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DESCRIPTION: GRAVITY DRAINS

MATERIAL: Cast Iron, ASTM A74, SERVICE WEIGHT, BELL & SPIGOT JOINTS

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 32F to 212F

RATING CLASS: 125, ASME B16.1 - 2010

CORROSION ALLOWANCE: 0.0000 in
DESIGN CODE: Per ASME B31.1 - 2014

STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 32 10 212 10

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 GASKET MATERIAL INDICATED INCLUDES FLANGED AND BELL AND SPIGOT JOINTS. DIMENSIONS AND RATING ARE PER THE TYPE OF GASKET SELECTED.
- 4 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	2-15	-		Pipe , A 74 , Double Bell/Spigot Ends , Cast Iron
	2-15	-	S-SV	Pipe, A 74, PE, Cast Iron
	2-15	-	S-SV	Pipe , A 74 , Single Bell/Spigot End , Cast Iron
Large Bore Fittings				
	2-12	-	S-SV	1/4 Bend Long Sweep , A 74 , Bell/Spigot End , Cast Iron
	2-12	-	S-SV	One-Eigth Bend , A 74 , Bell/Spigot End , Cast Iron
	2-12	-	S-SV	Sanitary Tee, Single , A 74 , Spigot End/Bell , Cast Iron
	2-8	-	S-SV	Y & One Eighth Bend , Tyler , Spigot End/Bell , A 74
	2-12	_	S-SV	Y Branch, Single, A 74, Spigot End/Bell, Cast Iron
	3-15	2-12	S-SV	Increaser C.I., A 74, Bell/Spigot End, Cast Iron
	3-15	2-12	S-SV	Reducer C.I., A 74, Spigot End, Gast Iron
	3-8	2-6	S-SV	Reducing Y & 1/8Bend , Tyler , Spigot End/Bell , A 74
	6-12	4-10	S-SV	45 Deg Red. Lateral , American , BLE , A 74
Small Bore Fittings	0-12	4-10	3-31	45 Deg Red. Lateral , American , BLE , A 74
Siliali Bore Fittings				
Bolts	-	-		
DORS				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	2-15			Cad Plated
Gaskets	2-13			Cau i lated
Caskets				
				Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10
				Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration,
	2-15			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
	2 10			Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard
				3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	2-15			or better, 0.125" non compressed thickness
Flanges	2-13			of better, 0.125 horr compressed trickness
i langes	 2-15		S-SV	Flange Connecting Pc , Romac Style "FCA501" , CL125 , FF , Ductile Iron
	2-15 2-15	_	0-0 v	Blind Flg., B16.1, CL125, FF, Cast Iron
Gate Valves	2-13			Billiot 1g., B10.1, GE125, 11, Cast IIOII
Gate valves				Gate Valve Underground , AWWA C509 and/or C515 , FF , Bltd Bonnet , Post
				Indicator , Ductile Iron , Resilient Wedge, 250 Psig Working Pressure\125 deg F or
	3-14	_		better
	3-14	-		
				Gate Valve Underground, AWWA C509 and/or C515, FF, Bltd Bonnet, Ductile Iron
	2 14			, With Valve Box, Resilient Wedge, 250 Psig Working Pressure\125 deg F or better
Globe Valves	3-14	-		
Cione Agives				
Check Valves	T			
		1		· · · · · · · · · · · · · · · · · · ·
Ball Valves				
Butterfly Valves				
·				

PIPE SPEC: 1AGA0 **Date:** 8/4/2016 4:53:15 PM

93

DESCRIPTION: POTABLE WATER (UNDERGROUND)

MATERIAL: HDPE SDR 11, PE 4710
EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: 0F to 140F

RATING CLASS: 125, ASME B16.1 - 2010 CORROSION ALLOWANCE: 0.0000 in

140

DESIGN CODE: Per ASME B31.1 - 2014

STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 150 0 32 150 73 150 90 150 146 100 110 140 120 118 130 112

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 POTABLE WATER PIPING SHALL BE CERTIFIED ACCORDING TO NSF 14 AND NSF 61. PIPING SHALL ALSO BE CONTINUOUSLY MARKED WITH A BLUE STRIPE.
- 5 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 6 FINAL LEAK TESTING SHALL BE HYDROSTATIC ONLY IN ACCORDANCE WITH ASTM F2164, FIELD LEAK TESTING OF POLYETHYLENE PRESSURE PIPING SYSTEM USING HYDROSTATIC PRESSURE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.75-24	-	SDR 11	Pipe , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
	0.75-8	-	SDR 11	45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	0.75-8	-	SDR 11	90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	0.75-8	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-24	0.75-22	SDR 11	Concentric Reducer, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	1-24	0.75-22	SDR 11	Eccentric Reducer, WOLSELEY, ASTM D3261, PE4710, Butt Fusion, IPS
				Eccentric Reducer, WOLSELEY, ASTM D3350, PE4710, Butt Fusion, 3 Piece
	1-24	0.75-22	SDR 11	Fabbed
	1-24	-	SDR 11	Flange Adapter, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS -
	2-24	-	SDR 11	Cross, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	2-24	-		Pipe, 25D Bend, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	2-24	-		Pipe, 25D Bend, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	3-12	2-10	SDR 11	Branch Saddle, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	3-24	-	SDR 11	Lateral , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
	3-24	2-16	SDR 11	Reducing Tee, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
				45 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 3 Piece
	10-24	-	SDR 11	Fabbed
				90 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 3 Piece
	10-24	-	SDR 11	Fabbed
				90 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 5 Piece
	10-24	-	SDR 11	Fabbed
	10-24	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
Small Bore Fittings				
	0.5-2	-	-	Male Adapater , ISCO or eq. , ASTM D3350, PE4710 , TF x MTE , IPS
Bolts				•



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	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets	0.0 24			
	0.75-24			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760-V, 0.125" non compressed thickness
Flanges				
	2-24	-	SDR 11	Backing Ring , ISCO or eq. , CL125 , FF , Ductile Iron -
Gate Valves				
	2.5-24	-		Gate VIv , Powell B16.10 or eq. , CL125 , FF , Bltd Bonnet , Handwheel Operator , Cast Iron
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				

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DESCRIPTION: GRAVITY DRAINS (UNDERGROUND)

MATERIAL: HDPE SDR 11, PE 4710
EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -10F to 140F
RATING CLASS: 125, ASME B16.1 - 2010

CORROSION ALLOWANCE: 0.0000 in

130 140

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -10 5 32 5 73 5 90 5 5 100 5 110 5 120

5

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 7 SUPPLY FLAT WASHERS WHEN RECOMMENDED BY MANUFACTURER.
- 8 FLANGE ASSEMBLIES SHALL BE PROTECTED WITH POLYETHYLENE SLEEVE SEALED TO PIPE.
- 9 FINAL LEAK TESTING SHALL BE HYDROSTATIC ONLY IN ACCORDANCE WITH ASTM F2164, FIELD LEAK TESTING OF POLYETHYLENE PRESSURE PIPING SYSTEM USING HYDROSTATIC PRESSURE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	1-24	=	SDR 11	Pipe , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
	1-8	-	SDR 11	45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-8	-	SDR 11	90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-24	-	SDR 11	Flange Adapter , ISCO or eq. , ASTM PE4710, D3261 , Butt Fusion , IPS -
	1-8	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
				22.5 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 2 Piece
	2-24	-	SDR 11	Fabbed
	2-12	-	SDR 11	Branch Saddle, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	2-24	1-22	SDR 11	Concentric Reducer , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
		• • •	000 44	Eccentric Reducer, Industrial Pipe Fittings, ASTM D3350, PE4710, Butt Fusion,
	3-24	2-22	SDR 11	IPS
		2.42	000 44	Reducing Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Branch
	3-24	2-16	SDR 11	Saddle
	4-24	-		CAP , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	4-8	-	SDR 11	Combination Wye , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
	4-24	-	SDR 11	Lateral , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed 45 Deg Red Lateral , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS ,
	6-24	4-22	SDR 11	Fabbed
	6-10	4-8	SDR 11	Red Combination Wye , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS

 Kiewit 1AGA1 PIPE SPEC: **Date:** 8/4/2016 4:54:09 PM 45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece **SDR 11** Fabbed 10-24 90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 5 Piece **SDR 11** 10-24 10-24 **SDR 11** Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed **Small Bore Fittings** Bolts Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or 0.5-24 Cad Plated Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8M / A 194 B8M 14-24 Gaskets Non Metal Flat Gskt, B16.21, CL125, FF, Neoprene Rubber, 0.125" non 0.5-24 compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Synthetic Fiber, Rubber Binder, Garlock 1-24 3760, 0.125" non compressed thickness Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.125" non compressed thickness 2-24 Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non 2-24 compressed thickness Flanges Blind Flg., B16.1, CL125, FF, A 126 Gr. B 1-24 1-26 **SDR 11** Backing Ring, B16.5, CL150, FF, Ductile Iron **Gate Valves** Gate VIv , Mueller B16.10 or eq. , CL125 , FF , Bltd Bonnet , Wrench Operator , A 0.25-24 126 Gr. B, FM Approved, 2" Nut Gate Valve Underground , B16.10 App. Mfg. , CL125 , FF , Bltd Bonnet , Post Indicator, Cast Iron 2.5-24 Globe Valves **Check Valves** Ball Valves

Butterfly Valves

PIPE SPEC: 1AGA6 Date: 8/4/2016 4:55:04 PM

112

93

DESCRIPTION: GENERAL SERVICE WATER (UNDERGROUND) MATERIAL: HDPE SDR 11, PE 4710

EXAMINATION: Per ASME B31.1 - 2014 TEMPERATURE LIMIT: -10F to 140F **RATING CLASS:** 125, ASME B16.1 - 2010

CORROSION ALLOWANCE: 0.0000 in

130

140

DESIGN CODE: Per ASME B31.1 - 2014

STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -10 150 32 150 73 150 90 150 146 100 140 110 120 118

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION **DETAILS**
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM. WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE **USED**
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 7 SUPPLY FLAT WASHERS WHEN RECOMMENDED BY MANUFACTURER.
- 8 FLANGE ASSEMBLIES SHALL BE PROTECTED WITH POLYETHYLENE SLEEVE SEALED TO PIPE.
- 9 FINAL LEAK TESTING SHALL BE HYDROSTATIC ONLY IN ACCORDANCE WITH ASTM F2164, FIELD LEAK TESTING OF POLYETHYLENE PRESSURE PIPING SYSTEM USING HYDROSTATIC PRESSURE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	1-24	-	SDR 11	Pipe , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
	1-8	-	SDR 11	45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-8	-	SDR 11	90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-24	-	SDR 11	Flange Adapter , ISCO or eq. , ASTM PE4710, D3261 , Butt Fusion , IPS -
	1-8	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
				22.5 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 2 Piece
	2-24	-	SDR 11	Fabbed
	2-12	-	SDR 11	Branch Saddle, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	2-24	1-22	SDR 11	Concentric Reducer, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
				Eccentric Reducer, Industrial Pipe Fittings, ASTM D3350, PE4710, Butt Fusion,
	3-24	2-22	SDR 11	IPS
				Reducing Tee, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, Branch
	3-24	2-16	SDR 11	Saddle
	4-24	-		CAP, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, Molded
	4-8	-	SDR 11	Combination Wye , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
				45 Deg Red Lateral, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS,
	6-8	4-6	SDR 11	Fabbed
	6-8	4-6	SDR 11	Red Combination Wye , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
				45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece
	10-24	-	SDR 11	Fabbed



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				90 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 5 Piece
	10-24	-	SDR 11	Fabbed
	10-24	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
Small Bore Fittings				
	1-2	1-2	S-80	Red. Thd. Flg., B16.5, CL150, FF, A105, Galvanized
Bolts				
	1-24		•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	1-24			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760, 0.125" non compressed thickness
Flanges				
	1-26	-	SDR 11	Backing Ring , ISCO or eq. , CL150 , FF Lap Flgd , Ductile Iron -
	1-24	-		Blind Flg. , B16.1 , CL125 , FF , A 126 Gr. B
Gate Valves				
	1-2	-		Gate VIv , American Valve or eq. , CL125 , FTE , Union Bonnet , Handwheel Operator , BRASS / BRONZE B62 Gate VIv , Powell B16.10 or eq. , CL125 , FF , Bltd Bonnet , Handwheel Operator ,
	2.5-24	-		Cast Iron
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				
Dutterny valves	l			

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DESCRIPTION: CLOSED COOLING WATER (UNDERGROUND)

MATERIAL: HDPE, PE 4710

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -10F to 140F

RATING CLASS: 125, ASME B16.1 - 2010

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-10	175
32	175
80	175
90	175
100	175
110	175
120	175
130	165
140	153

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 7 SUPPLY FLAT WASHERS WHEN RECOMMENDED BY MANUFACTURER.
- 8 FLANGE ASSEMBLIES SHALL BE PROTECTED WITH POLYETHYLENE SLEEVE SEALED TO PIPE.
- 9 FINAL LEAK TESTING SHALL BE HYDROSTATIC ONLY IN ACCORDANCE WITH ASTM F2164, FIELD LEAK TESTING OF POLYETHYLENE PRESSURE PIPING SYSTEM USING HYDROSTATIC PRESSURE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	1-26	-	SDR 9	Pipe, ISCO or eq., ASTM D3261, PE4710, Butt Fusion, IPS
Large Bore Fittings				
			000.0	(-D. 5" 1999 1971 1999 1971 1999 1991 1991 199
	1-6	-	SDR 9	45 Deg Elbow , ISCO or eq. , ASTM D3261, PE4710 , Butt Fusion , IPS , Molded
	1-6	-	SDR 9	90 Deg Elbow, ISCO or eq., ASTM D3261, PE4710, Butt Fusion, IPS, Molded
	1-26	-	SDR 9	Flange Adapter , ISCO or eq. , ASTM D3261, PE4710 , Butt Fusion , IPS -
	1-6	-	SDR 9	Tee , ISCO or eq. , ASTM D3261, PE4710 , Butt Fusion , IPS , Molded
				22.5 Deg Elbow , ISCO or eq. , ASTM D3261, PE4710 , Butt Fusion , IPS , 2 Piece
	2-26	-	SDR 7	Fabbed
	2-26	1.5-24	SDR 9	Concentric Reducer, ISCO or eq., ASTM D3261, PE4710, Butt Fusion, IPS
				Eccentric Reducer, Industrial Pipe Fittings, ASTM D3350, PE4710, Butt Fusion,
	3-26	2-24	SDR 9	IPS
				Reducing Tee, ISCO or eq., ASTM D3261, PE4710, Butt Fusion, IPS, Branch
	3-26	2-24	SDR 9	Saddle
				45 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 3 Piece
	8-24	-	SDR 7	Fabbed
				90 Deg Elbow, ISCO or eq., ASTM D3261, PE4710, Butt Fusion, IPS, 5 Piece
	8-26	-	SDR 7	Fabbed
	8-26	-	SDR 7	Tee , ISCO or eq. , ASTM D3261, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
Small Bore Fittings				
		_	,	
Bolts				

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	0.5-26			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	1-24			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760, 0.125" non compressed thickness
Flanges				
	2-26 1-26	-	SDR 9	Blind Flg. , B16.5 , CL150 , FF , A105 Backing Ring , B16.5 , CL150 , FF , A105
Gate Valves				
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1AGA8 Date: 8/4/2016 4:56:54 PM

DESCRIPTION: GENERAL SERVICE WATER (UNDERGROUND)

MATERIAL: HDPE, PE 4710
EXAMINATION: Per ASME B31.1 - 2010
TEMPERATURE LIMIT: 32F to 140F
RATING CLASS: 125, ASME B16.1 -2005

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2010 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ST TO CHAINGE IF SI	FECIFIED IN NOTES
TEMP. F	PRESS. PSIG
32	175
80	175
90	175
100	156
110	150
120	126
130	120
140	100

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 ALL FITTINGS SHALL BE MOLDED. FABRICATED FITTINGS ARE NOT ALLOWED TO BE USED ON THIS PIPE CODE.
- 3 FLANGE ASSEMBLIES SHALL BE PROTECTED WITH POLYETHYLENE SLEEVE SEALED TO PIPE.
- 4 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 5 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 6 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 7 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 8 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08.
- 9 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 10 SUPPLY FLAT WASHERS WHEN RECOMMENDED BY MANUFACTURER.

