size Reductions Without Piping Engineer Approval.
27.) Remove Temporary Strainers After Flushing.

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

<b>Piping Material Specification</b>			
<b>Spec. No. : 10087902-SP-50-03</b>			
<b>Class : C2</b>			
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END OF DOCUMENT

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

**Piping Material Specification**

**Spec. No.: 10087902-SP-50-03**  
**Class: C2**

**Contract #:** 1310087902  
**Client:** Valero Refining Company - Texas  
**Location:** Texas City, Texas  
**Project:** Valero Refinery Reconfiguration (TCRR)

Client Ref. VALERO	Rev. No. 3	Issue Date 3-Jun-02	Page 1
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**ATTACHMENT "A"**

REINFORCEMENT CHART																				
APPLICABLE TO PIPE SPECIFICATION (S) : C2																				
MATERIAL (S) : CARBON STEEL, SMLS ASTM A106 GR. B											P/SE :		C.A. : 0.125"							
CARBON STEEL, EFW, ASTM A 672 GR C70 CL 12																				
DESIGN LIMIT (S) : 740 PSIG AT -20F TO 100F; 410 PSIG AT 800F MAX. TEMP.																				
NOM. SIZE	NOM. THICK.	NOMINAL SIZE OF BRANCH CONNECTION (INCHES)																		
		1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	
1/2	160	T																		
3/4	160	RT	T																	
1	160	RT	RT	T																
1 1/2	160	RT	RT	RT	T															
2	XS	RT	RT	RT	RT	T														
3	STD	SK	SK	SK	SK	SK	T													
4	STD	SK	SK	SK	SK	SK	W	T												
6	STD	SK	SK	SK	SK	SK	W	W	T											
8	STD	SK	SK	SK	SK	SK	W	W	W	T										
10	STD	SK	SK	SK	SK	SK	W	W	W	W	T									
12	STD	SK	SK	SK	SK	SK	W	W	W	W	W	T								
14	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	T							
16	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	T						
18	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	T					
20	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	T				
24	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	T			
30	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	CA	T		
36	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	CA	CA	T	

**LEGEND :**

- T = TEE
- RT = REDUCING TEE
- RE = TEE AND REDUCER OR REDUCING INSERT
- SK = SOCKOLET, SW ELBOLET OR LATROLET
- TH = THREDOLET, THD ELBOLET OR LATROLET
- W = WELDOLET, BW ELBOLET OR LATROLET
- LW = LONG WELD NECK FLANGE
- TB = TEE AND BUSHING
- CA = CALCULATE
- F1 = STUB IN WITH 3/8" FILLET WELD
- P2 = STUB IN WITH 2" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)
- P3 = STUB IN WITH 3" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)
- P4 = STUB IN WITH 4" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)
- P5 = STUB IN WITH 5" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)
- P6 = STUB IN WITH 6" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)
- P7 = STUB IN WITH 7" WIDE PAD (PAD TO BE SAME THICKNESS AS RUN SIZE)

**NOTE : ANY SITUATION NOT COVERED BY THE ABOVE CHART SHOULD BE BROUGHT TO THE ATTENTION OF THE ASSIGNED PIPING ENGINEER.**