



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 : N1                    |          |            |      |
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Appr. by: L.SMITH

Issued for : E  
Issued by: T.WILLIAMSON

Checked by: T.WILLIAMSON

|  |                                    |  |  |
|--|------------------------------------|--|--|
| <b>Service:</b><br>STEAM, BOILER FEED WATER, AND CONDENSATE,<br>(FOR BRANCH CONNECTIONS SEE ATTACHMENT "A" ) |                                    |  |  |
| <b>Gaskets :</b><br>SPIRAL WOUND<br>GRAPHITE /<br>S.S.304  | <b>Rating/Facing :</b><br>CL150 RF | <b>Corrosion :</b><br>0.063"<br>(1.5MM)<br>See Note 7  | <b>Facing Finish :</b><br>ASME B16.5             |
|  |                                    | <b>Block Valve Trim :</b><br>API TRIM No. 8  | <b>Weld Quality Insp :</b><br>PER JOB SPEC -52A1 |
|  |                                    |  | <b>Stress Relief :</b><br>NO (See Note 8)        |
| <b>Materials :</b><br>CARBON STEEL PIPING & VALVES (SEE<br>GENERAL NOTES 1 THRU 27)                          |                                    | <b>Temp/Press Limits :</b><br>285 PSIG AT -20F TO 100F ; 260 PSIG AT 200F ; 230 PSIG AT 300F ; 200<br>PSIG AT 400F ; 170 PSIG AT 500F ; 140 PSIG AT 600F ; 125 PSIG AT 650F<br>; 110 PSIG AT 700F ; 95 PSIG AT 750F MAX. TEMP. (See Note 9 & 10) |  |

| Item Name   | Range       |            | Det        | Rev |
|---|-------------|------------|------------|-----|
| Unique/Client* Code   | from        | to         |            |     |
| <b>GATE VALVE</b><br>512GQ0004  | <b>1/2"</b> | <b>2"</b>  | <b>GAT</b> |     |
| Body Mat'l : ASTM A105<br>Codes : API 602<br>Body constr. : WELDED BONNET<br><b>Rating : 800#</b><br><b>Ends : S.W.</b><br>Trim constr. : PLAIN SOLID WEDGE, O.S.& Y.<br>Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)<br>Bolt Mat'l : PER API STANDARD 602.<br>Packing : GRAPHITE PACKING .<br>Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9<br>Operator : HANDWHEEL  |             |            |            |     |
| <b>GATE VALVE</b><br>511GA0001  | <b>3"</b>   | <b>24"</b> | <b>GAT</b> |     |
| Body Mat'l : ASTM A216 GR.WCB<br>Codes : API 600<br>Body constr. : BOLTED BONNET<br><b>Rating : 150#</b><br><b>Ends : RF</b><br>Face finish : ASME B16.5<br>Trim constr. : PLAIN OR FLEXIBLE SOLID WEDGE, O.S.& Y.<br>Trim Mat'l : API TRIM N.8 (STELLITE BODY SEATS)<br>Bolt Mat'l : PER API STANDARD 600.<br>Gasket Mat'l : PER API STANDARD 600.<br>Packing : GRAPHITE PACKING .<br>Note : GENERAL NOTES FOR VALVES: SEE JOB SPEC 59B9<br>Operator : HANDWHEEL |             |            |            |     |

\* Client codes only, not including sizes



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**GATE VALVE N**      **14"**      **24"**      **GATN**  
 511GA0002

Body Mat'l : ASTM A216 GR.WCB  
 Codes : API 600  
 Body constr. : BOLTED BONNET  
**Rating : 150#**  
**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**  
 512GA0001

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : BOLTED BONNET, FULL PORT.  
**Rating : 150#**  
**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"**      **GAFP1**  
 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

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

GATST

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  
 Operator : HANDWHEEL

GATE V. FLG. 1/2" 2"  
512GA0005

GAF

Body Mat'l : ASTM A105  
 Codes : API 602  
 Body constr. : BOLTED BONNET  
**Rating : 150#**  
**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

GATE V. FLG. 1/2" 2"  
512GB0005

GAF1

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

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GATE V. FLG. 3" 24" GAF1  
511GB0002

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 : 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  
511DA0002

Body Mat'l : ASTM A216 GR.WCB  
Codes : API 600 / ASME B16.34  
Body constr. : BOLTED BONNET  
Rating : 150#  
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"
512CQ0003

