



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 : A2S			
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Appr. by: L.SMITH

Issued for : E
Issued by: T.WILLIAMSON

Checked by: T.WILLIAMSON

Service:
SOUR PROCESS FLUIDS,
(FOR BRANCH CONNECTIONS SEE ATTACHMENT "A")

Gaskets : SPIRAL WOUND GRAPHITE / S.S.304	Rating/Facing : CL150 RF	Corrosion : 0.125" (3.0MM) See Note 7	Facing Finish : ASME B16.5	Block Valve Trim : API TRIM No. 10	Weld Quality Insp : PER JOB SPEC -52A1	Stress Relief : NO (See Note 8 & 9)
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Materials : CARBON STEEL PIPING & VALVES (SEE GENERAL NOTES 1 THRU 27)	Temp/Press Limits : 285 PSIG AT -20F TO 100F ; 260 PSIG AT 200F ; 230 PSIG AT 300F ; 200 PSIG AT 400F ; 170 PSIG AT 500F ; 140 PSIG AT 600F ; 125 PSIG AT 650F ; 110 PSIG AT 700F ; 95 PSIG AT 750F MAX. TEMP. (THUR 24") (30"-36"- 260 PSIG AT 100F) (See Note 10)
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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 Rating : 800# Ends : S.W. 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 511GA0003	3"	24"	GAT	
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.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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GATE VALVE N 4" 24"
511GA0004

GATN

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.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 VALVE N 30" 36"
511GA0012

GATN

Body Mat'l : ASTM A216 GR.WCB
Codes : API 600 (ASME B16.47 "B" FOR FLANGE DIMENSIONS ABOVE 24")
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.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"
512GA0003

GAFP

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.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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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.SWxTH 1/2" 2" **GATST**
512GQ0013

Body Mat'l :ASTM A105
Codes : API 602
Body constr. : BOLTED BONNET
Rating : 800#
Ends : S.W. x THDD
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**
512GA0006

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.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
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GATE V. FLG. 1/2" 2" GAF1
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

GATE V. FLG. 3" 24" GAF1
511GB0003

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 : HANDWHEEL

GLOBE VALVE 1/2" 2" GLO
512DQ0003

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

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GLOBE VALVE 3" 8" **GLO**
511DA0003

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.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" **CHE**
512CQ0004

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

CHECK VALVE 3" 24" **CHE**
511CA0003

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.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

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PIPE A/G 541SGAAAG	1/2"	1-1/2"	SCH. 160	PIP8	
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 : P.E.					
<u>PIPE A/G</u> <u>541SGAAAF</u>	<u>2"</u>	<u>2"</u>	SCH. XS	PIP8	[*]
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 : P.E.					[*] [*] [*] [*] [*] [*]
PIPE A/G 541SGAAAE	3"	24"	SCH. STD	PIP8	
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.E.					
PIPE A/G 541SG0003	2"	2"	SCH. 160	PIPP	
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.					
NIPPLES 551NC0002	1/2"	2"	SCH. XXS	NIP	
Material : C.S. ASTM A106 GR.B Codes : ASME B36.10 Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2 Ends : T.O.E.					

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FLANGE W.N. **30"** **36"** **SCH. STD** **FWN7B**
 561WB0003

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"** **1-1/2"** **SCH. 160** **FL1**
 561NB0006

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 **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

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FLANGE F.F. **1/2"** **1-1/2"** **SCH. 160** **FLGFF**
561NB0007

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

FLANGE F.F. **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

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

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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

BLIND FLANGE **1/2"** **24"** **FB1** [*]
561BB0004

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

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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).

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).

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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" 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

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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" **SCH. STD** **45E**
551EF0004

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

CAP 1/2" 1-1/2" **CAP**
551HB0012

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

CAP 2" 2" **CAP**
551HB0003

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

CAP 3" 24" **SCH. STD** **CAP**
551EF0006

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

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CAP 30" 36" SCH. STD 551EF0005 Material: C.S. ASTM A234 WPB Component: CAP Codes: ASME B16.9 Manufact.: WELDED Ends: B.W. Note: FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

PLUG 1/2" 2" 551HB0004 Material: C.S. ASTM A105 Component: PLUG ROUND BAR STOCK L=75 MM (3") Codes: ASME B16.11 Ends: SCRD Note: FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

PLUG ORI 1/2" 1/2" 551HB0005 Material: C.S. ASTM A105 Component: PLUG ROUND BAR STOCK L=75 MM (3") Codes: ASME B16.11 Ends: P.E. Note: FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CONC. RED. 3" 24" SCH. STD 551RF0001 Material: C.S. ASTM A234 WPB Component: CONCENTRIC REDUCER Codes: ASME B16.9 Manufact.: SMLS Ends: B.W. Note: FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

CONC. RED. 30" 36" SCH. STD 551RF0002 Material: C.S. ASTM A234 WPB Component: CONCENTRIC REDUCER Codes: ASME B16.9 Manufact.: WELDED Ends: B.W. Note: FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

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ECC.RED. 3" 24" SCH. STD ERE
551RF0003
Material : C.S. ASTM A234 WPB
Component : ECCENTRIC REDUCER
Codes : ASME B16.9
Manufact. : SMLS
Ends : B.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

ECC.RED. 30" 36" SCH. STD ERE
551RF0004
Material : C.S. ASTM A234 WPB
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
551HB0013
Material : C.S. ASTM A105
Component : TEE
Codes : ASME B16.11
Rating : 6000#
Ends : S.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

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" 24" 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

* Client codes only, not including sizes



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

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

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

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

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

ELBOLET BW 3" 36" **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**
 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" **SCH. STD** **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#**

* Client codes only, not including sizes



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

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LATROLET BW 3" 36" 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
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

* Client codes only, not including sizes



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

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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

UNION 2" 2" GRO
551HB0009

Material : C.S. ASTM A105
Component : UNION, GROUND JOINT, INTEGRAL CS SEATS
Codes : MSS SP83
Rating : 3000#
Ends : S.W.
Note : FITTINGS SHALL COMPLY WITH JOB SPEC 52A2

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.

