



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 : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	1
Compared with:	2	28 Feb 02	

Appr. by: L.SMITH

Issued for : E  
 Issued by: T.WILLIAMSON

Checked by: T.WILLIAMSON

<b>Service:</b> AMINE SERVICE, (PWHT REQUIRED FOR ALL WELDS SEE JOB SPEC -88A1.) (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 6	<b>Facing Finish :</b> ASME B16.5
		<b>Block Valve Trim :</b> API TRIM No. 10	<b>Weld Quality Insp :</b> PER JOB SPEC -52A1
			<b>Stress Relief :</b> YES (See Note 7)
<b>Materials :</b> CARBON STEEL PIPING & VALVES (SEE GENERAL NOTES 1 THRU 25)		<b>Temp/Press Limits :</b> 643 PSIG AT 100F ; 643 PSIG AT 200F; 510 PSIG AT 492F. (See Note 8 & 9)	

Item Name	Range		Det	Rev
Unique/Client* Code	from	to		
GATE VALVE 512GQ0015	1/2"	2"	GAT	
Body Mat'l : ASTM A105 Codes : API 602 Body constr. : BOLTED BONNET <b>Rating : 800#</b> <b>Ends : S.W.</b> Trim constr. : PLAIN SOLID WEDGE, O.S.& Y. Trim Mat'l : API TRIM N.10 (SS.316 TRIM) 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 VALVE 511GB0003	3"	24"	GAT	
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.10 (SS.316 TRIM) 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				

\* Client codes only, not including sizes



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Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	2
Compared with:		2	28 Feb 02

**GATE VALVE N**      **10"    24"**      **GATN**  
 511GB0004

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.10 (SS.316 TRIM)  
 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**  
 512GB0004

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.10 (SS.316 TRIM)  
 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**  
 512GQ0014

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : BOLTED BONNET, FULL PORT.  
**Rating : 800#**  
**Ends : S.W.**  
 Trim constr. : PLAIN SOLID WEDGE, FULL PORT, O.S. & Y.  
 Trim Mat'l : API TRIM N.10 (SS.316 TRIM)  
 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

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Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	3
Compared with:	2	28 Feb 02	

**DR/VE VALVE**      1/2"      2"      **GAD**  
 512EQ0005

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : EXTENDED BODY, BOLTED BONNET.  
**Rating : 800#**  
**Ends : MALE PE x FEMALE NPT**  
 Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.  
 Trim Mat'l : API TRIM N.10 (SS.316 TRIM)  
 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

**INSTR. VALVE**      1/2"      2"      **GAI**  
 512EQ0008

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : EXTENDED BODY, BOLTED BONNET.  
**Rating : 800#**  
**Ends : MALE NPT x FEMALE NPT**  
 Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.  
 Trim Mat'l : API TRIM N.10 (SS.316 TRIM)  
 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. FLG.**      1/2"      2"      **GAF**  
 512GB0006

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.10 (SS.316 TRIM)  
 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

\* Client codes only, not including sizes



Contract N.: 1310087902
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Table with 4 columns: Client Ref., Rev. No., Issue Date, Page. Contains specification details like Spec. No.: 10087902-SP-50-03 and Class: C2Z.

GLOBE VALVE 1/2" 2"
512DQ0003

GLO

Body Mat'l :ASTM A105
Codes : API 602 / ASME B16.34
Body constr. :BOLTED BONNET
Rating : 800#
Ends : S.W.
Trim constr. : LOOSE DISC, O.S. & Y.
Trim Mat'l :API TRIM N.10 (SS.316 TRIM)
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 3" 8"
511DB0002

GLO

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.10 (SS.316 TRIM)
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

CHECK VALVE 1/2" 2"
512CQ0004

CHE

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.10 (SS.316 TRIM)
Bolt Mat'l :PER API STANDARD 602.
Gasket Mat'l :PER API STANDARD 602.
Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9

\* Client codes only, not including sizes



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

Table with 4 columns: Client Ref., Rev. No., Issue Date, Page. Contains specification details like 'Piping Material Specification', 'Spec. No.: 10087902-SP-50-03', and 'Class: C2Z'.

CHECK VALVE 3" 24" CHE
511CB0002

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.10 (SS.316 TRIM)
Bolt Mat'l :PER API STANDARD 600.
Gasket Mat'l :PER API STANDARD 600.
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.

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" 12" 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 14" 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.