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.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"
511CA0002

CHE

Body Mat'l :ASTM A216 GR.WCB
Codes : API 600 / ASME B16.34
Body constr. :BOLTED CAP
Rating : 150#
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

PIPE A/G 1/2" 2" SCH. XS
541SG0001

PIP

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" 24" SCH. STD
541SG0002

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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| PIPE A/G                     | 30"         | 36"        | CALC   | PIP                                    |
|------------------------------|-------------|------------|--|--|
|                              |             |            | Material : C.S. ASTM A672 GR.C70 CL.12<br>Manufact. : E.F.W.<br>Codes : ASME B36.10<br>Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2<br>Ends : B.E.  |  |
| <u>PIPE A/G</u><br>541SGAAAD | <u>1/2"</u> | <u>2"</u>  | SCH. XS  | PIP2 [*]                               |
|                              |             |            | Material : KILLED C.S. ASTM A106 GR.B<br>Manufact. : SMLS<br>Coating : PAINTING SYSTEM NO. 2, PER VALERO JOB SPEC NO. SP-80-02.<br>Codes : ASME B36.10<br>Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2<br>Ends : P.E. | [*]<br>[*]<br>[*]<br>[*]<br>[*]<br>[*] |
| <u>PIPE A/G</u><br>541SGAAAC | <u>3"</u>   | <u>24"</u> | SCH. STD   | PIP2 [*]                               |
|                              |             |            | Material : KILLED C.S. ASTM A106 GR.B<br>Manufact. : SMLS<br>Coating : PAINTING SYSTEM NO. 2, PER VALERO JOB SPEC NO. SP-80-02.<br>Codes : ASME B36.10<br>Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2<br>Ends : B.E. | [*]<br>[*]<br>[*]<br>[*]<br>[*]<br>[*] |
| <u>PIPE A/G</u><br>541SGAAAF | <u>1/2"</u> | <u>2"</u>  | SCH. XS  | PIP8 [*]                               |
|                              |             |            | Material : KILLED C.S. ASTM A106 GR.B<br>Manufact. : SMLS<br>Coating : PAINTING SYSTEM NO. 8, PER VALERO JOB SPEC NO. SP-80-02.<br>Codes : ASME B36.10<br>Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2<br>Ends : P.E. | [*]<br>[*]<br>[*]<br>[*]<br>[*]<br>[*] |
| <u>PIPE A/G</u><br>541SGAAAE | <u>3"</u>   | <u>24"</u> | SCH. STD   | PIP8 [*]                               |
|                              |             |            | Material : KILLED C.S. ASTM A106 GR.B<br>Manufact. : SMLS<br>Coating : PAINTING SYSTEM NO. 8, PER VALERO JOB SPEC NO. SP-80-02.<br>Codes : ASME B36.10<br>Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2<br>Ends : B.E. | [*]<br>[*]<br>[*]<br>[*]<br>[*]<br>[*] |

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**FLANGE W.N.**      **30"**    **36"**    **CALC**      **FWN7B**

Type : W.N.  
 Material : ASTM A105  
 Codes : ASME B16.47 "B" ( EX API-605 )  
 Rating : **150#**  
 Ends : **RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**FLANGE**      **1/2"**    **2"**    **SCH. XS**      **FL1**  
 561NB0005

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

**FLANGE**      **3"**    **24"**    **SCH. STD**      **FL1**  
 561WB0005

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

**FLANGE**      **3"**    **24"**    **SCH. STD**      **FL2** [\*]  
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

[\*]  
 [\*]  
 [\*]  
 [\*]  
 [\*]  
 [\*]

**FLANGE F.F.**      **1/2"**    **2"**    **SCH. XS**      **FLGFF**  
 561NB0003

Type : S.W.  
 Material : ASTM A105  
 Codes : ASME B16.5  
 Rating : **150#**  
 Ends : **FF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

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**FLANGE F.F.**      3"      24"      **SCH. STD**      **FLGFF**  
561WB0001

Type : W.N.  
Material : ASTM A105  
Codes : ASME B16.5  
**Rating : 150#**  
**Ends : FF**  
Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**BLIND FLANGE**      1/2"      24"      **FBL**  
561BB0001

Material : ASTM A105  
Codes : ASME B16.5  
**Rating : 150#**  
**Ends : RF**  
Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**BLIND F.47/A**      30"      36"      **FBL7A**  
561BB0003

Material : ASTM A105  
Codes : ASME B16.47 "A" ( EX MSS-SP44 )  
**Rating : 150#**  
**Ends : RF**  
Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**BLIND F.47/B**      30"      36"      **FBL7B**  
561BB0002

Material : ASTM A105  
Codes : ASME B16.47 "B" ( EX API-605 )  
**Rating : 150#**  
**Ends : RF**  
Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

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

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).