NPS 1	NPS2	SCH	Description:
1-24	-	SDR 11	Pipe , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
1-12	-	SDR 11	45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
1-12	-	SDR 11	90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	-		Flange Adapter , ISCO or eq. , ASTM PE4710, D3261 , Butt Fusion , IPS -
	-		Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	-	SDR 11	Branch Saddle, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
2-12	1-10	SDR 11	Concentric Reducer, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS Eccentric Reducer, Industrial Pipe Fittings, ASTM D3350, PE4710, Butt Fusion,
3-12	2-10	SDR 11	IPS
2 12	2.10	SDD 11	Reducing Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Branch Saddle
3-12	2-10	3DK 11	Saudie
T	<u> </u>	Ī	
1-24	1	ı	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
1-24	•	•	Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760, 0.125" non compressed thickness
	1-24 1-12 1-12 1-12 1-12 1-12 2-12 2-12 3-12 3-12	1-24 - 1-12 - 1-12 - 1-12 - 1-12 - 1-12 - 2-12 - 2-12 1-10 3-12 2-10 1-24	1-24 - SDR 11 1-12 - SDR 11 2-12 - SDR 11 2-12 - SDR 11 2-12 - SDR 11 3-12 2-10 SDR 11 3-12 2-10 SDR 11



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	1-12 1-12	- -	SDR 11	Backing Ring , B16.5 , CL150 , FF , Ductile Iron Blind Flg. , B16.1 , CL125 , FF , A 126 Gr. B
Gate Valves				
	1-2	-		Gate VIv , American Valve or eq. , CL125 , FTE , Union Bonnet , Handwheel Operator , BRASS / BRONZE B62 Gate VIv , Powell B16.10 or eq. , CL125 , FF , Bltd Bonnet , Handwheel Operator ,
	3-12	-		Cast Iron
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				
·	·		-	

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DESCRIPTION: POTABLE WATER (UNDERGROUND)
MATERIAL: HDPE SDR 11, PE4710, PRE-INSULATED

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 0F to 140F

RATING CLASS: 125, ASME B16.1 - 2010 CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014
STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

	5. Lon 125 111110 126
TEMP. F	PRESS. PSIG
0	150
32	150
73	150
90	150
100	146
110	140
120	118
130	112
140	93

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 THREADED JOINTS ARE NOT PERMITTED UNDER ANY CIRCUMSTANCES
- 7 POTABLE WATER PIPING SHALL BE CERTIFIED ACCORDING TO NSF 14 AND NSF 61. PIPING SHALL ALSO BE CONTINUOUSLY MARKED WITH A BLUE STRIPE.
- 8 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.
- 9 FINAL LEAK TESTING SHALL BE HYDROSTATIC ONLY IN ACCORDANCE WITH ASTM F2164, FIELD LEAK TESTING OF POLYETHYLENE PRESSURE PIPING SYSTEM USING HYDROSTATIC PRESSURE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.75-24	-	SDR 11	Pipe , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
	0.75-8	-	SDR 11	45 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	0.75-8	-	SDR 11	90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	0.75-8	-	SDR 11	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
	1-24	0.75-22	SDR 11	Concentric Reducer, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	2-24	-	SDR 11	Flange Adapter , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS -
	3-12	2-10	SDR 11	Branch Saddle, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS
	3-24	-	SDR 11	Cross , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
	3-24	-	SDR 9	Lateral , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
	3-24	2-16	SDR 11	Reducing Tee, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS 45 Deg Elbow, ISCO or eq., ASTM D3350, PE4710, Butt Fusion, IPS, 3 Piece
	10-24	-	SDR 9	Fabbed
				90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece
	10-24	-	SDR 9	Fabbed
				90 Deg Elbow , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 5 Piece
	10-24	-	SDR 9	Fabbed
	10-24	-	SDR 9	Tee , ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , 3 Piece Fabbed
Small Bore Fittings				

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Bolts				
	•	•		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.75-24			Cad Plated
Gaskets				
	0.5-24			Non Metal Flat Gskt , B16.21 , CL150 , FF , Synthetic Fiber, Rubber Binder, Garlock 3760 , 0.125" non compressed thickness
Flanges				
	0.75-24	-	SDR 11	Backing Ring , ISCO or eq. , CL125 , FF , Ductile Iron -
Gate Valves				
	·			
Globe Valves				
Check Valves				
		T	•	
Ball Valves				
- · · · · · · · · · · · · · · · · · · ·			1	
Butterfly Valves				

DESCRIPTION: GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

JI TO CHANGE II	SELCII ILD IN NOTES
TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200
500	170
600	140
650	125
700	110
750	95
800	80

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 4 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
	1-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A105
	1-24	0.5-2		Threadolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A105
	2.5-48	-	MATCH	45 Deg Eq Lat Custom , Manuf. Std , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. Elbow 3D , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-36	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-36	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	2.5-48	2-24	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
	3-3	1-2	S-XXS	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	6-10	0.75-0.75		Elbolet , Manuf. Std , CL3000 , SWE , A105
	6-24	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				

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PIPE SPEC:	1BAA1	Date:	8/4/2016 4:58:44	PM Wiewit	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105	
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105	
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Flatolet , MSS SP-97 , CL3000 , SWE , A105	
	0.5-2	-		Flatolet , MSS SP-97 , CL6000 , SWE , A105	
	0505			Male Connector , 0.5 x 0.5in Swagelok or Eq , MNPT x CTBE , A 182 Gr. F316 , SS-810-1-8	
	0.5-0.5 0.5-0.5	-		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P	
	0.5-0.5	- 0.25-1.5		Reducing Insert, MSS SP-79, CL3000, PE x SWE, A105	
	0.5-2	0.23-1.3		Union , MSS SP-83 , CL3000 , SWE , A105	
	0.5-2	<u>-</u>		Union , MSS SP-83 , CL6000 , SWE , A105	
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB	
	5 5 <u>2</u>	5.5 1.6		Male Connector, 0.75 x 0.5in Swagelok or Eq, MNPT x CTBE, A 182 Gr. F316, SS	
	0.75-0.75	-		810-1-12	
	- -			Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-	
	0.75-0.75	-		810-1-12W	
	0.75-2	-		Plug Hex Head, B16.11, MTE, A105	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105	
				Male Connector , 1 x 0.5in Swagelok or Eq , MNPT x CTBE , A 182 Gr. F316 , SS-	
	1-1	-		810-1-16W	
				Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-	
Bolts	1-1	-		16W	
	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H	
Gaskets					
				Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration,	
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness	
				Insulating Gskt Set , B16.21 , CL150 , RF , G10 Retainer with PTFE Seal Rings, G10	
	0.5.40			Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration,	
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness	
	0.5.40			Insulating Gskt Set, B16.21, CL150, RF, Per Specification 81.33.08, Max Temp:	
	0.5-48			250 deg -F , 0.125" non compressed thickness	
				Insulating Gskt Set , B16.21 , CL300 , RF , G10 Retainer with PTFE Seal Rings, G10	
				Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration,	
				r all zong. r cloor co, cloor zir and cro rradicio, zodbio rradicio configuration,	
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness	
	0.5-48				
				LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig	
	0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness	
				LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard	
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig	
				LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness	
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, Aramid Fiber/ NBR Binder (Blue-Gard	
	0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig	
	0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness	
	0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard	
	0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig	
	0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness	
	0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800	
	0.5-48 0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness	
	0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR ,	
	0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness	
	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness	
	0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR ,	
	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 0.75-24		MATOLI	LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 0.75-24 2.5-24		MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 2.5-24 2.5-24 26-48	- - - -		LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 0.75-24 2.5-24 26-48 2.5-24	- - - - - -	MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL150 , RF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , RF , A105 Blind Flg. , B16.5 , CL150 , RF , A105	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 0.75-24 2.5-24 2.5-24 2.5-24 2.5-24	- - - - - -	MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL150 , RF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 0.75-24 2.5-24 26-48 2.5-24	- - - - - - -	MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105	
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.75-24 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 26-48	- - - - - - - -	MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL150 , RF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL300 , RF , A105	

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	1-8 26-48 2.5-24	- -	MATCH MATCH	WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart Blind Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N WN Flg. , B16.5 , CL300 , FF , A105
<u> </u>	26-48	-	WATCH	Blind Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N
Gate Valves				Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
	0.5-2	-		105 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	0.75-2	-		A 105 Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,
	2.5-6	-		A 216 Gr. WCB
	2.5-6	-	MATCH	Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A
	8-36	-		216 Gr. WCB
	8-36	-	MATCH	Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A 216 Gr. WCB
Globe Valves				Clobe Valve Mont Std. CL 900 SWE v ETE. Pltd Pennet. Handwheel Operator
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 105 $$
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	2.5-6	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	8-24	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
	8-24	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
Check Valves	0.5.0			
	0.5-2 0.5-2	-		Check Valve Pistn Lft, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 105 Check Valve Pistn Lft, App. Mfg., CL800, SWE, Bltd Bonnet, A 105 Check Valve Swing LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, A 216 Gr.
	2.5-24	-	MATCH	WCB Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.
	2.5-24	-		WCB Check Valve Wafer Dual PI LP, B16.10 App. Mfg., CL150, FFTBE, A 216 Gr.
	6-24	<u>-</u>		WCB
Ball Valves				Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever
	0.5-2	-		Operator , A 105 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator
	0.5-2	-		, A 105 Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator ,
	0.75-2	-		A 105
	2.5-6	-		Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever Operator, A 216 Gr. WCB Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Trun. Mount. Ball,
	8-12	-		Gear Operator , A 216 Gr. WCB
Detterfly Value	14-24	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
Butterfly Valves	2.5-6	-	1	Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray Controls or eq., Cl 150, Lugged FF w/ Integral
	2.5-6	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem
	8-20	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Gear Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem
	24-48	-		Butterfly Valve, Bray Controls, CL150, FF w/Integral Gaskets, Gear Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem

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DESCRIPTION: LUBE/HYDRAULIC OIL, LOW AND INTERMEDIATE TEMP

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE II	OI LOII ILD IN NOTES
TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200
500	170
600	140
650	125
700	110
750	95
800	80

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 4 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
•	0.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE/TE, A 106 Gr. B, 3" Long, SMLS
	1-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-24	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
	3-3	1-2	S-XXS	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	6-24	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A105
	0.5-2	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105
				Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
	0.75-0.75	-		810-1-12W

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Polts	1-1	-	T	Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets	0.0 10			Sta Bit a 211VyHox 14t , Monte B16.61.27 B16.2.2 , M 166 B1 / M 161 211
	0.5-48			Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
	0.5-48			Insulating Gskt Set, B16.21, CL150, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
	0.5-48			Insulating Gskt Set, B16.21, CL300, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard
	0.5-48			3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard
	0.5-48			3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard
	0.5-48			3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800
	0.5-48 0.5-48			deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
	0.5-48			Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR ,
Flores	0.5-48		1	800 deg F or better , 0.175" non compressed thickness
Flanges	0.75-24	-		
	26-48	-		Blind Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N
	0.75-24	-		Blind Flg. , B16.5 , CL300 , RF , A105
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	26-48 0.5-24	-	MATCH	Blind Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	1-24	-	MATCH	WN Flg. , B16.5 , CL300 , FF , A105 WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , RF , A105
	0.75-24	-		Blind Flg. , B16.5 , CL150 , FF , A105
	26-48	-	MATOU	Blind Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
Gate Valves	26-48 T	-	MATCH T	WN Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
Gate valves			l	Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2 2.5-6	-	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	2.5-0		WATON	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
	8-36	-	MATCH	216 Gr. WCB
Globe Valves	0.5-2		MATCH	Globe Valve , Manf. Std. , CL800 , BE , Bltd Bonnet , Handwheel Operator , A 105
	2.5-6	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-24 8-24	-	MATCH	216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
Check Valves	0-24	<u>-</u>	WATCH	210 GL. WCB
	0.5-2 2.5-24	-	MATCH	Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 105 Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 216 Gr. WCB
	2.0 2 7		17.7 (1 01 1	Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 216 Gr.
	2.5-24	-		WCB
Ball Valves				PURING A LIBERT AND ME CLOSE DE TEU D
	0.5-2	-	MATCH	Ball Valve LP FB , App. Mfg. , CL600 , BE , Three Piece Fltg. Ball , Lever Operator , A 105 Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator ,
	0.75-2	-		A 105
	0.5.0			Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever
	2.5-6	-		Operator , A 216 Gr. WCB

PIPE SPEC: 1BAA6

GENERAL UG SERVICE DESCRIPTION:

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 400F RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

71 10 017 11 10 11	OI LOII ILD IIV NOTLO
TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200

GENERAL NOTES

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- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION **DETAILS**
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM. WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE **USED**
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
Large Bore Fittings				
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. Elbow 3D , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	2-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-24	2-22	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-6	0.75-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-20	-	MATCH	Eq. Cross, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	2-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-	•	45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
Bolts				
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				



PIPE SPEC: 1BAA6 **Date:** 8/4/2016 5:01:50 PM



				Insulating Gskt Set , B16.21 , CL150 , RF , G10 Retainer with PTFE Seal Rings, G10
	0.5-24			Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non
	0.5-24			compressed thickness
	0.5-24			Non Metal Flat Gskt , B16.21 , CL150 , RF , Neoprene Rubber , 0.125" non compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness
Flanges				
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	0.5-24	-		Blind Flg. , B16.5 , CL150 , RF , A105
	0.5-2	-	MATCH	SW Flg., B16.5, CL150, RF, A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A105
Gate Valves				
Globe Valves				
Check Valves		I		
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1BAB1

DESCRIPTION: GENERAL SERVICE MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0625 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

1 10 01 // 11 10 11	0. 20. 120
TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200
500	170
600	140
650	125
700	110
750	95
800	80

GENERAL NOTES

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- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.2.1
- 4 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 53 Gr. B , ERW
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 3" Long, SMLS
Large Bore Fittings				
	1-14	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, SWE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, FTE, A105
	2.5-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	6-48	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings			-	



	1BAB1	Date: {	8/4/2016 5:03:11	PM Wiewit
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105
	0.5-2 0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105 Cplg. , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-0.5	-		Male Connector , 0.5 x 0.5in Swagelok or Eq , MNPT x CTBE , A 182 Gr. F316 , SS-810-1-8
	0.5-0.5	_		Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810 1-8W
	0.5-2	-		Plug Hex Head , B16.11 , MTE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , FTE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL6000 , FTE , A105
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Con. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS
	0.75-2 0.75-2	0.5-1.5 0.5-1.5	MATCH MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS Ecc. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB
	0.75-2 0.75-2	0.5-1.5 0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PE/TE, A 234 Gr. WPB Ecc. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS
	0.75-0.75	-	W// CFT	Male Connector, 0.75 x 0.5in Swagelok or Eq, MNPT x CTBE, A 182 Gr. F316, SS 810-1-12
	0.75-0.75	_		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W
	0.75-0.75 0.75-2	- 0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2 0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
	0.75-2	0.5-1.5		Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105
				Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1
Bolts	1-1	<u>-</u>		16W
Gaskets	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
	0.5-48			Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Insulating Gskt Set, B16.21, CL150, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
				Insulating Gskt Set , B16.21 , CL300 , RF , G10 Retainer with PTFE Seal Rings, G10
	0.5-48			Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard
				LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard
	0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness
	0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness
	0.5-48 0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR,
	0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48	- -	МАТСН	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48		MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48	- - - -		LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 0.5-24	- - - - -	MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 0.5-24 26-48 26-48 25-24	- - - - - -	MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Fill , B16.47 Sr. A , CL150 , FF , A105 WN Fig. , B16.47 Sr. A , CL150 , FF , A105 WN Fig. , B16.5 , CL150 , FF , A105 WN Fig. , B16.5 , CL150 , FF , A105
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 26-48 26-48 25-24 25-24	- - - - - - -	MATCH MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness WN Flg. , B16.47 Sr. A , CL150 , FF , A105 WN Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , RF , A105 WN Flg. , B16.5 , CL150 , RF , A105
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 26-48 26-48 2.5-24 2.5-24 0.5-2	- - - - - - - -	MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 SW Flg. , B16.5 , CL150 , FF , A105
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 26-48 26-48 2.5-24 2.5-24 0.5-2 26-48	- - - - - - - - - -	MATCH MATCH MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better , PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.50 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.50 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.50 , CL300 , RF , A105 WN Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 SW Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105 Blind Flg. , B16.5 , CL150 , FF , A105
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-24 26-48 26-48 26-48 2.5-24 2.5-24 0.5-2	- - - - - - - - - - -	MATCH MATCH MATCH MATCH	LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness WN Flg. , B16.47 Sr. A , CL150 , FF , A105 Blind Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 WN Flg. , B16.5 , CL150 , FF , A105 SW Flg. , B16.5 , CL150 , FF , A105