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.

* Client codes only, not including sizes



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

Piping Material Specification			
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TEMP. CONIC. 30" 36" TCS
592TE0002

Rating : 150#
Codes : ASME B16.47 "B" (EX API-605)
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

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

* Client codes only, not including sizes



Foster Wheeler USA Corporation

Contract N.: 1310087902

Client: Valero Refining Company - Texas

Location: Texas City, Texas

Project: Valero Refinery Reconfiguration (TCRR)

Piping Material Specification			
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DRIP RING	1"	12"	DRI
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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
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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

SPACER RING	14"	24"	SPA
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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
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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
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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

* Client codes only, not including sizes



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

Piping Material Specification			
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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**

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**

* Client codes only, not including sizes



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

Piping Material Specification			
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GASKET 574SA0002	1/2"	24"	GAS1
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			
GASK.16.47/A 574SC0009	30"	36"	GAS1A
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			
GASK.16.47/B 574SC0010	30"	36"	GAS1B
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)

Piping Material Specification			
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<u>GASKET</u> <i>574SA0003</i>	<u>1/2"</u>	<u>24"</u>	GAS2	[*]
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				[*]

<u>GASK.16.47/B</u> <i>574SC0012</i>	<u>30"</u>	<u>36"</u>	GAS2B	[*]
Material : SPIRAL WOUND SS.304/GRAPHITE				[*]
Codes : GASKET DIMENSIONS PER ASME B16.20 ; FLANGES DIMENSIONS PER ASME B16.47 "B" (API-605)				[*]
Thickness : 3.2 MM (1/8")				[*]
Rating : 600#				[*]
Ring Out/In : 3.2 MM (1/8") THK. OUTER C.S. RING / INNER SS.304 RING				[*]
Note : GASKETS SHALL COMPLY WITH JOB SPEC 52A3. GASKETS TO BE SUPPLIED W/O TAPE, STRING OR OTHER WRAPPING AROUND SPIRAL WINDING.				[*]
Ends : RF				[*]

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

General Notes:

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

* 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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Be Flow Up Only.

- 6.) Gear Operated Valves Shall Be Used When Indicated On The EFD,S.
- 7.) A Minimum Of 0.10" Corrosion Allowance May Be Used To Substantiate Wall Schedule Selection For Boderline Cases. Such Cases Must Be Approved By The Project Engineering Manager And A Remark Added To The Line List.
- 8.) Heat Treatment Noted Is For General Fabrication. Weld Size For Fillet And/Or Branch Connections Shall Govern Per ASME B31.3 Para. 331.1.3. Heat Treatment For Bends Shall Be ASME B31.3 Para. 332.4.1 & 332.4.2 And Specs 52A5 And 52A6 Accordingly.
- 9.) Maximum Allowable Hardness Of 200 BHN. PWHT Required For Welds Above 200 BHN.
- 10.) Typical Hydrotest Limiting Factor Is 1.5 x ASME Class RAtng Cold Working Pressure Exception To This Include:
 * 1.1 x CWP For Closed Valves (Test Against Seat. This Method Is Not Preferred.)
 * Check Manufactures Data For Ball Valves.
- 11.) Pipe And Components > 1/2" Thickness May Require Impact Tested Materials When The Minimum Design Metal Temperature Is Below 100F Per ASME B31.3 Para. 323.2.2.
- 12.) All Fabrication Shall Comply With 52A1.
- 13.) Pipe 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 Union Or Coupling To Join Pipe. Flanged Joint To Be Used Only Where Indicated On EFD'S.
- 18.) Couplings Shall Not Be Used For Branch Connections Use Inline Only.
- 19.) Use Flat Face Valve, Flange & Full Face Gasket To Mate With Flat Face Nozzles Only.
- 20.) Flanges Shall Not Be Insulated.
- 21.) Temperature Instrument Connection Shall Be NPS 1-1/2" Flanged.
- 22.) Pressure Instrument Connection Shall Be NPS 3/4" Socket-weld.
- 23.) In Sizes Above NPS 24", Flanges In Accord With ASME B16.47 Series B (API-605) Preferred. Where Required To Match Equipment Or Wafer Style Valves, Flanges Per ASME B16.47 Series A MSS-SP44) May Be Used.
- 24.) Branch Connections Should Follow The Guidelines Of Job Spec 52B2 And The Attachment Unless Specifically Overriden By The Pipe Sress 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: A2S

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) : A2S																				
MATERIAL (S) : CARBON STEEL, SMLS, ASTM A106 GR. B											P/SE :		C.A. : 0.125"							
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	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	P2	T						
18	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	P2	P3	T					
20	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	P3	P3	P4	T				
24	STD	SK	SK	SK	SK	SK	W	W	W	W	W	W	P4	P5	P6	P6	T			
30/36	STD	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.