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**ORIFICE FLG**      3"      16"      **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**      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"      16"      **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).

**90 ELBOW**      1/2"      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

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**90 ELBOW**      3"      24"      **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**      30"      36"      **CALC**      **90E**

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

**45 ELBOW**      1/2"      2"      **45E**  
551HB0002

Material : C.S. ASTM A105  
Component : 45 DEGREES ELBOWS  
Codes : ASME B16.11  
Rating : **3000#**  
Ends : **S.W.**  
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

**45 ELBOW**      3"      24"      **SCH. STD**      **45E**  
551EF0003

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

\* 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 : N1                    |          |            |           |
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**ECC.SWAGE**      1/2"      2"      **SCH. XS**      **ESA**  
 551SC0030

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. XS**      **ESC**  
 551SC0007

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

**ELBOLET SW**      1/2"      36"      **SCH. STD**      **ELBS**  
 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"      **SCH. STD**      **SOL**  
 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





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 |          |            |      |
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**WELDOLET**      3"      24"      SCH. STD      WOL

551WB0002

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

**LATROLET BW**      3"      8"      SCH. STD      LATBW

551WB0003

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

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

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"      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

**STEAM TRAP**      3/4"      3/4"      STR

579DA0002

Body Mat'l : ASTM A105  
 Intern.Mat'l : S.S. TYPE 304  
 Type : DISC-TYPE THERMODYNAMIC TRAP, INTEGRAL STRAINER WITH SS  
 SCREEN AND INTEGRAL BLOW-OFF VALVE.SPIRAX/SARCO UTD-52L.  
 Gasket Mat'l : AS PER MANUFACTURER'S STANDARD (ASBESTOS NOT PERMITTED)  
 Rating : **600#**  
 Ends : **S.W.**

\* 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 |          |            |      |
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**Y STRAINER**      1/2"      2"      **YST**  
 592YA0012

Body Mat'l : ASTM A216 GR.WCB  
 Codes : ACCORDING TO MANUFACTURER'S STD  
 Body constr. : BOLTED CAP  
**Rating : 600#**  
**Ends : S.W.**  
 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.

**Y STRAINER**      3"      4"      **SCH. STD**      **YST**  
 592YA0003

Body Mat'l : ASTM A216 GR.WCB  
 Codes : ACCORDING TO MANUFACTURER'S STD  
 Body constr. : BOLTED CAP  
**Rating : 150#**  
**Ends : B.W.**  
 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.

**TEMP. CONIC.**      2"      24"      **TCS**  
 592TE0001

**Rating : 150#**  
 Codes : ASME B16.5  
**Ends : RF**  
 Material : C.S. CONICAL SCREEN.  
 Mesh size : 14 GA PERFORATED PLATE WITH 1/8" DIA. HOLES ON 3/16" CENTERS,  
 200% OPEN AREA.

**FIGURE 8**      6"      12"      **F8F**  
 561FP0002

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 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 |          |            |      |
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**PADDLE BLIND**      1"      4"      **PBL**  
 561PP0003

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**PADDLE BLIND**      14"      24"      **PBL**  
 561PP0003

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**PAD.B16.47/B**      30"      36"      **PAD7B**  
 561PP0011

Material : ASTM A516 GR.70  
 Codes : ASME B16.47 "B" ( EX API-605 )  
**Rating : 150#**  
**Ends : RF**  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

**DRIP RING**      1"      12"      **DRI**  
 561DP0008

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**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**  
 561RP0003

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**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 |          |            |      |
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**SPACER RING**      14"      24"      SPA

561RP0003

Material : ASTM A516 GR.70  
 Codes : ASME B16.48  
**Rating : 150#**  
**Ends : RF**  
 Face finish : ASME B16.5  
 Note : FLANGES SHALL COMPLY WITH JOB SPECS 50A2 AND 52A2

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

561RP0011

Material : ASTM A516 GR.70  
 Codes : ASME B16.47 "B" ( EX API-605 )  
**Rating : 150#**  
**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