PIPE SPEC:	1BAB1	Date	e: 8/4/2016 5:03:11	PM Kiewit
	26-48 1-24 0.5-2 26-48 26-48	- - - -	MATCH MATCH MATCH	Blind Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart SW Flg. , B16.5 , CL300 , RF , A105 WN Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N Blind Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N
Gate Valves				
	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 105 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	-		
	0.5-2	-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-		A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bitd Bonnet, Handwheel Operator,
	2.5-6	-	MATCH	A 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-36	-	MATCH	216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
Globe Valves	8-36	<u>-</u>	MATCH	216 Gr. WCB
0.000 1.000	0.5-2	-	·	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105
	0.5-2	-		Globe Valve, Marii. Stu., GLOOO, SWE, Bitu Borinet, Hariuwheel Operator, A 103
	2.5-6	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-24	-		216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
	8-24	-	MATCH	216 Gr. WCB
Check Valves	0.5-2			Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 105
	0.5-2	-		Check Valve Pistri Lit , B16.10 App. Mig. , CL150 , RF , Bitd Borniet , A 105 Check Valve Pistri Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 105 Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 216 Gr.
	2.5-24	-	MATCH	WCB Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.
	2.5-24 6-24	- -		WCB Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr. WCB
Ball Valves	0 24			Wob
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 105
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 105 Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator ,
	0.5-2	-		A 105 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever
	2.5-6	-		Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball ,
	8-12 14-24	-		Gear Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
Butterfly Valves	14-24			Gear Operator, A 210 Gr. WCD
,	2.5-6	-	<u>'</u>	Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral

Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral Gaskets , Gear Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem

PIPE SPEC: 1BAB6

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200
500	170
600	140
650	125
700	110
750	95
800	80

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

•	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 53 Gr. B , ERW
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 12" Long, SMLS
Large Bore Fittings				
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	3-48	2.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-48	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.5-2	-		Cplg., B16.11, CL6000, SWE, A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Union, MSS SP-83, CL3000, SWE, A105
	0.5-2	-		Union, MSS SP-83, CL6000, SWE, A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105

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PIPE SPEC:

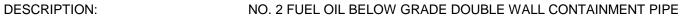
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	0.75-2	0.5-1.5	_	Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105
Bolts	0.5-48			Ctd Dit 9 2Haylloy Nt ACME D49 24 2 / D49 2 2 A 402 D7 / A 404 2H
Gaskets	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
	0.5-48		•	Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Insulating Gskt Set, B16.21, CL150, RF, G10 Retainer with PTFE Seal Rings, G10
	0.5-48			Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
	0.5-48			Insulating Gskt Set, B16.21, CL300, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.5-48			or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.5-48			or better , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.5-48 0.5-48			or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness
	0.5-48			Sp. Wound Gskt, B16.20, CL150, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800
	0.5-48			deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR ,
Flores	0.5-48		1	800 deg F or better , 0.175" non compressed thickness
Flanges	26-48	-	<u>I</u> MATCH	
	0.5-24	-		Blind Flg. , B16.5 , CL150 , RF , A105
	0.5-2	-	MATCH	SW Flg., B16.5, CL300, RF, A105
	26-48	-		Blind Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	0.5-2	-	MATCH	SW Flg., B16.5, CL150, RF, A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A105
	0.5-24	-		Blind Flg., B16.5, CL150, FF, A105
	26-48	-		Blind Flg., B16.47 Sr. A, CL300, RF, A105/A105N
	0.5-24	-		Blind Flg., B16.5, CL300, RF, A105
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A105/A105N
	26-48	-		Blind Flg., B16.47 Sr. A, CL150, FF, A105/A105N
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , RF , A105
Gate Valves				
	0.44			Gate Valve Underground , AWWA C509 and/or C515 , FF , Bltd Bonnet , Post Indicator , Ductile Iron , Resilient Wedge, 250 Psig Working Pressure\125 deg F or
	3-14	-		better Gate Valve Underground , AWWA C509 and/or C515 , FF , Bltd Bonnet , Ductile Iron , With Valve Box, Resilient Wedge, 250 Psig Working Pressure\125 deg F or better
	3-14	-		
Globe Valves				
Check Valves				
-	T		1	
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1BAB7 **Date:** 8/4/2016 5:06:08 PM



MATERIAL: Carbon Steel
EXAMINATION: Per NFPA 24 - 2010
TEMPERATURE LIMIT: -29C to 150C
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0787 in
DESIGN CODE: NFPA 24 - 2010
STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

.00 0.0	0. 20250
TEMP. F	PRESS. PSIG
-20	269.6
100	269.6
122	263.8
212	242
302	214.5

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 PIPE SHALL BE PERMALERT ULTRA FS OR EQUAL.
- 4 INNER PIPE SHALL BE STANDARD WEIGHT A53 GR B. OUTER CONTAINMENT PIPE SHALL BE 10GAUGE OR THICKER WITH A FRP EXTERNAL COATING A MINIMUM OF 0.1" THICK (100-MILS).
- 5 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.75-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , ERW
	0.75-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.75-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.75-2	-	S-80	Nipple, B36.10M, PE/TE, A 106 Gr. B, 6" Long, SMLS
	0.75-2	-	S-80	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.75-2	-	S-80	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-24	0.75-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.75-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	1-24	0.75-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-6	0.75-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	2-22	MATCH	Weldolet, MSS SP-97, BE, A105, SMLS
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	3-24	2.5-22	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB , SMLS
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
Small Bore Fittings				
	0.75-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.75-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.75-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.75-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Reducing Insert, MSS SP-79, CL3000, PE x SWE, A105
	1-2	0.75-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS
	1-2	0.75-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB , SMLS
	1-2	0.75-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
Bolts				
	0.75-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				



PIPE SPEC: 1BAB7 **Date:** 8/4/2016 5:06:08 PM



	0.75-48			Insulating Gskt Set , B16.21 , CL150 , FF , G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal , 300 deg F or better , 0.125" non compressed thickness
	0.75-48			Insulating Gskt Set, B16.21, CL150, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness
	0.75-48			Insulating Gskt Set, B16.21, CL300, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.75-48			or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.75-48			or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
	0.75-48			or better , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS Winding , Graphite Fill, CS CR , 800
	0.75-48			deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS Winding , Graphite Fill, CS CR ,
	0.75-48			800 deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS Winding , Graphite Fill, CS CR , 800
	0.75-48 0.75-48			deg F or better , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS Winding , Graphite Fill, CS CR , 800 deg F or better , 0.175" non compressed thickness
Flanges	0.70 10			Coo dog i oi bottoi ; c. i i o i icii compressosa tilicianese
900	0.75-24	-	<u> </u>	Blind Flg. , B16.5 , CL150 , FF , A105
	0.75-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	0.75-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	0.75-24	-		Blind Flg. , B16.5 , CL150 , RF , A105
	0.75-24	-		Blind Flg. , B16.5 , CL300 , RF , A105
	0.75-24	-	MATCH	WN Flg. , B16.5 , CL300 , RF , A105
Gate Valves			<u> </u>	
Globe Valves				
Check Valves			1	
Olieck valves				
Ball Valves				
Butterfly Valves		Г	T	

PIPE SPEC: 1BAB8

DESCRIPTION: GENERAL SERVICE
MATERIAL: Galvanized Carbon Steel
EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSI

EMP. F	PRESS. PSIG
-20	285
100	285
200	260

GENERAL NOTES

1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.

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- 2 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 3 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-4	-	Calc	Pipe, B36.10M, MTE, A 53 Gr. B, Galvanized
	0.5-4	-	Calc	Nipple, B36.10M, TBE, A 53 Gr. B, 3" Long, Galvanized
	0.5-4	-	Calc	Nipple, B36.10M, TBE, A 53 Gr. B, 6" Long, Galvanized
Large Bore Fittings				
	0.5-4	-		45 Deg. Elbow , B16.11 , CL3000 , FTE , A105 , Galvanized
	0.5-4	-		45 Deg. Elbow , B16.11 , CL6000 , FTE , A105 , Galvanized
	0.5-4	-		90 Deg. Elbow , B16.11 , CL3000 , FTE , A105 , Galvanized
	0.5-4	-		90 Deg. Elbow , B16.11 , CL6000 , FTE , A105 , Galvanized
	0.5-4	-		Cap , B16.11 , CL3000 , FTE , A105 , Galvanized
	0.5-4	-		Cap , B16.11 , CL6000 , FTE , A105 , Galvanized
	0.5-4	-		Cplg., B16.11, CL3000, FTE, A105, Galvanized
	0.5-4	-		Cplg., B16.11, CL6000, FTE, A105, Galvanized
	0.5-4	-		Equal Tee , B16.11 , CL3000 , FTE , A105 , Galvanized
	0.5-4	-		Equal Tee , B16.11 , CL6000 , FTE , A105 , Galvanized
	0.5-4	-		Plug Hex Head , B16.11 , MTE , A105 , Galvanized
	0.5-3	-		Union, MSS SP-83, CL3000, FTE, A105, Galvanized
	0.5-3	-		Union, MSS SP-83, CL6000, FTE, A105, Galvanized
	0.75-4	0.5-3	MATCH	Con. Swage, MSS SP-95, TBE, A 234 Gr. WPB, Galvanized, SMLS
	0.75-4	0.5-3	MATCH	Ecc. Swage , MSS SP-95 , TBE , A 234 Gr. WPB , Galvanized, SMLS
	0.75-4	0.5-3		Red. Tee, B16.11, CL3000, FTE, A105, Galvanized
	0.75-4	0.5-3		Red. Tee, B16.11, CL6000, FTE, A105, Galvanized
Small Bore Fittings				
		•	•	<u> </u>
Bolts				
	0.5-4	•	•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				

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Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, 0.75-48 LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Insulating Gskt Set, B16.21, CL150, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness 0.75-48 Insulating Gskt Set, B16.21, CL300, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness 0.75-48 Non Metal Flat Gskt , B16.21 , CL150 , FF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig 0.75-48 or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal) , Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, 0.125" non compressed thickness 0.75-48 Non Metal Flat Gskt , B16.21 , CL300 , RF , Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig 0.75-48 or better, 0.125" non compressed thickness

PIPE SPEC: 1BAB8

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Flanges			
	0.5-4	-	Blind Flg., B16.5, CL150, RF, A105, Galvanized
	0.5-4	-	Blind Flg., B16.5, CL150, FF, A105, Galvanized
	0.5-4	-	Blind Flg., B16.5, CL300, RF, A105, Galvanized
	0.5-4	-	Thd. Flg., B16.5, CL150, FF, A105, Galvanized
	0.5-4	-	Thd. Flg., B16.5, CL150, RF, A105, Galvanized
	0.5-4	-	Thd. Flg., B16.5, CL300, RF, A105, Galvanized
Gate Valves			
			Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,
	0.5-2	-	A 105
			Gate Valve , App. Mfg. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	-	
	0.0 =		Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator
	2.5-4	-	A 216 Gr. WCB
Globe Valves			AZIOGI. WOD
	ļ.	ļ	Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator
	0.5-2	-	, A 105
	0.0 _		Globe Valve , Manf. Std. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	_	Clobe Valve, Marii. Cla., Clobe, 1 12, Bita Borinot, Flandwicer Operator, 71 100
	0.0 2		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator
	2.5-4	_	, A 216 Gr. WCB
Check Valves	2.0 +		, A 210 GI. WOD
Officer valves	0.5-2	<u> </u>	Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 105
	0.5-2		Check Valve 1 Stir Lit, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 103 Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.
	2.5-4	-	WCB
Ball Valves	2.5-4	<u> </u>	WCB
Dail Valves			Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator
	0.5-2	_	A 105
	0.5-2	-	Ball Valve LP FB , App. Mfg. , CL600 , FTE , Three Piece Fltg. Ball , Lever Operator
	0.5-2		, A 105
	0.5-2	-	·
	2.5-4		Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever
Buttorfly Volves	2.5-4	- -	Operator , A 216 Gr. WCB
Butterfly Valves			Dutterfly Valva Wafer Type Dray Centrals or og Cl 150 FF willets and Caskata
	254		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets,
	2.5-4	-	Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem
	2.5-4		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem

PIPE SPEC: 1BAM1

STEAM AND WATER SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESCRIPTION:

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

01 10 017 11 10 11	OI LOII ILD IIV IVO I LO
TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230
400	200
500	170
600	140
650	125
700	110
750	95
800	80

GENERAL NOTES

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- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , API 5L Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , API 5L Gr. B , SMLS
	0-0	-	S-XXS	Nipple , B36.10M , BE x PE , API 5L Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, API 5L Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, API 5L Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, API 5L Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, API 5L Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, API 5L Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , API 5L Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	2.5-48	2-24	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS



PIPE SPEC:	1BAM1	- Date	M Kiewit	
	3-3	1-2	S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Con. Swage, MSS SP-95, BBE, A 234 Gr. WPB
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	6-10	0.75-0.75		Elbolet , Manuf. Std , CL3000 , SWE , A105
	6-24	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Flatolet, MSS SP-97, CL3000, SWE, A105
	0.5-2	-		Flatolet, MSS SP-97, CL6000, SWE, A105
	0.5-2	0.25-1.5		Reducing Insert, MSS SP-79, CL3000, PE x SWE, A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A105
	0.75-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
				Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
				Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810
	1-1	-		16W
Bolts				
-	0.5-48	T		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				
				Insulating Cokt Set R16 21 CL150 FF Per Specification 81 33 08 0 125" non-

	0.75-0.75	_		810-1-12W
	0.75-2	_		Plug Hex Head , B16.11 , MTE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
	0.70 2	0.0 1.0		Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-
	1-1	_		16W
Bolts				
	0.5-48	•	•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				
				Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.125" non
	0.5-48			compressed thickness
				Insulating Gskt Set, B16.21, CL300, FF, Per Specification 81.33.08, 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL300, FF, Neoprene Rubber, 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL300, FF, NM Comp. Gskt., 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL300, RF, NM Comp. Gskt., 0.125" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
Flanges				
g-c	0.75-48	_		Blind Flg. , B16.5 , CL150 , RF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , FF , A105
	10-24	-	MATCH	WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart
	0.75-48	_	-	Blind Flg. , B16.5 , CL300 , RF , A105
	30-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , FF , A105
	22-22	_	MATCH	WN Flg. , MSS-SP-44-NB , CL150 , RF , A105
	30-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A105 , 125 - 250 Ra Finish
	26-48	_	MATCH	WN Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL300 , RF , A105
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL300 , FF , A105
	0.5-2	_	MATCH	SW Flg. , B16.5 , CL150 , RF , A105
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A105
	1-8	-	MATCH	WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart
Gate Valves				
			•	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
	0.5-2	-		105
				Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	-		
				Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,
	0.75-2	-		A 105
				Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,
	2.5-6	-		A 216 Gr. WCB
				Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-	MATCH	A 216 Gr. WCB
			-	Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-36	_		216 Gr. WCB
				· · · -

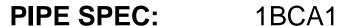
PIPE SPEC:

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	8-36	-	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105
	0.5-2	-		
	2.5-6	-	MATCH	Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator
	2.5-6	-		, A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-24	-		216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
Г.	8-24	-	MATCH	216 Gr. WCB
Check Valves				
	0.5-2 0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 105
				Check Valve Swing LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, A 216 Gr.
	2.5-24	-	MATCH	WCB Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 216 Gr.
	2.5-24	-		WCB
	6-24	-		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr. WCB
Ball Valves				
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 105
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 105
	0.75-2	-		Ball Valve, B16.10 App. Mfg., CL150, RF, Three Piece Fltg. Ball, Lever Operator, A 105
	2.5-6	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Fltg. Ball , Lever Operator , A 216 Gr. WCB
	8-12	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
	14-24	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
Butterfly Valves				
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem
	2.5-6	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral
	8-20	-		Gaskets , Gear Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem



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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

I TO CHANGE IF SPE	CIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples	•	02		
•	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	2.5-48	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	2.5-2.5	-	Calc	Nipple, B36.19M, BE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	2.5-2.5	-	Calc	Nipple, B36.19M, BE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	2.5-2.5	-	Calc	Nipple, B36.19M, BE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
_arge Bore Fittings				
=	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.