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Piping Material Specification			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	6
Compared with:	2	28 Feb 02	

<b>PIPE A/G</b>	<b>30"</b>	<b>36"</b>	<b>CALC</b>	<b>PIP</b>
<p>Material : C.S. ASTM A672 GR.C70 CL.22          Manufact. : E.F.W.          Codes : ASME B36.10          Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2          Ends : <b>B.E.</b></p>				
<b>PIPE A/G</b>	<b>3"</b>	<b>12"</b>	<b>SCH. STD</b>	<b>PIP2</b>
<p>541SGAAAC</p> <p>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>B.E.</b></p>				
<b>PIPE A/G</b>	<b>14"</b>	<b>24"</b>	<b>CALC</b>	<b>PIP2</b>
<p>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>B.E.</b></p>				
<b>PIPE A/G</b>	<b>3"</b>	<b>12"</b>	<b>SCH. STD</b>	<b>PIP8</b>
<p>541SGAAAE</p> <p>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></p>				
<b>PIPE A/G</b>	<b>14"</b>	<b>24"</b>	<b>CALC</b>	<b>PIP8</b>
<p>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></p>				

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<b>Spec. No. : 10087902-SP-50-03</b>			
<b>Class : C2Z</b>			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	7
Compared with:	2	28 Feb 02	

<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 : <b>T.O.E.</b>				
<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"	12"	<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>	14"	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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Piping Material Specification			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	8
Compared with:	2	28 Feb 02	

FLANGE W.N.      30"      36"      CALC      FWN7A

Type : W.N.  
 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

FLANGE W.N.      30"      36"      CALC      FWN7B

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

FLANGE      1/2"      1-1/2"      SCH. 160      FL1  
 561NB0011

Type : S.W.  
 Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **600#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

FLANGE      2"      2"      SCH. XS      FL1  
 561NB0009

Type : S.W.  
 Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **600#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

FLANGE      3"      12"      SCH. STD      FL1  
 561WB0006

Type : W.N.  
 Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **600#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

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Piping Material Specification			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	9
Compared with:	2	28 Feb 02	

<b>FLANGE</b>	<b>14"</b>	<b>24"</b>	<b>CALC</b>	<b>FL1</b>
Type : W.N. Material : ASTM A105 Codes : ASME B16.5 <b>Rating : 600#</b> <b>Ends : RF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE F.F.</b>	<b>1/2"</b>	<b>1-1/2"</b>	<b>SCH. 160</b>	<b>FLGFF</b>
561NB0012  Type : S.W. Material : ASTM A105 Codes : ASME B16.5 <b>Rating : 300#</b> <b>Ends : FF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE F.F.</b>	<b>2"</b>	<b>2"</b>	<b>SCH. XS</b>	<b>FLGFF</b>
561NB0010  Type : S.W. Material : ASTM A105 Codes : ASME B16.5 <b>Rating : 300#</b> <b>Ends : FF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE F.F.</b>	<b>3"</b>	<b>12"</b>	<b>SCH. STD</b>	<b>FLGFF</b>
561WB0007  Type : W.N. Material : ASTM A105 Codes : ASME B16.5 <b>Rating : 300#</b> <b>Ends : FF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				
<b>FLANGE F.F.</b>	<b>14"</b>	<b>24"</b>	<b>CALC</b>	<b>FLGFF</b>
Type : W.N. Material : ASTM A105 Codes : ASME B16.5 <b>Rating : 300#</b> <b>Ends : FF</b> Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2				

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Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	10
Compared with:		2	28 Feb 02

<b>RED.FLG. SW</b> 561NB0032	<b>1/2"</b>	<b>1-1/2"</b>	<b>SCH. 160</b>	<b>RFS</b>	[*] [*] [*] [*] [*] [*] [*]
Type : RED. 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>BLIND FLANGE</b> 561BB0004	<b>1/2"</b>	<b>24"</b>		<b>FBL</b>	
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>BLIND F.47/A</b> 561BB0006	<b>30"</b>	<b>36"</b>		<b>FBL7A</b>	
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>BLIND F.47/B</b> 561BB0005	<b>30"</b>	<b>36"</b>		<b>FBL7B</b>	
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>ORIFICE FLG</b> 561CB0007	<b>2"</b>	<b>2"</b>	<b>SCH. XS</b>	<b>FTR</b>	
Material : ASTM A105 Component : ORIFICE FLANGE SET, WELD NECK TYPE Codes : ASME B16.36 Rating : <b>300#</b> Ends : <b>RF</b> 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).					

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Contract N.: 1310087902
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Table with Piping Material Specification header and a grid containing Client Ref. (VALERO), Rev. No. (3), Issue Date (03 Jun 02), Page (11), and Compared with (2, 28 Feb 02).

ORIFICE FLG 3" 12" SCH. STD FTR
561CB0008

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 14" 16" CALC 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 FTRI
561CB0009

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" 12" SCH. STD FTRI
561CB0010

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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Table with 4 columns: Client Ref., Rev. No., Issue Date, Page. Contains revision history for Piping Material Specification.

ORIFICE FLG 14" 16" CALC FTRI

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).