574SC0001

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 : 150#**  
 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)

| Piping Material Specification |          |            |           |
|-------------------------------|----------|------------|-----------|
| Spec. No. : 10087902-SP-50-03 |          |            |           |
| Class : N1                    |          |            |           |
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**GASK.16.47/A**      **30"**    **36"**      **GA2**  
574SC0002

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 : **150#**  
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**  
574SA0001

Material : SPIRAL WOUND SS.304/GRAPHITE  
Codes : DIMENSIONS PER ASME B16.20  
Thickness : 3.2 MM (1/8")  
Rating : **150#**  
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**  
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**

\* 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 |          |            |      |
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|  |                    |                   |             |  |
|--|--------------------|-------------------|-------------|--|
| <b><u>GASKET</u></b><br><u>574SA0003</u>   | <b><u>1/2"</u></b> | <b><u>24"</u></b> | <b>GAS2</b> | [*]                                    |
| Material : SPIRAL WOUND SS.304/GRAPHITE<br>Codes : DIMENSIONS PER ASME B16.20<br>Thickness : 3.2 MM (1/8")<br><b>Rating : 600#</b><br>Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING<br>Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.<br><b>Ends : RF</b> |                    |                   |             | [*]<br>[*]<br>[*]<br>[*]<br>[*]<br>[*] |

|  |             |            |              |  |
|--|-------------|------------|--------------|--|
| <b>GASKET FF</b><br>574Cy0001  | <b>1/2"</b> | <b>24"</b> | <b>GASFF</b> |  |
| Material : FLEXIBLE GRAPHITE ENCAPSULATED GASKET. CORR-A-SEAL / GRAPHONICS<br>Codes : DIMENSIONS PER ASME B16.21<br>Thickness : 1.6 MM (1/16")<br><b>Rating : 150#</b><br>Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3<br><b>Ends : FF</b> |             |            |              |  |

**General Notes:**

- 1.) Use Extended Body Gate Valves, Threaded Outlet, For Branch 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.
- 5.) Check Valves When Installed InThe 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 0.05" 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 Connections 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.)

\* Client codes only, not including sizes

Continue....



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 : N1</b>                    |          |            |      |
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\* 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 Supports 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 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 Coupling To Join Pipe. Flanged Joint To Be Used Only Where Required For Breakout.
- 18.) Couplings Shall Not Be Used For Branch Connections Use Inline Only.
- 19.) Use Flat Face Valve, Flange & Full Face Gaskett 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.

END OF DOCUMENT

\* Client codes only, not including sizes



Foster Wheeler USA Corporation

**Piping Material Specification**

**Spec. No.: 10087902-SP-50-03**  
**Class: N1**

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

|                       |               |                        |           |
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**ATTACHMENT "A"**

| REINFORCEMENT CHART   |             |  |     |    |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
|---|-------------|--|-----|----|-------|----|---|---|---|--------|----|---------------|----|----|----|----|----|-------|--|
| APPLICABLE TO PIPE SPECIFICATION (S) : N1                               |             |  |     |    |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
| MATERIAL (S) : CARBON STEEL, SMLS, ASTM A106 GR. B                      |             |  |     |    |       |    |   |   |   | P/SE : |    | C.A. : 0.063" |    |    |    |    |    |       |  |
| CARBON STEEL, EFW, ASTM, A672 GR. C70 CL. 12                            |             |  |     |    |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
| DESIGN LIMIT (S) : 285 PSIG AT -20F TO 100F; 95 PSIG AT 750F 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   | XS          | T  |     |    |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
| 3/4   | XS          | RT   | T   |    |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
| 1   | XS          | RT   | RT  | T  |       |    |   |   |   |        |    |               |    |    |    |    |    |       |  |
| 1 1/2   | XS          | 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             | P2 | T  |    |    |    |       |  |
| 18  | STD         | SK   | SK  | SK | SK    | SK | W | W | W | W      | W  | W             | P2 | P2 | T  |    |    |       |  |
| 20  | STD         | SK   | SK  | SK | SK    | SK | W | W | W | W      | W  | W             | P2 | P2 | P2 | T  |    |       |  |
| 24  | STD         | SK   | SK  | SK | SK    | SK | W | W | W | W      | W  | W             | P3 | P3 | P4 | P4 | T  |       |  |
| 30/36   | CALC        | SK   | SK  | SK | SK    | SK | W | W | W | W      | W  | W             | 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.**