PIPE SPEC:	1BCA1	Date:	8/4/2016 5:10:18	PM Wiewit	
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	2.5-48 2.5-24	- 0.5-2	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.	
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	3-48 3-48	2.5-42 2.5-42	MATCH MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F304/304L Dual Cert.	
Small Bore Fittings	0.5-2	<u>-</u>		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	- -		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-		Cplg., B16.11, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cplg. , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Male Connector, 0.5 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810	
	0.5-0.5 0.5-2	-		1-8W Plug Hex Head , B16.11 , MTE , A105	
	0.5-2	0.5-1.5		Red. Cplg., B16.11, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	0.5-1.5		Red. Cplg., B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	0.5-1.5		Red. Cplg., B16.11, CL6000, FTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	0.5-1.5		Red. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304/304L Dual	
	0.5-2	0.25-1.5		Cert.	
	0.5-2	-		Union , MSS SP-83 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Union , MSS SP-83 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A 403 Gr. WP304/304L Dual Cert., SMLS Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-	
	0.75-0.75	-		810-1-12W	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.75-2 0.75-2	0.5-1.5 0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105	
	0.73-2	0.3-1.3		Male Connector, 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1	
Bolts	1-1	-		16W	
Dons		<u> </u>		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
Gaskets	0.5-48	1 1		Cad Plated	
<u> </u>				Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.125" non	
	0.5-48			compressed thickness Insulating Gskt Set, B16.21, CL150, RF, Per Specification 81.33.08, 0.125" non	
	0.5-48			compressed thickness Insulating Gskt Set, B16.21, CL300, RF, Per Specification 81.33.08, 0.125" non	
	0.5-48			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.125" non	
	0.5-48			compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, NM Comp. Gskt., 0.125" non	
	0.5-48			compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
	0.5-48			non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
	0.5-48			non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
	0.5-48			non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
Flanges	0.5-48			non compressed thickness	
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F304/304L Dual Cert.	
	0.5-24 0.5-2	-		Blind Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 2.5-24	-	MATCH	Thd. Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	_	MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-	MATCH MATCH	SW Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert.	

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	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 2		
	10-24	-	MATCH	Taps , 180deg apart		
	26-48 26-48	-	MATCH	Blind Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304/304L Dual Cert.		
	0.5-24	-		Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.		
	2.5-24 2.5-24	-	MATCH MATCH	WN Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert.		
	2.5-24	-	WATCH	WN Flg. , B16.5 , CL300 , FF , A 182 Gr. F304/304L Dual Cert. WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 2		
	1-8	-	MATCH	Taps , 180deg apart		
	0.5-2 2.5-24	-	MATCH	Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert.		
Gate Valves	2.5-24		WATCH	WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.		
	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3		
	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3		
	0.5-2	-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8		
	2.5-6	-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8		
	2.5-6	-	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3		
	8-36	-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8		
	8-36	-	MATCH	Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3		
Globe Valves						
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351		
	0.5-2	-		Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator		
	2.5-6	-	MATCH	, A 351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator		
	2.5-6	-		, A 351 Gr. CF8		
	8-24	-		Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A 351 Gr. CF8 Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A		
	8-24	-	MATCH	351 Gr. CF3		
Check Valves						
	0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8		
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3		
	2.5-24		MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 351 Gr. CF3		
	2.5-24	-	WATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr.		
	2.5-24	-		CF8		
	6-24	-		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 351 Gr. CF3		
Ball Valves						
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator		
	0.5-2	-		, A 351 Gr. CF3 Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator ,		
	0.75-2	-		A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever		
	2.5-6	-		Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball ,		
	8-12	-		Gear Operator , A 351 Gr. CF8		
Dustantle Valera	14-24	-	T	Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8		
Butterfly Valves			1	Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral		
	2.5-6	-		Gaskets , Lever Operator , A536 Gr 65-45-12 , EPDM / BUNA-N Seat, SS Stem		
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem		
	8-20	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Gear Operator, A536 Gr 65-45-12, EPDM / BUNA-N Seat, SS Stem		
		-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral		



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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

I TO CHAINGE IF SI	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 7 E HAS BEEN SELECTED BASED ON INSPECTION ACCORDANCE WITH BASE MATERIAL SPECIFICATION. E MAY BE INCREASED DEPENDING ON LEVEL OF INSPECTION. CONSULT THE EXACT CODE LANGUAGE FOR THIS CHANGE. ANY CHANGES TO INSPECTION SHALL BE ENGINEER APPROVED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304/304L Dual Cert. , EFW (E = 0.8)
	2.5-48	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , EFW (E = 0.8)
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304/304L Dual Cert. , 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL3000, SWE, A 182 Gr. F304/304L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL6000, SWE, A 182 Gr. F304/304L Dual Cert.
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.

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	2.5-48 2.5-48	-	MATCH MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A 182 Gr. F304/304L Dual Cert.	
	2.5-24 2.5-24	0.5-2 0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304/304L Dual Cert. Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304/304L Dual Cert.	
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	3-48	2.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.	
Small Bore Fittings	6-48	2.5-22	MATCH I	Weldolet , MSS SP-97 , BE , A 182 Gr. F304/304L Dual Cert.	
man bore rittings	0.5-2			45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	<u>-</u>		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	- -		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 162 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cplg., B16.11, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cplg. , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Cplg., B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Male Connector, 0.5 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-8	
	0.5-0.5	-		1-8W	
	0.5-2	-		Plug Hex Head, B16.11, MTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Union, MSS SP-83, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.5-2	-		Union , MSS SP-83 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.5-2 0.75-2	- 0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	0.75-2	0.5-1.5	MATCH	Con. Swage, MSS SP-95, PE/TE, A 403 Gr. WP304/304L Dual Cert., SMLS	
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , TBE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A 403 Gr. WP304/304L Dual Cert., SMLS	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PE/TE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , TBE , A 403 Gr. WP304/304L Dual Cert. , SMLS	
	0.75.0.75			Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-	
	0.75-0.75 0.75-2	- 0.5-1.5		810-1-12W Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.	
				Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304/304L Dual	
	0.75-2	0.5-1.5		Cert. Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-	
	1-1	-		16W	
Bolts				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
	0.5-48		T	Cad Plated	
Gaskets				Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.125" non	
	0.5-48			compressed thickness	
	0.5-48			Insulating Gskt Set, B16.21, CL150, RF, Per Specification 81.33.08, 0.125" non compressed thickness	
				Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.125" non	
	0.5-48			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non	
	0.5-48			compressed thickness	
	0.5-48			Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175 non compressed thickness	
	0.5-48			Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175 non compressed thickness	
				Sp. Wound Gskt , B16.20 , CL300 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175	
	0.5-48			non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175	
	0.5-48	<u> </u>	Τ	non compressed thickness	
3	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert.	
	2.5-24	-	MATCH	WN Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F304/304L Dual Cert.	
	0.5-2	-	MATCH	SW Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert.	
	10-24	_	MATCH	WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 2 Taps , 180deg apart	

PIPE SPEC:	1BCA2	— Date	e: 8/4/2016 5:11:51	M Kiewit
	2.5-24 2.5-24 0.5-24 26-48	- - - -	MATCH MATCH MATCH	WN Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert. Blind Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.47 Sr. A, CL300, RF, A 182 Gr. F304/304L Dual Cert.
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert.
Gate Valves				Octo Value Are Mar Ol 200 ONE of ETE Dital Beneat Handwise I Or anaton A
	0.5-2	-		Gate Valve, App. Mfg., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve, App. Mfg., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351
	0.5-2	-		Gr. CF3 Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	0.5-2	-		A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-		A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-	MATCH	A 351 Gr. CF3 Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-36	-		351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
Globe Valves	8-36	-	MATCH	351 Gr. CF3
Globe valves	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator
	2.5-6	-	MATCH	, A 351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	-		, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-24	-		351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A
-	8-24	-	MATCH	351 Gr. CF3
Check Valves				
	0.5-2 0.5-2	- -		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3
	2.5-24	-	MATCH	Check Valve Swing LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, A 351 Gr. CF3 Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 351 Gr.
	2.5-24	-		CF8
	6-24	-		Check Valve Wafer Dual PI LP, B16.10 App. Mfg., CL150, FFTBE, A 351 Gr. CF3
Ball Valves	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3
	0.5-2	-		Ball Valve, B16.10 App. Mfg., CL150, RF, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF8
	2.5-6	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Fltg. Ball , Lever Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball ,
	8-12	-		Gear Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball ,
Butterfly Valves	14-24	<u>.</u>		Gear Operator , A 351 Gr. CF8
Datterny valves		1	1	Butterfly Valve Wafer Type , Bray Controls or eq. , CL150 , FF w/Integral Gaskets ,
	2.5-6	-		Lever Operator , A 351 Gr. CF3 , EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral
	2.5-6	-		Gaskets, Lever Operator, A 351 Gr. CF3, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral

8-20

Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral Gaskets , Gear Operator , A 351 Gr. CF3 , EPDM / BUNA-N Seat, SS Stem

PIPE SPEC: 1BCA3

Date: 8/4/2016 5:13:25 PM



DESCRIPTION: LUBE/HYDRAULIC OIL, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OF THE CHAINGE IF SE	COLLED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- ${\tt 4~GASKET~THICKNESS~AFTER~COMPRESSION~IS~APPROXIMATELY~1/8"}.$
- 5 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 6 ALL PIPING SHALL BE PICKLED, PASSIVATED AND SOLVENT CLEANED AFTER FABRICATION.
- 7 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 8 PIPE IN LUBE OIL SERVICE SHALL BE PICKLED AND PASSIVATED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-48	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP304/304L Dual Cert., SMLS
	0.5-2	-	Calc	Pipe, B36.19M, PE, A 312 Gr. TP304/304L Dual Cert., SMLS
	0.5-2	-	Calc	Nipple, B36.19M, TBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, TBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, TBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, TBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304/304L Dual Cert. , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304/304L Dual Cert. , 12" Long, SMLS
Large Bore Fittings				

PIPE SPEC:	1BCA3	Date:	8/4/2016 5:13:25 P	M Kiewit
	0.5-48 0.5-48 0.5-48 0.75-48 0.75-48 1-24 2.5-24 2.5-24	- - 0.5-42 0.5-42 0.5-42 - 0.5-2 0.5-18	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	90 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Cap, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Eq. Tee, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Con. Reducer, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Ecc. Reducer, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Red. Tee, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. 90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert. Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304/304L Dual Cert. Weldolet, MSS SP-97, BE, A 182 Gr. F304/304L Dual Cert.
Small Bore Fittings		0.0 10	IVI/ CT OTT	
	0.5-2 0.5-2 0.5-0.5 0.5-2 0.5-2 0.75-0.75	- - - - - -		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810 1-8W Plug Hex Head , B16.11 , MTE , A105 Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1
Bolts	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Flanges	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.125" non compressed thickness Insulating Gskt Set , B16.21 , CL150 , RF , Per Specification 81.33.08 , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
	0.5-2 0.5-24 30-48 0.5-24 30-48 30-48 0.5-2 10-24 4-8 0.5-24 0.5-24	- - - - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert. Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert. Blind Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F304/304L Dual Cert. SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 2 Taps , 180deg apart SO Flg Hub Type , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert.
Gate Valves	0.5-2 2.5-6 8-36	- - -	MATCH MATCH MATCH	Gate Valve, App. Mfg., CL800, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3
Globe Valves	0.5-2 2.5-6 2.5-6 8-24 8-24	- - - -	MATCH MATCH MATCH	Globe Valve, Manf. Std., CL800, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL150, RF, Welded Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3
Check Valves	0.5-2 2.5-24	-	MATCH MATCH	Check Valve Pistn Lft , App. Mfg. , CL800 , BE , Bltd Bonnet , A 351 Gr. CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 351 Gr. CF3
Ball Valves	0.5-2 0.5-2 2.5-6 8-12	- - -		Ball Valve, B16.10 App. Mfg., CL150, RF, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF8 Ball Valve LP FB, App. Mfg., CL600, BE, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF3 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever Operator, A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Trun. Mount. Ball, Gear Operator, A 351 Gr. CF8

PIPE SPEC:

1BCA3

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Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball ,

14-24 - Gear Operator , A 351 Gr. CF8

Butterfly Valves

PIPE SPEC: 1BCB6

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 400F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	230
100	230
200	195
300	175
400	160

GENERAL NOTES

Date: 8/4/2016 5:14:55 PM

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-24	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304L , SMLS
Large Bore Fittings				
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304L
	1-12	0.75-2		45 Deg Latrolet, Manuf. Std, CL6000, SWE, A 182 Gr. F304L
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	2-22	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304L
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304L , SMLS
	2.5-24	2-22	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304L
	2.5-6	0.75-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	2-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304L
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A 182 Gr. F304L
	0.5-2	-		Cplg., B16.11, CL6000, SWE, A 182 Gr. F304L
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		Union, MSS SP-83, CL3000, SWE, A 182 Gr. F304L
	0.5-2	-		Union, MSS SP-83, CL6000, SWE, A 182 Gr. F304L
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L
		0.5-1.5 0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L



PIPE SPEC: 1BCB6

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Bolts				
	•		•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-24			Cad Plated
Gaskets				
	0.5-24			Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, NM Comp. Gskt., 0.125" non
	0.5-24			compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
Flanges				
	0.5-2	-	MATCH	SW Flg., B16.5, CL150, RF, A 182 Gr. F304L
	2.5-24	-	MATCH	WN Flg., B16.5, CL150, FF, A 182 Gr. F304L
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L
	0.5-24	-		Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L
	2.5-24	-	MATCH	WN Flg., B16.5, CL150, RF, A 182 Gr. F304L
Gate Valves				
	2-2	-		Gate Valve Underground , B16.10 App. Mfg. , CL150 , FF , Bltd Bonnet , Wrench Operator , A 351 Gr. CF8
	2.5-24	-		Gate Valve Underground , B16.10 App. Mfg. , CL150 , FF , Bltd Bonnet , Wrench Operator , A 351 Gr. CF8
Globe Valves				
Check Valves				
Ball Valves	<u> </u>	Τ	1	
Dun Tuites	<u> </u>	<u> </u>		L
Butterfly Valves				

PIPE SPEC: 1BCD1

Date: 8/4/2016 5:16:16 PM



DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OF THE CHAINGE IF SE	COLLED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP316/316L Dual Cert. , SMLS
	2.5-48	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP316/316L Dual Cert. , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL3000, SWE, A 182 Gr. F316/316L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL6000, SWE, A 182 Gr. F316/316L Dual Cert.
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS

PIPE SPEC: 1BCD1 **Date:** 8/4/2016 5:16:16 PM



FIFE SFEG.	IDCDI	Date:	8/4/2016 5:16:16	PM
	0.5.0	0.5.0	MATOLI	Fac Course MCC CD OF DIF/DOF A 400 Cs W/D040/0401 Dual Cast CMI C
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	2.5-48		MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A 182 Gr. F316/316L Dual Cert.
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A 182 Gr. F316/316L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F316/316L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F316/316L Dual Cert.
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	3-48	2.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
Crack Dave Fittings	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F316/316L Dual Cert.
Small Bore Fittings	0.5-2	<u> </u>		L 45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	_		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	_		90 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cplg., B16.11, CL3000, FTE, A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cplg., B16.11, CL6000, FTE, A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
				Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-
	0.5-0.5	-		1-8W
	0.5-2	-		Plug Hex Head , B16.11 , MTE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PE/TE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , TBE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PE/TE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , TBE , A 403 Gr. WP316/316L Dual Cert. , SMLS
				Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
	0.75-0.75	-		810-1-12W
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
				Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F316/316L Dual
	0.75-2	0.5-1.5		Cert.
	1-1	-		Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-16W
Bolts				
	0.5-48			Cap Screw , ASME B18.2.1 / B18.2.2 , A193 B7
	0.5.40			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
Gaskets	0.5-48	T	Τ	Cad Plated
Odoneto	1			Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL150, RF, Red Rubber or EPDM, 0.125" non
	0.5-48			compressed thickness
	0.5-48			Sp. Wound Gskt, B16.20, CL150, FF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness
	0.5-40			Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175"
	0.5-48			non compressed thickness
				Sp. Wound Gskt , B16.20 , CL300 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175"
	0.5-48			non compressed thickness
				Sp. Wound Gskt, B16.20, CL300, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175"
	0.5-48			non compressed thickness
Flanges			=	
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F316/316L Dual Cert.
	26-48	-	MATCH	WN Flg., B16.47 Sr. A, CL300, RF, A 182 Gr. F316/316L Dual Cert.
	0.5-24	-	NAA TOU	Blind Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert.
	2.5-24	-	MATCH	WN Flg., B16.5, CL300, FF, A 182 Gr. F316/316L Dual Cert.
	0.5-24	-	MATOLI	Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert.
	2.5-24	-	MATCH	WN Flg., B16.5, CL150, FF, A 182 Gr. F316/316L Dual Cert.
	2.5-24	-	MATCH	WN Flg., B16.5, CL150, RF, A 182 Gr. F316/316L Dual Cert.
	26-48 26-48	-		Blind Flg., B16.47 Sr. A, CL150, RF, A 182 Gr. F316/316L Dual Cert.
	26-48	-	NAATOLI	Blind Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-	MATCH	SW Flg., B16.5, CL300, RF, A 182 Gr. F316/316L Dual Cert.
	40.04		MATOLI	WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. , 2
	10-24	-	MATCH	Taps , 180deg apart
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert.
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F316/316L Dual Cert.
	2.5-24	-	MATCH	WN Flg., B16.5, CL300, RF, A 182 Gr. F316/316L Dual Cert.
	0.5-24	-		Blind Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert.
	0.5-24	-		Blind Flg. , B16.5 , CL300 , FF , A 182 Gr. F316/316L Dual Cert.

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Gato Valvos				
Gate Valves				Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
	0.5-2	-		351 Gr. CF3M Gate Valve, App. Mfg., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351
	0.5-2	-		Gr. CF3M Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator
	0.5-2	-		A 351 Gr. CF8M Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator
	2.5-6	-		A 351 Gr. CF8M Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator
	2.5-6	-	MATCH	A 351 Gr. CF3M Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A
	8-36	-		351 Gr. CF8M
	8-36	-	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF3M
Globe Valves				Oleke Velva Mark Otal Ol 000 OWE wETE Dital Demost Handwise Consisten
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M
	2.5-6	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operato , A 351 Gr. CF3M
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operato , A 351 Gr. CF8M
	8-24	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8M
	8-24	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF3M
Check Valves				
	0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8M
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3M
	2.5-24	-	MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 351 Gr. CF3M
	2.5-24	-		Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8M
	6-24	-		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 351 Gr. CF3M
Ball Valves				Doll Value I D.ED. Ann. May. Cl. COO. CWE v. ETE. Three Diese Elfa Dell. Lever
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE x FTE, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF3M
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3M
	0.75-2	-		Ball Valve, B16.10 App. Mfg., CL150, RF, Three Piece Fltg. Ball, Lever Operator A 216 Gr. WCB
	2.5-6	-		Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever Operator, A 351 Gr. CF8M
	8-12	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8M
	14-24	<u>-</u>		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8M
Butterfly Valves				
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 351 Gr. CF3M, EPDM / BUNA-N Seat, SS Stem
	2.5-6	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A 351 Gr. CF3M, EPDM/BUNA-N Seat, SS Stem
				Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral



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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

I TO CHANGE IF S	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 7 E HAS BEEN SELECTED BASED ON INSPECTION ACCORDANCE WITH BASE MATERIAL SPECIFICATION. E MAY BE INCREASED DEPENDING ON LEVEL OF INSPECTION. CONSULT THE EXACT CODE LANGUAGE FOR THIS CHANGE. ANY CHANGES TO INSPECTION SHALL BE ENGINEER APPROVED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP316/316L Dual Cert. , EFW (E = 0.8)
	2.5-48	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP316/316L Dual Cert., EFW (E = 0.8)
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PBE , A 312 Gr. TP316/316L Dual Cert. , 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	2.5-48	-	MATCH	45 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.
	2.5-48	-	MATCH	90 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.

PIPE SPEC:	1BCD2	Date: 8	8/4/2016 5:17:49	PM Wiewit	
	2.5-48 2.5-48	-	MATCH MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Cap , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.	
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS	
	2.5-6 2.5-48 2.5-24 2.5-24 2.5-24 2.5-24 3-48 3-48	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 2.5-42 2.5-42	MATCH MATCH MATCH MATCH MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS Eq. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F316/316L Dual Cert. Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F316/316L Dual Cert. Con. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Ecc. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Red. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.	
Small Bore Fittings	6-48	2.5-22	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F316/316L Dual Cert.	
Bolts	0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 1.75-2 1.1		MATCH MATCH MATCH MATCH MATCH MATCH	45 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. 45 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Cap, B16.11, CL3000, FTE, A 182 Gr. F316/316L Dual Cert. Cap, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Cap, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Cap, B16.11, CL6000, FTE, A 182 Gr. F316/316L Dual Cert. Cap, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Cplg., B16.11, CL3000, FTE, A 182 Gr. F316/316L Dual Cert. Cplg., B16.11, CL6000, FTE, A 182 Gr. F316/316L Dual Cert. Cplg., B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Cplg., B16.11, CL6000, FTE, A 182 Gr. F316/316L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Male Connector, 0.5 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810 1-8W Plug Hex Head, B16.11, MTE, A105 Union, MSS SP-83, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Union, MSS SP-83, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Con. Swage, MSS SP-95, PBE, A 403 Gr. WP316/316L Dual Cert., SMLS Con. Swage, MSS SP-95, TBE, A 234 Gr. WPB Con. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS Ecc. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS Ecc. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS Ecc. Swage, MSS SP-95, TBE, A 234 Gr. WPB, SMLS Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W Red. Tee, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Red. Tee, B16.11, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Reducing Insert, MSS SP-79, CL3000, PE x SWE, A105 Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1	
Boits	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated	
Gaskets	0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48 0.5-48			Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.125" non compressed thickness Insulating Gskt Set , B16.21 , CL150 , RF , Per Specification 81.33.08 , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness	
Flanges	0.5-2 2.5-24 0.5-2 2.5-24 0.5-2 2.5-24 10-24 0.5-24 26-48 26-48 26-48	- - - - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert. SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. WN Ori Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. Blind Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F316/316L Dual Cert.	

PIPE SPEC: 1BCD2 **Date:** 8/4/2016 5:17:49 PM



PIPE SPEC:	IBCDZ	Date	: 8/4/2016 5:17:49	M	
	26-48	<u>-</u>	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F316/316L Dual Cert.	
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , FF , A 182 Gr. F316/316L Dual Cert.	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F316/316L Dual Cert.	
Gate Valves					
	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M	
	0.5-2	_		Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M	
	0.5-2	_		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8M	
		-		Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,	
	2.5-6	-	=	A 351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator ,	
	2.5-6	-	MATCH	A 351 Gr. CF3M Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A	
	8-36	-		351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A	
	8-36	-	MATCH	351 Gr. CF3M	
Globe Valves					
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M	
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M	
	2.5-6	_	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M	
		-	WATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator	
	2.5-6	-		, A 351 Gr. CF8M Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A	
	8-24	-		351 Gr. CF8M Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A	
	8-24	-	MATCH	351 Gr. CF3M	
Check Valves				Chook Value Dieta I th D46 40 App Mfg. CL450 DE Ditd Dennet A 254 Cr	
	0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8M	
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3M	
	2.5-24	-	MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 351 Gr. CF3M	
	2.5-24	-		Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 351 Gr. CF8M	
	6-24	-		Check Valve Wafer Dual PI LP, B16.10 App. Mfg., CL150, FFTBE, A 351 Gr. CF3M	
Ball Valves					
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3M	
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3M	
	0.75-2	-		Ball Valve , B16.10 App. Mfg. , CL150 , RF , Three Piece Fltg. Ball , Lever Operator , A 216 Gr. WCB	
	2.5-6	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Fltg. Ball , Lever Operator , A 351 Gr. CF8M	
	8-12	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8M	
	14-24	_		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8M	
Butterfly Valves	17-27			Godi Oporator, A 351 Gr. Or olivi	
	2.5-6	-		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Lever Operator, A 351 Gr. CF3M, EPDM / BUNA-N Seat, SS Stem	
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 351 Gr. CF3M, EPDM/BUNA-N Seat, SS Stem	
	8-20	_		Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral Gaskets, Gear Operator, A 351 Gr. CF3M, EPDM / BUNA-N Seat, SS Stem	
	0-20			Cacholo, Coal Operator, A 301 Or. Or 3101, Er Divi / DOINA-IN Seat, 30 Stelli	

PIPE SPEC: 1BCE6

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 400F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

71 10 017 11 10 11	OI LOII ILD IIV NOTLO
TEMP. F	PRESS. PSIG
-20	230
100	230
200	195
300	175
400	160

GENERAL NOTES

Date: 8/4/2016 5:19:22 PM

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- $3\,$ GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 5 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.

Γ	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
<u> </u>	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP316L , SMLS
	2.5-24	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP316L , SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 3" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 3" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 9" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 12" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 9" Long, SMLS
	0.5-2	-	S-80S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 12" Long, SMLS
Large Bore Fittings				
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F316L
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F316L
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP316L
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP316L
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP316L
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP316L
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	2.5-6	0.75-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP316L, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP316L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F316L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F316L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F316L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F316L
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP316L
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP316L
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP316L
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316L
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316L
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F316L
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F316L
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F316L



PIPE SPEC:	1BCE6	- Date:	: 8/4/2016 5:19:22	M Kiewit	
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 1-2	- - - 0.5-1.5 0.5-1.5 0.5-1.5 - - 0.5-1.5 0.5-1.5	MATCH MATCH	Cap , B16.11 , CL6000 , SWE , A 182 Gr. F316L Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F316L Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F316L Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316L Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316L Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP316L , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP316L , SMLS Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F316L Reducing Insert , MSS SP-79 , CL6000 , PE x SWE , A 182 Gr. F316L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F316L Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F316L Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316L Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316L	
Bolts	1-2	0.5-1.5		Ned. 166 ; B10.11 ; CL0000 ; GWL ; A 102 G1.1310L	
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated	
Gaskets				Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.125" non	
	0.5-24 0.5-24 0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness	
Flanges					
	2.5-24 2.5-24 0.75-24 0.75-2 0.75-2	- - - -	MATCH MATCH MATCH MATCH	WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F316L WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F316L	
Gate Valves					
	2-2 2.5-24	-		Gate Valve Underground, B16.10 App. Mfg., CL150, FF, Bltd Bonnet, Wrench Operator, A 351 Gr. CF3M Gate Valve Underground, B16.10 App. Mfg., CL150, FF, Bltd Bonnet, Wrench Operator, A 351 Gr. CF3M	
Globe Valves	2.0-24			Operator, A 331 GL. GESIVI	
		1			
Check Valves					
Ball Valves					
Butterfly Valves	<u> </u>	T			

PIPE SPEC: 1BCH1 Date: 8/4/2016 5:20:52 PM

0.5-12

DESCRIPTION: DEMINERALIZED WATER, INSTRUMENT AIR, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	230
100	230
200	195

GENERAL NOTES

- 1 CHOICE OF PIPE SCHEDULE IS LIMITED TO S-10S.
- 2 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.

(®) Kiewit

- 3 GROOVED-END PIPE AND FITTINGS SHALL BE VICTAULIC OR EQUAL. MECHANICAL COUPLINGS SHALL BE RIGID TYPE VICTAULIC STYLE 489 STAINLESS STEEL OR EQUAL.
- 4 BOLTS FOR MECHANICAL COUPLINGS SHALL BE TYPE 316 SS OVAL NECK TRACK BOLTS AND HEAVY HEX NUTS CONFORMING TO ASTM A193.
- 5 FOR MATING TO THREADED PIPE OR VALVES A VICTAULIC FEMALE THREAD ADAPTER OR VICTAULIC MALE THREAD ADAPTER SHALL BE USED. SPECIFY 304SS MATERIALS.
- 6 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (EPDM).
- 7 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 8 USE VICTAULIC VIC-PRESS SERIES P569 BALL VALVE FOR INSTRUMENT AIR SERVICE, FOR ALL OTHER SYSTEMS USE VICTAULIC VIC-PRESS SERIES P589 BALL VALVE

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples	•	1 02	33	
i ipod di imppied	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-12	_	S-10S	Pipe, Victaulic Grooved, MGE, A 312 Gr. TP304L, SMLS
	0.5-2	_	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
Large Bore Fittings	1		T	Tipple Deciron 1 2/12 7/16/12 etc. 11 etc. 1/2 Deciro 2 etc. etc.
g	2.5-12	_	S-10S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 411
	2.5-12	_	S-10S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 410
	2.5-12	_	S-10S	Cap , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 460
	2.5-12	2-10	S-10S	Concentric Reducer , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 450
	2.5-12	2-10	S-10S	Reducing Tee, Victaulic Grooved, MGE, A 403 Gr. WP304L, No. 425
	2.5 12	2 10	0 100	Rigid Coupling, Victaulic Grooved, MGE, A 403 Gr. WP304L, Style 489, Type E
	2.5-12	_		Gasket
	2.5-12	-	S-10S	Tee , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 420
Small Bore Fittings	2.3-12	<u> </u>	3-103 T	Tee , victaulic Grooved , MGE , A 403 Gr. WF304E , No. 420
Sman Bore Fittings	0.5-2	_	S-10S	45 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P591
	0.5-2	-	S-10S	90 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P586
	0.5-2	-	3-103	90 Deg Elbow, Victaulic Vic-Fress, VF3, A 312 Gr. 1F304L, Style F300
	0.5-2	0.5-2	S-10S	Female Adapter, Victaulic Vic-Press, FTE x VPS, A 312 Gr. TP304L, Style P599
				, , , , , , , , , , , , , , , , , , ,
	0.5-2	0.5-2	S-10S	Male Adapter, Victaulic Vic-Press, MTE x VPS, A 312 Gr. TP304L, Style P596
				Male Connector, 0.5 x 0.5in Swagelok or Eq, MNPT x CTBE, A 182 Gr. F304, SS
	0.5-0.5	_		810-1-12
	0.5-2	_		Plug Square Head , B16.11 , MTE , A 182 Gr. F304L
	0.5-2	_	S-10S	PressFit Coupling, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P597
	0.5-2	_	S-10S	Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P592
	0.5-2	_	S-10S	Union , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P584
	0.0 2		0 100	Official, violating vio 1 1000, vi G, 7, 012 Oi. 11 0042, Gtyle 1 004
	0.5-2	-	S-10S	Weld Adapter , Victaulic Vic-Press , PE x VPS , A 312 Gr. TP304L , Style P561
	0.75-2	0.5-1.5	S-10S	Concentric Reducer, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P594
	0.13-2	0.0-1.0	3-103	Male Connector, 0.75 x 0.5in Swagelok or Eq, MNPT x CTBE, A 182 Gr. F304, St
	0.75-0.75			810-1-12
	0.75-0.75 0.75-2	- 0.5-1.5	S-10S	Reducing Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P593
Bolts	0.73-2	0.0-1.0	3-103	Trouvelly 166, victabile vic-11633, vi 3, A 312 Gi. 17304L, Style F393
Doile		1	<u> </u>	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8 / A 194 Gr 8 ,CS CR,
	0.5-12			304SS IR
Gaskets	0.0 12	1		00100 IIX
Cushets		1	l	