90 ELBOW 1/2" 1-1/2" 90E

551HB0010

Material : C.S. ASTM A105
Component : 90 DEGREES ELBOWS
Codes : ASME B16.11
Rating : 6000#
Ends : S.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

90 ELBOW 2" 2" 90E

551HB0001

Material : C.S. ASTM A105
Component : 90 DEGREES ELBOWS
Codes : ASME B16.11
Rating : 3000#
Ends : S.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

90 ELBOW 3" 12" SCH. STD 90E

551EF0001

Material : C.S. ASTM A234 WPB
Component : 90 DEGREES LONG RADIUS
Codes : ASME B16.9
Manufact. : SMLS
Ends : B.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

90 ELBOW 14" 24" CALC 90E

Material : C.S. ASTM A234 WPB
Component : 90 DEGREES LONG RADIUS
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			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	14
Compared with:	2	28 Feb 02	

<b>45 ELBOW</b>	<b>30"</b>	<b>36"</b>	<b>CALC</b>	<b>45E</b>
-----------------	------------	------------	-------------	------------

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

<b>CAP</b>	<b>1/2"</b>	<b>1-1/2"</b>		<b>CAP</b>
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

<b>CAP</b>	<b>2"</b>	<b>2"</b>		<b>CAP</b>
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

<b>CAP</b>	<b>3"</b>	<b>12"</b>	<b>SCH. STD</b>	<b>CAP</b>
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

<b>CAP</b>	<b>14"</b>	<b>24"</b>	<b>CALC</b>	<b>CAP</b>
------------	------------	------------	-------------	------------

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

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Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	17
Compared with:	2	28 Feb 02	

TEE 2" 2" TEE  
551HB0006

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

TEE 3" 12" SCH. STD TEE  
551EF0007

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 14" 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

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#**

\* 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			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	19
Compared with:	2	28 Feb 02	

**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

**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#**

\* 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			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	21
Compared with:	2	28 Feb 02	

**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			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	23
Compared with:	2	28 Feb 02	

**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

**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

\* 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			
Spec. No. : 10087902-SP-50-03			
Class : C2Z			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	24
Compared with:	2	28 Feb 02	

**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)

Table with Piping Material Specification header and Client Ref., Rev. No., Issue Date, Page, and Compared with details.

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

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

\* Client codes only, not including sizes



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 : C2Z</b>			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	3	03 Jun 02	26
Compared with:	2	28 Feb 02	

**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.) Dets 'GAF' AND 'GAF1' Are To Be Used At Flanged Equipment Or When Required At Instrument.

3.) 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.

4.) Check Valves When Install In The Horizontal Position Shall Be Bonnet Cover Up & Those Install In The Vertical Position Shall Be Flow Up Only.

5.) Gear Operated Valves Shall Be Used When Indicated On The EFD'S.

6.) A Minimum Of 0.10" Corrosion Allowance May Be Used To Substantiate Wall Schedule For Boderline Cases. Such Cases Must Be Approved By The Project Engineering Manager And A Remark Added To The Line List.

7.) Heat Treatment Noted Is For General Fabrication. Weld Size For Fillet and/OR Branch Connections Shall Govern Per ASME B31.3 Para. 331.1.3. Heat Treatment For Bends Shall Be Per ASME B31.3 Parra. 332.4.1 & 332.4.2 And Specs 52A5 And 52A6 Accordingly.

8.) 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.

9.) 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.

10.) 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.

11.) All Fabrication Shall Comply With 52A1.

12.) Pipe Supports And Spring Hangers Shall Comply With 59A2 And 59A3 Respectively.

13.) 'BEP' Nipples Shall Be Cut From Pipe.

14.) The Crotch Thickness Of The Branch Outlet Of Buttweld Tees 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.

15.) Use Union Or Coupling To Join Pipe. Flanged Joint To Be Used Only Where Indicated On EFD'S.

16.) Couplings Shall Not Be Used For Branch Connections Use Inline Only.

17.) Use Flat Face Valve, Flange & Full Face Gasket To Mate With Flat Face Nozzles Only.

18.) Flanges Shall Not Be Insulated.

19.) Temperature Instrument Connection Shall Be NPS 1-1/2" Flanged.

20.) Pressure Instrument Connection Shall Be NPS 3/4" Socket-weld.

21.) 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.

22.) Branch Connections Should Follow The Guidelines Of Job Spec 52B2 And The Attachment Unless Specifically Overriden By The

\* 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 : C2Z</b>			
Client Ref.	Rev. No.	Issue Date	Page
VALERO	<b>3</b>	<b>03 Jun 02</b>	<b>27</b>
Compared with:	<b>2</b>	<b>28 Feb 02</b>	

Pipe Stress Engineer.

23.) CORR-A-SEAL / GRAPHONICS Gaskets Shall Be Used For Flat Face Flanges.

24.) Concentric & Eccentric Reducers Are Limited To 2 Nominal Diameter Size Reductions Without Piping Engineer Approval.

25.) Remove Temporary Strainers After Flushing.

END OF DOCUMENT

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

**Piping Material Specification**

**Spec. No.: 10087902-SP-50-03**  
**Class: C2Z**

**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
Compared with:			

**ATTACHMENT "A"**

REINFORCEMENT CHART																				
APPLICABLE TO PIPE SPECIFICATION (S) : C2Z																				
MATERIAL (S) : CARBON STEEL, SMLS ASTM A106 GR. B											P/SE :		C.A. : 0.125"							
CARBON STEEL, EFW, ASTM A672 GR. C70 CL.22																				
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	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	T							
16	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	T						
18	CALC	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	T					
20	CALC	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.**