



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 : CD2			
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

Service: PROCESS FLUIDS, (PWHT REQUIRED FOR ALL WELD SEE JOB SPEC -88A1.) (FOR BRANCH CONNECTIONS SEE ATTACHMENT "A")			
Gaskets : SPIRAL WOUND GRAPHITE / S.S.304	Rating/Facing : CL300 RF	Corrosion : 0.125" (3.0MM) See Note 6	Facing Finish : ASME B16.5
		Block Valve Trim : API TRIM No. 8	Weld Quality Insp : PER JOB SPEC -52A1
			Stress Relief : YES (See Note 7)
Materials : 5 CR.-1/2 MO. PIPING & VALVES (SEE GENERAL NOTES 1 THRU 25)		Temp/Press Limits : 418 PSIG AT -20F TO 415F (< 18") ; 386 PSIG AT 641F (< 20") ; 65 PSIG AT 840F ; (See Note 8 & 9)	

Item Name	Range		Det	Rev
Unique/Client* Code	from	to		
GATE VALVE 514GQ0012	1/2"	2"	GAT	
Body Mat'l : ASTM A182 GR.F5 Codes : API 602 Body constr. : BOLTED BONNET Rating : 800# Ends : S.W. 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 VALVE 513GB0003	3"	24"	GAT	
Body Mat'l : ASTM A217 GR.C5 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				

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GATE VALVE N **10" 24"** **GATN**
 513GB0004

Body Mat'l : ASTM A217 GR.C5
 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**
 514GB0002

Body Mat'l : ASTM A182 GR.F5
 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**
 514GQ0011

Body Mat'l : ASTM A182 GR.F5
 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.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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DR/VE VALVE 1/2" 2" **GAD**
 514EQ0006

Body Mat'l : ASTM A182 GR.F5
 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.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

INSTR. VALVE 1/2" 2" **GAI**
 514EQ0005

Body Mat'l : ASTM A182 GR.F5
 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.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" **GAF**
 514GB0001

Body Mat'l : ASTM A182 GR.F5
 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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GLOBE VALVE 1/2" 2" **GLO**
514DQ0005

Body Mat'l :ASTM A182 GR.F5
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.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 3" 8" **GLO**
513DB0002

Body Mat'l :ASTM A217 GR.C5
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

CHECK VALVE 1/2" 2" **CHE**
514CQ0005

Body Mat'l :ASTM A182 GR.F5
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

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Table with Piping Material Specification details including Spec. No., Class, Client Ref., Rev. No., Issue Date, and Page.

CHECK VALVE 3" 24" CHE
513CB0002

Body Mat'l :ASTM A217 GR.C5
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
514CB0001

Body Mat'l :ASTM A182 GR.F5
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
542SF0001

Material : ASTM A335 GR.P5
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
542SF0002

Material : ASTM A335 GR.P5
Manufact. : SMLS
Codes : ASME B36.10
Note : PIPE SHALL COMPLY WITH JOB SPEC 52A2
Ends : P.E.

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ORIFICE FLG 2" 2" SCH. XS 562CH0005 FTR

Body Mat'l : ASTM A182 GR.F5
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 562CH0006 FTR

Body Mat'l : ASTM A182 GR.F5
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 562CH0003 FTR

Body Mat'l : ASTM A182 GR.F5
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 : WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

ORIFICE FLG 3" 16" SCH. STD 562CH0004 FTR

Body Mat'l : ASTM A182 GR.F5
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 : WITHOUT BOLTS AND GASKETS. FLANGES SHALL COMPLY WITH JOB SPECS 50A2, 52A2, AND 57B12 (JACK SCREWS).