Dielectric FlangeKit , CL150 , 0.175" non compressed thickness

PIPE SPEC:	1BCH1	Date	e: 8/4/2016 5:20:52	EPM Wiewit
	0.5-12			Dielectric FlangeKit , CL300 , 0.175" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non
	0.5-12			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Red Rubber , 0.175" non compressed
	0.5-12			thickness, use Red Rubber up to 150 Deg F Seal Ring, Victaulic, Seal Ring, EPDM Victaulic Gr.E, 0.0625" non compressed
	0.5-12			thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, 304 SS CR , 0.175"
	0.5-12			non compressed thickness
Flanges				
	0.5-12 0.5-2	-	MATCH	Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F304
	2.5-12	-	S-10S	Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 182 Gr. F304L , No. 445F
	0.5-2	-	0.400	Thd. Flg., B16.5, CL150, FF, A 182 Gr. F304L Flg. Adapter, Victaulic Pressfit, CL150, RFFE X VPS, A 182 Gr. F304L, Style
	0.5-2	-	S-10S	P595 Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 182 Gr. F304L , No. 445R
Osta Walasa	2.5-12	-	S-10S	
Gate Valves				Cata VIII. Damas Farra DD ar an Cl 900 FTF Dital Damas Llandukasi
	0.5-2	-		Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F304L
	2.5-12	-		Gate VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8
Globe Valves				Olaha Viki, Daggasi Fassa Dad Dagtas as 20,000 FTF, Ditd Daggat, Handukaal
	0.5-2	-		Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F304L
[2.5-12	-		Globe VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8
Check Valves				O in Old VII. Prove Free Pal Partners Oldon FTF PILIPourt A 400
	0.75-2	-		Swing Chk VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , A 182 Gr. F304L
[m	2.5-12	-	_	Swing Chk VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8
Ball Valves				Dall VIII I D. FD. Vietavija Via Dagas an an IVDO I avea Operator A 054 Oc 050M
	0.5-2	-		Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M Series P569
[-	1.5-6	-		Ball VIv FB , Victaulic Grooved or eq. , MGE , Lever Operator , A 351 Gr. CF8M , Series 726S
Butterfly Valves				D ((v.f) M) M'(v.f) [v. Over 1 10 v. (v. 700 MOF 1
	2.5-10	-		Butterfly VIv , Victaulic Grooved Series 763 , MGE , Lever Operator , A 351 Gr. CF8M

PIPE SPEC: 1BCH2

DESCRIPTION:

MATERIAL:

Stainless Steel - Type 304L

EXAMINATION:

Per ASME B31.1 - 2012

TEMPERATURE LIMIT:

-20E to 200E

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2012 STRESS RELIEF: Per ASME B31.1 - 2012

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIC
-20	230
100	230
200	195

GENERAL NOTES

Date: 8/4/2016 5:21:43 PM

- 1 CHOICE OF PIPE SCHEDULE IS LIMITED TO S-40S FOR SMALL BORE AND S-10S FOR LARGE BORE.
- 2 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 3 GROOVED-END PIPE AND FITTINGS SHALL BE VICTAULIC OR EQUAL. MECHANICAL COUPLINGS SHALL BE RIGID TYPE VICTAULIC STYLE 489 STAINLESS STEEL OR EQUAL.
- 4 BOLTS FOR MECHANICAL COUPLINGS SHALL BE TYPE 304 SS OVAL NECK TRACK BOLTS AND HEAVY HEX NUTS CONFORMING TO ASTM A193.
- 5 FOR MATING TO THREADED PIPE OR VALVES A VICTAULIC FEMALE THREAD ADAPTER OR VICTAULIC MALE THREAD ADAPTER SHALL BE USED. SPECIFY 304SS MATERIALS.
- 6 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (EPDM).
- 7 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.75-2	=	S-40S	Pipe , Victaulic Grooved , MGE , A 312 Gr. TP304L , SMLS
	2.5-12	-	S-10S	Pipe, Victaulic Grooved, MGE, A 312 Gr. TP304L, SMLS
				Adapter Nipple, Victaulic Grooved, MGE x BE, A 312 Gr. TP304L, No. 442H SS
	0.75-2	-	S-40S	
				Adapter Nipple, Victaulic Grooved, MGE x FTE, A 312 Gr. TP304L, No. 440H SS
	0.75-2	-	S-40S	
	0.75-2	-	S-40S	Adapter Nipple, Victaulic Grooved, MGE, A 312 Gr. TP304L, No. 443H SS
				Adapter Nipple, Victaulic Grooved, MGE x BE, A 312 Gr. TP304L, No. 442 SS
	2.5-12	-	S-10S	
	2.5-12	-	S-10S	Adapter Nipple, Victaulic Grooved, MGE, A 312 Gr. TP304L, No. 443 SS
Large Bore Fittings				
				Rigid Coupling, Victaulic Grooved, FGE, A 351 Gr. CF8M, Style 489, Type E
	1.5-12	-		Gasket
	2.5-12	-	S-10S	11.25 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 413 SS
	2.5-12	-	S-10S	22.5 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 412 SS
	2.5-12	-	S-10S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 411 SS
	2.5-12	-	S-10S	45 Deg Lateral , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 430 SS
	2.5-12	-	S-10S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 410 SS
	2.5-12	-	S-10S	Cap , Victaulic Grooved , MGE , A 351 Gr. CF8M , No. 460 SS
	2.5-12	1-10	S-10S	Concentric Reducer , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 450 SS
	2.5-12	-	S-10S	Cross, Victaulic Grooved, MGE, A 403 Gr. TP304L, No. 435 SS
	2.5-6	1-4	S-10S	Eccentric Reducer , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 451 SS
	2.5-2.5	0.75-2	S-10S	Reducing Tee , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 425 SS
	2.5-12	-	S-10S	Tee, Victaulic Grooved, MGE, A 403 Gr. WP304L, No. 420 SS
	2.5-12	-	S-10S	Wye , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 433 SS
	3-12	0.75-10	S-10S	Reducing Tee , Victaulic Grooved , MGE , A 312 Gr. TP304L , No. 425 SS
Small Bore Fittings				
	0.75-2	-	S-40S	11.25 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 413H SS
	0.75-2	-	S-40S	22.5 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 412H SS
	0.75-2	-	S-40S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 411H SS
	0.75-2	-	S-40S	45 Deg Lateral , Victaulic Grooved , MGE , A 403 Gr. TP304L , No. 430H SS
	0.75-2	-	S-40S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 410H SS
	0.75-2	-	S-40S	Cap , Victaulic Grooved , MGE , A 351 Gr. CF8M , No. 60 SS
	0.75-2	-	S-40S	Cross, Victaulic Grooved, MGE, A 403 Gr. TP304L, No. 435H SS Flexible Coupling, Victaulic Grooved, FGE, A 890 Gr. CE8MN, Style 77DX, Type E
	0.75-1	-		Gasket
	0.75-2	-	S-40S	Tee , Victaulic Grooved , MGE , A 403 Gr. WP304L , No. 420H SS
	0.75-2	-	S-40S	Wye, Victaulic Grooved, MGE, A 403 Gr. TP304L, No. 433H SS



PIPE SPEC: 1BCH2

Date: 8/4/2016 5:21:43 PM



	2-2	0.75-1.5	S-40S	Concentric Reducer, Victaulic Grooved, MGE, A 403 Gr. TP304L, No. 50H SS
	2-2	0.75-1.5	S-40S	Eccentric Reducer, Victaulic Grooved, MGE, A 403 Gr. TP304L, No. 51H SS
	2-2	0.75-1.5	S-40S	Reducing Tee, Victaulic Grooved, MGE, A 403 Gr. WP304L, No. 425H SS
Bolts				
	•			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8 / A 194 Gr 8 ,CS CR,
	0.75-12			304SS IR
Gaskets				
	•			Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non
	0.75-12			compressed thickness
				Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, 304 SS CR, 0.175"
	0.75-12			non compressed thickness
Flanges				
	0.75-2	-		Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L
				Flg. Adapter, Victaulic Grooved, CL150, FFFE X MGE, A 182 Gr. F304L, No. 45F
	0.75-12	-		, , , , , , , , , , , , , , , , , , , ,
	0.75-12	-		Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L
				Flg. Adapter, Victaulic Grooved, CL150, RF x MGE, A 182 Gr. F304L, NO. 45R
	0.75-12	-		· · · · · · · · · · · · · · · · · · ·
Gate Valves				
	.			Gate Valve , App. Mfg. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182
	0.75-2	-		Gr. F304L
				Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator
	2.5-6	-		A 351 Gr. CF8
				Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A
	8-12	-		351 Gr. CF8
Globe Valves				
<u></u>	ļ.	1		Globe Valve, Manf. Std., CL800, FTE, Bltd Bonnet, Handwheel Operator, A 182
	0.75-2	-		Gr. F304L
	5.7.5 2			Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	_		, A 351 Gr. CF8
	2.0 0			Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
	8-12	_		351 Gr. CF8
Check Valves	0 12			331 GI. GI 0
Check valves				
	0.75-2	_		Check Valve Pistn Lft , App. Mfg. , CL800 , FTE , Bltd Bonnet , A 182 Gr. F304L
	0.73-2	<u>-</u>		Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr.
	2.5-12			CF8
Pall Valvas	2.5-12	- -		UFO
Ball Valves	1			Ball VIv LP FB, Victaulic Vic-Press or eq., VPS, Lever Operator, A 351 Gr. CF8,
	0.75.0			
	0.75-2	-		Series P569 Rell Viv EB Vietaulia Cranyad er eg MCE Layer Operator A 351 Cr. CER
	4.5.0			Ball VIv FB , Victaulic Grooved or eq. , MGE , Lever Operator , A 351 Gr. CF8 ,
Dutterfly Velves	1.5-6	<u>-</u>		Series 726
Butterfly Valves				Distantia Vila Vieterila Organia 700 MOE de la companya A 054 C 050
				Butterfly VIv , Victaulic Grooved Series 763 , MGE , Lever Operator , A 351 Gr. CF8

2-10

PIPE SPEC: 1BCH3 Date: 8/4/2016 5:22:39 PM

0.5-12

DESCRIPTION: DEMINERALIZED WATER, INSTRUMENT AIR, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	230
100	230
200	195

GENERAL NOTES

- 1 CHOICE OF PIPE SCHEDULE IS LIMITED TO S-10S.
- 2 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.

(®) Kiewit

- 3 GROOVED-END PIPE AND FITTINGS SHALL BE VICTAULIC OR EQUAL. MECHANICAL COUPLINGS SHALL BE RIGID TYPE VICTAULIC STYLE 489 STAINLESS STEEL OR EQUAL.
- 4 BOLTS FOR MECHANICAL COUPLINGS SHALL BE TYPE 316 SS OVAL NECK TRACK BOLTS AND HEAVY HEX NUTS CONFORMING TO ASTM A193.
- 5 FOR MATING TO THREADED PIPE OR VALVES A VICTAULIC FEMALE THREAD ADAPTER OR VICTAULIC MALE THREAD ADAPTER SHALL BE USED. SPECIFY 316SS MATERIALS.
- 6 GASKETS FOR LARGE BORE MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (EPDM).
- 7 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 8 USE VICTAULIC VIC-PRESS SERIES P569 BALL VALVE FOR INSTRUMENT AIR SERVICE, FOR ALL OTHER SYSTEMS USE VICTAULIC VIC-PRESS SERIES P589 BALL VALVE
- 9 GASKETS FOR SMALL BORE MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE H (HNBR).

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP316L , SMLS
	2.5-12	-	S-10S	Pipe, Victaulic Grooved, MGE, A 312 Gr. TP316L, SMLS
Large Bore Fittings				
	2.5-12	-	S-10S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 411 SS
	2.5-12	-	S-10S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 410 SS
	2.5-12	-	S-10S	Cap , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 460 SS
	2.5-12	2-10	S-10S	Concentric Reducer , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 450 SS
	2.5-12	2-10	S-10S	Reducing Tee, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 425 SS
				Rigid Coupling, Victaulic Grooved, FGE, A 403 Gr. WP316L, Style 489, Type E
	2.5-12	-		Gasket
	2.5-12	-	S-10S	Tee , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 420 SS
Small Bore Fittings				
	0.5-2	-	S-10S	45 Deg Elbow, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P571
	0.5-2	-	S-10S	90 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P568
	0.5-2	0.5-2	S-10S	Female Adapter , Victaulic Vic-Press , FTE x VPS , A 312 Gr. TP316L , Style P579
	0.5-2	0.5-2	S-10S	Male Adapter , Victaulic Vic-Press , MTE x VPS , A 312 Gr. TP316L , Style P576
	0.5-2	-		Plug Square Head, B16.11, MTE, A 182 Gr. F316L
	0.5-2	-	S-10S	PressFit Coupling, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P507
	0.5-2	-	S-10S	Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P572
	0.5-2	-	S-10S	Union, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P585
	0.5-2	-	S-10S	Weld Adapter , Victaulic Vic-Press , PE x VPS , A 312 Gr. TP304L , Style P561
	0.75-2	0.5-1.5	S-10S	Concentric Reducer , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P574
	0.75-2	0.5-1.5	S-10S	Reducing Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P573
Bolts				
	0.5-12			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8M / A 194 8M , CS CR, 316SS IR
Gaskets				
	0.5-12	•		Dielectric FlangeKit, CL150, 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non
				, , , , , , , , , , , , , , , , , , , ,

compressed thickness

PIPE SPEC:	1BCH3	Date: 8/4/201	16 5:22:39 F	M Kiewit
	0.5-12 0.5-12			Seal Ring , Victaulic , Seal Ring , EPDM Victaulic Gr.E , 0.0625" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
Flanges				
	0.5-2 0.5-12	- -		Thd. Flg., B16.5, CL150, FF, A 182 Gr. F316L Blind Flg., B16.5, CL150, RF, A 182 Gr. F316L
	0.5-2	-	S-10S	Flg. Adapter, Victaulic Pressfit, CL150, RFFE X VPS, A 182 Gr. F316L, Style P575 Flg. Adapter, Victaulic Grooved, CL150, RF x MGE, A 182 Gr. F316L, No. 445R
	2.5-12	-	S-10S	Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 182 Gr. F316L , No.
	2.5-12	-	S-10S	445F
Gate Valves				
	0.5-2	-		Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L Gate VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A
	2.5-12	-		351 Gr. CF8M
Globe Valves				
	0.5-2	-		Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L Globe VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-12	-		A 351 Gr. CF8M
Check Valves				
	0.75-2	-		Swing Chk VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , A 182 Gr. F316L
Dallyda	2.5-12	-		Swing Chk VIv , Powell B16.10 or eq. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8M
Ball Valves				Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M ,
	0.5-2	-		Series P569 Ball VIv FB , Victaulic Grooved or eq. , MGE , Lever Operator , A 351 Gr. CF8M ,
	1.5-6	-		Series 726S
Butterfly Valves				
	2.5-10	-		Butterfly VIv , Victaulic Grooved Series 763 , MGE , Lever Operator , A 351 Gr. CF8M

PIPE SPEC: 1BCH4

GENERAL AG SERVICE Stainless Steel - Type 316L

EXAMINATION: Per ASME B31.1 - 2012 TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESCRIPTION:

MATERIAL:

DESIGN CODE: Per ASME B31.1 - 2012 STRESS RELIEF: Per ASME B31.1 - 2012

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSIG

EMP. F	PRESS. PSIG
-20	230
100	230
200	195

GENERAL NOTES

Date: 8/4/2016 5:23:31 PM

- 1 CHOICE OF PIPE SCHEDULE IS LIMITED TO S-40S FOR SMALL BORE AND S-10S FOR LARGE BORE.
- 2 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 3 GROOVED-END PIPE AND FITTINGS SHALL BE VICTAULIC OR EQUAL. MECHANICAL COUPLINGS SHALL BE RIGID TYPE VICTAULIC STYLE 489 STAINLESS STEEL OR EQUAL.
- 4 BOLTS FOR MECHANICAL COUPLINGS SHALL BE TYPE 304 SS OVAL NECK TRACK BOLTS AND HEAVY HEX NUTS CONFORMING TO ASTM A193.
- 5 FOR MATING TO THREADED PIPE OR VALVES A VICTAULIC FEMALE THREAD ADAPTER OR VICTAULIC MALE THREAD ADAPTER SHALL BE USED. SPECIFY 304SS MATERIALS.
- 6 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (EPDM).
- 7 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.75-2	-	S-40S	Pipe , Victaulic Grooved , MGE , A 312 Gr. TP316L , SMLS
	2.5-12	-	S-10S	Pipe, Victaulic Grooved, MGE, A 312 Gr. TP316L, SMLS
				Adapter Nipple , Victaulic Grooved , MGE x BE , A 312 Gr. TP316L , No. 442H SS
	0.75-2	-	S-40S	
				Adapter Nipple , Victaulic Grooved , MGE x FTE , A 312 Gr. TP316L , No. 440H SS
	0.75-2	-	S-40S	
	0.75-2	-	S-40S	Adapter Nipple , Victaulic Grooved , MGE , A 312 Gr. TP316L , No. 443H SS
				Adapter Nipple , Victaulic Grooved , MGE x BE , A 312 Gr. TP316L , No. 442 SS
	2.5-12	-	S-10S	
	2.5-12	-	S-10S	Adapter Nipple , Victaulic Grooved , MGE , A 312 Gr. TP316L , No. 443 SS
Large Bore Fittings				
				Rigid Coupling, Victaulic Grooved, FGE, A 351 Gr. CF8M, Style 489, Type E
	1.5-12	-		Gasket
	2.5-12	-	S-10S	11.25 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 413 SS
	2.5-12	-	S-10S	22.5 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 412 SS
	2.5-12	-	S-10S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 411 SS
	2.5-12	-	S-10S	45 Deg Lateral , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 430 SS
	2.5-12	-	S-10S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 410 SS
	2.5-12	-	S-10S	Cap , Victaulic Grooved , MGE , A 351 Gr. CF8M , No. 460 SS
	2.5-12	1-10	S-10S	Concentric Reducer , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 450 SS
	2.5-12	-	S-10S	Cross , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 435 SS
	2.5-6	1-4	S-10S	Eccentric Reducer , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 451 SS
	2.5-2.5	0.75-2	S-10S	Reducing Tee, Victaulic Grooved, MGE, A 312 Gr. TP316L, No. 425 SS
	2.5-12	-	S-10S	Tee, Victaulic Grooved, MGE, A 312 Gr. TP316L, No. 420 SS
	2.5-12	-	S-10S	Wye, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 433 SS
	3-12	0.75-10	S-10S	Reducing Tee, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 425 SS
Small Bore Fittings				
	0.75-2	-	S-40S	11.25 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 413H SS
	0.75-2	-	S-40S	22.5 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 412H SS
	0.75-2	-	S-40S	45 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 411H SS
	0.75-2	-	S-40S	45 Deg Lateral , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 430H SS
	0.75-2	-	S-40S	90 Deg Elbow , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 410H SS
	0.75-2	-	S-40S	Cap , Victaulic Grooved , MGE , A 351 Gr. CF8M , No. 60 SS
	0.75-2	-	S-40S	Cross, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 435H SS
				Flexible Coupling, Victaulic Grooved, FGE, A 890 Gr. CE8MN, Style 77DX, Type E
	0.75-1	-		Gasket
	0.75-2	-	S-40S	Tee, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 420H SS



PIPE SPEC:	1BCH4	Date:	8/4/2016 5:23:3	PM Kiewit	
	0.75-2	-	S-40S	Wye , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 433H SS	
	2-2	0.75-1.5	S-40S	Concentric Reducer , Victaulic Grooved , MGE , A 403 Gr. WP316L , No. 50H SS	
	2-2 2-2	0.75-1.5 0.75-1.5	S-40S S-40S	Eccentric Reducer, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 51H SS Reducing Tee, Victaulic Grooved, MGE, A 403 Gr. WP316L, No. 425H SS	
Bolts	0.75-12			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8M / A 194 8M , CS CR, 316SS IR	
Gaskets	0.75-12			31033 IK	
Cuono	0.75-12			Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, 304 SS CR , 0.175"	
Γ	0.75-12			non compressed thickness	
Flanges	0.75-12	-		Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 182 Gr. F316L , NO. 45R	
	0.75-12	-			
	0.75-2	-		Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F316L Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 182 Gr. F316L , No. 45F	
	0.75-12	-			
Gate Valves	0.75-2	-		Gate Valve , App. Mfg. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,	
	2.5-6 8-12	-		A 351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8M	
Globe Valves	0-12	<u> </u>		331 GI. CFOM	
	0.75-2	-		Globe Valve , Manf. Std. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L	
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8M	
	8-12	<u>-</u>		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8M	
Check Valves					
	0.75-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , FTE , Bltd Bonnet , A 182 Gr. F316L Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr.	
<u> </u>	2.5-12	-		CF8M	
Ball Valves	0.75-2	<u> </u> -		Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M , Series P569	
<u> </u>	1.5-6	<u>-</u>		Ball VIv FB , Victaulic Grooved or eq. , MGE , Lever Operator , A 351 Gr. CF8M , Series 726	
Butterfly Valves				Duttorfly Viv. Victorillo Caronad Carina 700, MOF, Language A 051, C	
	2-10			Butterfly VIv , Victaulic Grooved Series 763 , MGE , Lever Operator , A 351 Gr.	

CF8M

2-10

PIPE SPEC: 1BCJ1

Date: 8/4/2016 5:24:26 PM



DESCRIPTION: GENERAL WATER AND STEAM SERVICE

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE IF SP	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	275
100	275
200	230
300	205
400	190
500	170
600	140
650	125
700	110
750	95
800	80
850	65
900	50
950	35
1000	20

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 358 Gr. 304L , SMLS
	2.5-48	-	Calc	Pipe , B36.19M , BE , A 358 Gr. 304L , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 358 Gr. 304L, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 358 Gr. 304L, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 358 Gr. 304L , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 358 Gr. 304L , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 358 Gr. 304L , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 358 Gr. 304L , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 358 Gr. 304L , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 358 Gr. 304L, 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304L
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304L
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304L
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304L , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304L
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304L
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304L

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0.5-2

PIPE SPEC:	1BCJ1 Date: 8/4/2016 5:24:26			Kiewit	
	3-48 3-48 6-24	2.5-42 2.5-42 2.5-18	MATCH MATCH MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304L Red. Tee , B16.9 , BE , A 403 Gr. WP304L Weldolet , MSS SP-97 , BE , A 182 Gr. F304L	
Small Bore Fittings	0-24	2.5-10	WATCH	Weldolet, Mod of 197, BE, A 102 of 11 304E	
<u> </u>	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2	- - - - - -		45 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F304L 45 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F304L 90 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F304L 90 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F304L Cap, B16.11, CL3000, FTE, A 182 Gr. F304L Cap, B16.11, CL3000, SWE, A 182 Gr. F304L	
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2	- - - - -		Cap, B16.11, CL6000, FTE, A 182 Gr. F304L Cap, B16.11, CL6000, SWE, A 182 Gr. F304L Cplg., B16.11, CL3000, SWE, A 182 Gr. F304L Cplg., B16.11, CL6000, SWE, A 182 Gr. F304L Equal Tee, B16.11, CL3000, SWE, A 182 Gr. F304L Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F304L Union, MSS SP-83, CL3000, SWE, A 182 Gr. F304L	
	0.5-2 0.75-2 0.75-2	0.5-1.5 0.5-1.5	MATCH MATCH	Union, MSS SP-83, CL6000, SWE, A 182 Gr. F304L Con. Swage, MSS SP-95, PBE, A 403 Gr. WP304L, SMLS Ecc. Swage, MSS SP-95, PBE, A 403 Gr. WP304L, SMLS Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W	
	0.75-2 0.75-2 1-1	0.5-1.5 0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1 16W	
Bolts	1-1	_			
	2504			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
Gaskets	0.5-24			Cad Plated	
Guorioto	0.5-24	•	•	Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.125" non compressed thickness	
	0.5-24			Insulating Gskt Set, B16.21, CL150, RF, Per Specification 81.33.08, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.125" non	
	0.5-24 0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non compressed thickness	
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness	
	0.5-24			Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304L SS, Graphite Fill, 304 SS CR, 0.175"	
	0.5-24			non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
Flanges	0.5-24			non compressed thickness	
Flanges	0.5-24	-		L Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L	
	0.5-2 2.5-24 26-48	- - -	MATCH MATCH MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F304L	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L	
	0.5-2 0.5-2	-	MATCH MATCH	SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F304L SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304L WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F304L , 2 Taps , 180deg	
	10-24 26-48	- -	MATCH	apart Blind Flg. , B16.47 Sr. A , CL150 , RF , A 182 Gr. F304L	
	2.5-24 2.5-24	-	MATCH MATCH	WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F304L WN Flg. , B16.5 , CL300 , FF , A 182 Gr. F304L	
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L	
Onto Wal	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A 182 Gr. F304L	
Gate Valves	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3	
	0.5-2	-		Gate Valve, App. Mfg., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,	
	0.5-2	-		A 351 Gr. CF8 Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator,	
	2.5-6 2.5-6	<u>.</u>	MATCH	A 351 Gr. CF8 Gate Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3	
	8-36	-	IVIATOR	Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8	
	8-36	_	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF3	
Globe Valves			WIATOH		
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351	

Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 $\,$

Gr. CF3

PIPE SPEC:	1BCJ1	_ Date	e: 8/4/2016 5:24:26 l	PM Kiewit
	2.5-6	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8
	8-24	-		Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A 351 Gr. CF8
Chask Values	8-24	<u>-</u>	MATCH	Globe Valve LP, B16.10 App. Mfg., CL150, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3
Check Valves				
	0.5-2 0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL150 , BE , Bltd Bonnet , A 351 Gr.
2.5-24 - 2.5-24 -	MATCH	CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 351 Gr. CF8		
I	6-24	-		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 351 Gr. CF3
Ball Valves				Della A. D. E. A. A. Mar. Ol 200 ONE ETE Three Bires Ette Bell Annual
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE x FTE, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF3
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF3 Ball Valve, B16.10 App. Mfg., CL600, RF, Three Piece Fltg. Ball, Lever Operator,
	0.75-2	-		A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Fltg. Ball, Lever
	2.5-6	-		Operator, A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Trun. Mount. Ball,
	8-12	-		Gear Operator, A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Three piece Trun. Mount. Ball,
	14-24	-		Gear Operator, A 351 Gr. CF8
Butterfly Valves				
	2.5-6	-		Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 351 Gr. CF3, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray Controls or eq., CL150, Lugged FF w/ Integral
	2.5-6	-		Gaskets , Lever Operator , A 351 Gr. CF3 , EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type , Bray Controls or eq. , CL150 , Lugged FF w/ Integral
	8-20	-		Gaskets , Gear Operator , A 351 Gr. CF3M , EPDM / BUNA-N Seat, SS Stem

PIPE SPEC: 1BGD6

Date: 8/4/2016 5:25:56 PM



DESCRIPTION: UNDERGROUND SEWER DRAINAGE

MATERIAL: PVC, ASTM D1785
EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: 32F to 140F
RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

1 10 017 1102 11	OI LOII ILD IIVIVO I LO
TEMP. F	PRESS. PSIG
32	150
73	150
100	150
110	135
120	110
130	75
140	50

- 1 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 4 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 5 UNDERGROUND VALVES SHALL BE PROVIDED WITH A VALVE BOX AS A MINIMUM.
- 6 MINIMUN PIPE WALL THICKNESS SHALL BE SCH 40.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples		111 02	55	
p-3 a mppros	0.75-24	-	S-80	Pipe , Spears or eq. , PVC 1120, ASTM D 1785 , PE , IPS , Seamless
Large Bore Fittings	1		T S S S S	1.po , oposito di 34. ; 1. vo 1.120, //o 111. b 1.100 ; 1. E ; 11. 0 ; 0 callilloto
	0.75-24		S-80	22.5 Deg Elbow , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-	S-80	45 Deg Elbow , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-	S-80	90 Deg Elbow , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-	S-80	CAP , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-		Coupling , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-	S-80	Tee , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	0.75-24	-	S-80	Wye , Spears or eq. , PVC 1120, ASTM D 2467 , Socket End , IPS
	0.70 2 1		2 00	Tryo, operate of eq., 1. To Trize, No. 1111 2 2 for , econot 2 ha , ii e
	1-24	0.75-20	S-80	Concentric Reducer, Spears or eq., PVC 1120, ASTM D 2466, Socket End, IPS
	1-24	0.75-20	S-80	Reducing Tee , Spears or eq. , PVC 1120, ASTM D 2466 , Socket End , IPS
	1-24	0.75-20	S-80	Reducing Wye , Spears or eq. , PVC 1120, ASTM D 2467 , Socket End , IPS
	· - ·	00 =0		
	2-18	1-16	S-80	Eccentric Reducer, Spears or eq., PVC 1120, ASTM D 2466, Socket End, IPS
Small Bore Fittings				
		ļ		
Bolts				
	•	•	•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.75-24			Cad Plated
Gaskets				
		•	•	Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non
	0.75-24			compressed thickness
Flanges				
	0.75-24	-		Blind Flg., Spears or eq., CL150, FF, PVC 1120, ASTM D 1784
	0.75-24	-	MATCH	SW Flg. , Spears or eq. , CL150 , FF , PVC 1120, ASTM D 1784
Gate Valves				
	-			
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1BGE1 Date: 8/4/2016 5:26:52 PM



MATERIAL: CPVC, ASTM D1784 CELL CLASSIFICATION 23447

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 32F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OI TO OI MIOL II C	I LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
32	150
73	150
100	123
110	116
120	98
130	93
140	75
150	71
160	60
170	48
180	38
190	33
200	30

GENERAL NOTES

1 THREADED JOINTS ARE PERMITTED IN CATEGORY D FLUID SERVICE ONLY (REF. TO ART.300.2 FOR DEFITION OF FLUID SERVICES).

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- 2 PRESSURE RATING FOR REDUCING WYE SHALL BE PER MANUFACTURER. PRESSURE RATING FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES. BLIND FLANGES LARGER THAN 12" SHALL FOLLOW MANUFACTURER'S PRESSURE RATING.
- 3 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PRESSURE RATING ONLY GOOD FOR PIPE 16" DIAMETER AND SMALLER
- 6 MINIMUN PIPE WALL THICKNESS SHALL BE SCH 80.
- 7 ALL FITTINGS ARE TO BE INJECTION MOLDED.
- 8 JOINING METHOD OF "SOCKET TYPE" CAN ALSO UTILIZE VAN STONE TYPE OR SOCKET GLUED FLANGE TYPE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-16	-	S-80	Pipe, ASTM F 441, CPVC ASTM D 1784 class 23447, PE, IPS, Seamless
Large Bore Fittings				
	0.5-16	-	S-80	45 Deg Elbow , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	90 Deg Elbow , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	CAP , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Coupling , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Female Adapter, Spears or eq., CPVC ASTM F439, SE X FTE, IPS
	0.5-16	-	S-80	Male Adapater , Spears or eq. , CPVC ASTM F439 , SE X MTE , IPS
	0.5-16	-	S-80	Tee , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Wye , Spears , CPVC ASTM F439 , Socket End , IPS
	0.75-16	0.5-14	S-80	Concentric Reducer, Spears or eq., CPVC ASTM F439, Socket End, IPS
	0.75-16	0.5-14	S-80	Eccentric Reducer , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.75-6	0.5-4	S-80	Reducer Bushing, F439, CPVC ASTM F439, Spigot X SE, IPS
	0.75-6	0.5-4	S-80	Reducer Bushing, Spears or eq., CPVC ASTM F439, Spig X FTE, IPS
	0.75-16	0.5-14	S-80	Reducing Tee , F439 , CPVC ASTM D 1784 class 23447 , SE , IPS
	0.75-16	0.5-14	S-80	Reducing Tee , Spears or eq. , CPVC ASTM F439 , SE X FTE , IPS
	0.75-16	0.5-14	S-80	Reducing Wye , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
Small Bore Fittings				
	0.5-2	-		Plug Square Head , B16.11 , MTE , A 105
	1-1	0.5-0.75	S-80	Red. Male Adapter , Spears or eq. , CPVC ASTM F439 , SE X MTE , IPS
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-16			Cad Plated
Gaskets				
				Non Metal Flat Gskt , B16.21 , CL150 , FF , PTFE , 0.175" non compressed
	0.5-16			thickness
Flanges				
	0.5-12	-	S-80	SW Flg. , Spears or eq. , CL150 , FF , CPVC ASTM F439