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CONC. RED. **30" 36" SCH. STD** **CRE**
552RN0003

Material : ASTM A234 GR.WP5
Component : CONCENTRIC REDUCER
Codes : ASME B16.9
Manufact. : WELDED
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

ECC.RED. **3" 24" SCH. STD** **ERE**
552RN0002

Material : ASTM A234 GR.WP5
Component : ECCENTRIC REDUCER
Codes : ASME B16.9
Manufact. : SMLS
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

ECC.RED. **30" 36" SCH. STD** **ERE**
552RN0004

Material : ASTM A234 GR.WP5
Component : ECCENTRIC REDUCER
Codes : ASME B16.9
Manufact. : WELDED
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

TEE **1/2" 1-1/2"** **TEE**
552HH0007

Material : ASTM A182 GR.F5
Component : TEE
Codes : ASME B16.11
Rating : **6000#**
Ends : **S.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

TEE **2" 2"** **TEE**
552HH0011

Material : ASTM A182 GR.F5
Component : TEE
Codes : ASME B16.11
Rating : **3000#**
Ends : **S.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

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CONC.SWAGE 1/2" 4" **SCH. 160** **CSC**
552ST0002

Material : ASTM A335 GR.P5
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**
552ST0003

Material : ASTM A335 GR.P5
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**
552ST0004

Material : ASTM A335 GR.P5
Component : ECCENTRIC SWAGE
Codes : MANUFACTURED TO ASTM A234
Manufact. : SMLS
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2
Ends : **LEB-SEP**

ELBOLET BW 3" 36" **SCH. STD** **ELBBW**
552WH0001

Material : ASTM A182 GR.F5
Component : ELBOLET
Codes : MSS SP97
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

ELBOLET SW 1/2" 36" **SCH. STD** **ELBS**
552LH0001

Material : ASTM A182 GR.F5
Component : ELBOLET
Codes : MSS SP97
Ends : **S.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2
Rating : **6000#**

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WELDOLET 3" 36" SCH. STD WOL
552WH0002

Material : ASTM A182 GR.F5
Component : WELDOLET
Codes : MSS SP97
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

FLAT WOL 3" 36" SCH. STD WOF
552WH0004

Material : ASTM A182 GR.F5
Component : FLAT WELDOLET
Codes : MSS SP97
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

LATROLET BW 3" 36" SCH. STD LATBW
552WH0003

Material : ASTM A182 GR.F5
Component : LATROLET
Codes : MSS SP97
Ends : **B.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

LATROLET SW 1/2" 36" LATS
552LH0003

Material : ASTM A182 GR.F5
Component : LATROLET
Codes : MSS SP97
Ends : **S.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2
Rating : **6000#**

LATROLET SW 2" 36" LATS1
552LH0006

Material : ASTM A182 GR.F5
Component : LATROLET
Codes : MSS SP97
Ends : **S.W.**
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2
Rating : **3000#**

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SPACER RING 1" 4" SPA

562RU0004

Material : ASTM A387 GR.5 CL.1
 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

562RU0004

Material : ASTM A387 GR.5 CL.1
 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

562RU0007

Material : ASTM A387 GR.5 CL.1
 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

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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

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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

GASK. SPIR.W 1/2" 24" GASK
574SC0008

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 / 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

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 Installed 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 Selection 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 Be 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.
8.) Where Pipe Schedule Is Shown, It Is Adequate For The Conditions Lisited In The Temp/Press Limits. 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:

* 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. Row 1: VALERO, 3, 03 Jun 02, 23. Row 2: Compared with: 2, 28 Feb 02.

* 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 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 Connection Should Follow The Guidelines Of Job Spec 52B2 And The Attachment Unless Specifically Overriden By The Pipe Stress Engineer.
23.) CORR-A-SEAL / GRAPHONICS Gaskets Shall Be Used For Flat Face Flanges.
24.) Det 'GASK' To Be Used for Coke Drum Inlet & Overhead Lines.
25.) Concentric & Eccentric Reducers Are Limited To 2 Nominal Diameter Size Reductions Without Piping Engineering Approval.
26.) 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: CD2

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) : CD2																				
MATERIAL (S) : 5CR-1/2MO, SMLS, ASTM A335 GR P5											P/SE :		C.A. : 0.125"							
5CR-1/2MO, EFW, ASTM A691, GR 5CR CL 22																				
DESIGN LIMIT (S) : 750 PSIG AT -20F TO 100F; 200 PSIG AT 1000F 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	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	T			
30	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	CA	T		
36	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	CA	CA	CA	CA	CA	CA	T	

LEGEND :

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