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	0.5-16 0.5-16	-	S-80	Blind Flg., Spears or eq., CL150, FF, CPVC ASTM F439
Cata Values	0.5-16	<u>-</u>	3-00	Van Stone Flg., Spears or eq., CL150, FF, CPVC ASTM F439
Gate Valves				
		Τ	1	
Globe Valves				
		T	1	
Check Valves				
	0.5-6	-		T-U Ball Check Valve , Spears or eq. , CL150 , Socket End , True Union , CPVC
Ball Valves				
				Ball VIv LP FB , Spears or eq. , CL150 , Socket End , Lever Operator , ASTM D
	0.5-4	-		1784 ,CPVC 4120
				Ball VIv LP FB, Spears or eq., CL150, FF, Three Piece Fltg. Ball, Lever Operator
	0.5-4	-		, ASTM D 1784 , CPVC 4120
Butterfly Valves				
	•	ļ.	i	Bfly VIv Lug Type, Nibco API 609 Cat. B, CL150, FF, Lever Operator, A536 Gr.60
	2.5-12	-		42-10
	—·• ·—			· - · •

PIPE SPEC: 1BGE6 Date: 8/4/2016 5:27:44 PM

DESCRIPTION: CHEMICAL FEED

MATERIAL: CPVC, ASTM D1784 CELL CLASSIFICATION 23447

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 32F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

I TO CHANGE II	SELCII ILD IN NOTES
TEMP. F	PRESS. PSIG
32	150
73	150
100	123
110	116
120	98
130	93
140	75
150	71
160	60
170	48
180	38
190	33
200	30

- 1 ALL FITTINGS ARE TO BE INJECTION MOLDED.
- 2 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 3 JOINING METHOD OF "SOCKET TYPE" CAN ALSO UTILIZE VAN STONE TYPE OR SOCKET GLUED FLANGE TYPE. DO NOT USE IN SUN EXPOSED AREA UNLESS UV PROTECTED.
- 4 MINIMUN PIPE WALL THICKNESS SHALL BE SCH 80.
- 5 PRESSURE RATING ONLY GOOD FOR PIPE 16" DIAMETER AND SMALLER
- 6 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 7 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-16	-	S-80	Pipe, ASTM F 441, CPVC ASTM D 1784 class 23447, PE, IPS, Seamless
Large Bore Fittings				
	0.5-16	-	S-80	45 Deg Elbow , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	90 Deg Elbow , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	CAP , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Coupling , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Tee , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.5-16	-	S-80	Wye , Spears , CPVC ASTM F439 , Socket End , IPS
	0.75-16	0.5-14	S-80	Concentric Reducer , Spears or eq. , CPVC ASTM F439 , Socket End , IPS
	0.75-16	0.5-14	S-80	Eccentric Reducer, Spears or eq., CPVC ASTM F439, Socket End, IPS
	0.75-6	0.5-4	S-80	Reducer Bushing, F439, CPVC ASTM F439, Spigot X SE, IPS
	0.75-16	0.5-14	S-80	Reducing Tee , F439 , CPVC ASTM D 1784 class 23447 , SE , IPS
	0.75-16	0.5-14	S-80	Reducing Wye, Spears or eq., CPVC ASTM F439, Socket End, IPS
Small Bore Fittings				
	•			
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-16			Cad Plated
Gaskets				
				Non Metal Flat Gskt, B16.21, CL150, FF, PTFE, 0.175" non compressed
	0.5-16			thickness
Flanges				
	14-16	-	S-80	Van Stone Flg., Spears or eq., CL150, FF, CPVC ASTM F439
	0.5-12	-		Blind Flg. , Spears or eq. , CL150 , FF , CPVC ASTM F439
	0.5-12	-	S-80	SW Flg. , Spears or eq. , CL150 , FF , CPVC ASTM F439
Gate Valves				
Globe Valves				
Check Valves				



PIPE SPEC:

1BGE6

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0.5-6	-	T-U Ball Check Valve , Spears or eq. , CL150 , Socket End , True Union , CPVC
		Ball VIv LP FB , Spears or eq. , CL150 , Socket End , Lever Operator , ASTM D
0.5-4	-	1784 ,CPVC 4120
2.5.42		Bfly VIv Lug Type, Nibco API 609 Cat. B, CL150, FF, Lever Operator, A536 Gr.
	0.5-4	

PIPE SPEC: 1BGH6

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DESCRIPTION: UNDERGROUND SERVICE / INSTRUMENT AIR

MATERIAL: Asahi Air-Pro, SDR 7.4
EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: 32F to 140F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

31 10 01 // (1 1 0 L 11	OF LOW ILD IN NOT LO
TEMP. F	PRESS. PSIG
-22	230
32	230
86	202
104	181
140	149

- 1 ALL FITTINGS ARE TO BE INJECTION MOLDED.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 4 ALL PIPE SHALL BE CONTINUOUSLY MARKED WITH DURABLE PRINTING, INCLUDING THE FOLLOWING INFORMATION: DIMENSION RATIO, MANUFACTURER'S NAME, CELL CLASS, ASTM BASIS, AND LOT NUMBER.
- 5 ASAHI AIR PRO PIPING EXPOSED TO SUNLIGHT AFTER INSTALLATION SHALL BE APPROPRIATELY JACKETED OR COATED WITH AN ENGINEERING APPROVED MATERIAL OR SYSTEM.
- 6 FITTINGS SHALL HAVE SAME PRESSURE RATING AS PIPE.
- 7 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8". GASKET FOR BURIED FLANGES SHALL BE GARLOCK TYPE 3760. GASKETS FOR EXPOSED FLANGES SHALL BE GARLOCK TYPE 3545
- 8 HYDROSTATIC DESIGN BASIS SHALL BE PER ASTM D-2837-88.
- 9 PIPE AND FITTINGS SHALL BE JOINED USING SOCKET FUSION PER ASTM D-2657 SECTION 8 AND ACCORDING TO PIPE MFG INSTRUCTIONS.
- 10 PIPE FITTINGS SHALL BE JOINED USING SOCKET FUSION WITH A ONE FOOT TRANSITION PIECE. PIPE-TO-PIPE CONNECTIONS MAY BE JOINED USING BUTT FUSION. IF BUTT FUSION IS NOT USED, THEN A ONE FOOT TRANSITION PIECE WILL BE UTILIZED WITH SOCKET FUSION.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-4	-	SDR 7.4	Pipe , Asahi Air-Pro or eq. , ASTM D3035, PE100 , PE , IPS
Large Bore Fittings				
	0.5-4	=	SDR 7.4	45 Deg Elbow , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
	0.5-4	-	SDR 7.4	90 Deg Elbow , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
	0.5-4	-	SDR 7.4	CAP , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
	0.5-4	-	SDR 7.4	Coupling , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
	0.5-4	-	SDR 7.4	Flange Adapter , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS -
	0.5-4	-	SDR 7.4	Tee , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
	0.75-4	0.5-3	SDR 7.4	Reducer Bushing, Asahi Air-Pro or eq., ASTM D3035, PE100, SE, IPS
Small Bore Fittings				
-	0.5-2	=		Female Adapter , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE X FTE , IPS
	0.5-2	-		Male Adapater , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE X MTE , IPS
	0.75-2	0.5-1.5	SDR 7.4	Reducing Tee , Asahi Air-Pro or eq. , ASTM D3035, PE100 , SE , IPS
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-4			Cad Plated
Gaskets				
	0.5-4			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3545, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock
	0.5-4			3760, 0.125" non compressed thickness
Flanges				,
	0.5-4	-	SDR 7.4	Backing Ring , ISCO or eq. , CL150 , FF Lap Flgd , Ductile Iron , (Non-Coated)
Gate Valves				
	•	•	•	Gate VIv , App. Mfg. , CL150 , FF , Wrench Operator , BRASS / BRONZE B62 , 2"
	2.5-4			Nut
Globe Valves				

PIPE SPEC: 1BGH6

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Check Valves			
Ball Valves			
			Ball VIv FB , Asahi Air-Pro or eq. , SE , One or Two piece Trun. Mount. Ball , Lever
	0.75-2	-	Operator , PE100
Butterfly Valves			

PIPE SPEC: 1BJA1

DESCRIPTION: CIRCULATING WATER

MATERIAL: FIBERGLASS
EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: Per ASME B31.1 - 2014

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSI

EMP. F	PRESS. PSIG
32	217
200	0
200	217

GENERAL NOTES

Date: 8/4/2016 5:29:24 PM

- 1 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 2 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 3 CAP SCREWS ARE ACCEPTABLE EXCLUSIVELY FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES.
- 4 PIPE SHALL MEET ASTM D2996 STANDARD FOR FILAMENT-WOUND GLASS FIBER REINFORCED THERMOSETTING RESIN PRESSURE PIPE (SIZES 1" TO 20")
- 5 THE FABRICATOR SHALL BE RESPONSIBLE FOR THE BASIC DESIGN OF PIPE AND FITTINGS INCLUDING WALL THICKNESS & STIFFENERS , AND SHALL RECOMMEND METHODS AND LOCATIONS OF SUPPORTS
- 6 THE MECHANICAL PROPERTIES OF PIPE AND FITTINGS SHALL COMPLY WITH ASTM C-582 -CONTACT-MOLDED REINFORCED THERMOSETTING PLASTIC (RTP) LAMINATES FOR CORROSIONRESISTANTEQUIPMENT
- 7 DESIGN FOR THE SPECIFIED PRESSURE AND FOR FULL VACUUM SERVICE, AND IN ACCORDANCE WITH AWWA MANUAL M45 - FIBERGLASS PIPE DESIGN
- 8 ELBOWS SHALL HAVE A TAKE-OUT DIMENSION EQUAL TO ONE (1.0) PIPE DIAMETER (R/D = 1.0)

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
				Pipe , NOV Fiber Glass Green Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	1-1	-	0.057" min	11FX1-3110
				Pipe , NOV Fiber Glass Green Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996
	1-1	-	0.057" min	, RTRP-11FX1-3110
				Pipe , NOV Fiber Glass Green Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996
	1.5-1.5	-	0.062" min	, RTRP-11FX1-3110
				Pipe , NOV Fiber Glass Green Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	1.5-1.5	-	0.062" min	11FX1-3110
				Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	2-2	-	0.058" min	RTRP-11AW1
				Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	2-2	-	0.058" min	11AW1
				Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	3-3	-	0.086" min	11AW1
				Pipe, NOV Fiber Glass Red Thread HP 16 or eq., Bell/Spigot End, ASTM D2996,
	3-3	-	0.086" min	RTRP-11AW1
				Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	4-4	-	0.083" min	RTRP-11AW1
				Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	4-4	-	0.083" min	11AW1
			0.400"	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	6-6	-	0.122" min	11AW1
	0.0		0.400#'.	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	6-6	-	0.122" min	RTRP-11AW1
	0.0		0.407"'.	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	8-8	-	0.127" min	RTRP-11AW1
	0.0		0.407"	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	8-8	-	0.127" min	11AW1
	40.40		0.450"	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	10-10	-	0.156" min	11AW1 Ding NOV Fiber Class Red Thread HD 16 or og Pall/Spiget Fnd ASTM D2006
	10.10		0.4FC" m:-	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	10-10	-	0.156" min	RTRP-11AW1
	10 10		0.185" min	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , Bell/Spigot End , ASTM D2996 ,
	12-12	-	0.100 11111	RTRP-11AW1
	12-12		0.105" min	Pipe , NOV Fiber Glass Red Thread HP 16 or eq. , PE , ASTM D2996 , RTRP-
	12-12	-	0.185" min	11AW1



(®) Kiewit PIPE SPEC: **1BJA1 Date:** 8/4/2016 5:29:24 PM Pipe, NOV Fiber Glass Red Thread HP 16 or eq., PE, ASTM D2996, RTRP-14-14 0.238" min 11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., Bell/Spigot End, ASTM D2996, 14-14 0.238" min RTRP-11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., Bell/Spigot End, ASTM D2996, 0.272" min 16-16 RTRP-11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., PE, ASTM D2996, RTRP-16-16 0.272" min 11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., PE, ASTM D2996, RTRP-18-18 0.277" min 11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., Bell/Spigot End, ASTM D2996, 0.277" min 18-18 RTRP-11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., Bell/Spigot End, ASTM D2996, 20-20 0.286" min RTRP-11AW1 Pipe, NOV Fiber Glass Red Thread HP 16 or eq., PE, ASTM D2996, RTRP-20-20 0.286" min 11AW1 Large Bore Fittings 45 Deg Elbow, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-2-16 **MATCH** 90 Deg Elbow, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-2-16 **MATCH** NOV RT pipe **MATCH** Branch Saddle, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End 2-4 1-1 CAP, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-NOV RT 2-16 **MATCH** pipe Concentric Reducer, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, **MATCH** Belled-NOV RT pipe 2-16 1-14 Coupling, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-NOV 2-16 Eccentric Reducer, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, 2-16 1-14 **MATCH** Belled-NOV RT pipe Tee, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-NOV RT **MATCH** 2-16 Branch Saddle, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-NOV RT pipe 3-14 2-4 **MATCH** Reducing Tee, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Belled-8-16 6-14 **MATCH** NOV RT pipe 45 Deg Elbow, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685 18-20 **MATCH** , Belled-NOV RT pipe 90 Deg Elbow, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685 **MATCH** , Belled-NOV RT pipe 18-20 Branch Saddle, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM **MATCH** D5685, Belled-NOV RT pipe 18-20 2-12 Concentric Reducer, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685, Belled-NOV RT pipe 18-20 16-18 **MATCH** Coupling, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685, 18-20 Belled-NOV RT pipe Eccentric Reducer, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM **MATCH** D5685, Belled-NOV RT pipe 18-20 14-16 Reducing Tee, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685 18-20 14-18 **MATCH** , Belled-NOV RT pipe Tee, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., ASTM D5685, Belled-NOV RT pipe 18-20 **MATCH** Small Bore Fittings 45 Deg Elbow, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End 1-1.5 **MATCH** 1-1.5 **MATCH** 90 Deg Elbow, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End CAP, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End 1-1.5 **MATCH** Coupling, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End 1-1.5 Tee, NOV Fiber Glass Green Thread HP or eq., ASTM D5685, Bell End 1-1.5 MATCH Bolts 1-20 Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8M / A 194 B8M Gaskets Insulating Gskt Set, B16.21, CL150, FF, Per Specification 600, 0.125" non 1-20 compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, Neoprene Rubber, furnish with 0.625" 1-20 PTFE compensation ring, 0.125" non compressed thickness Flanges Blind Flg., NOV Fiber Glass Green Thread HP or eq., CL150, FF, ASTM D4024 1-16 Bell End Flange, NOV Fiber Glass Green Thread HP or eq., CL300, FF x BLE 2-6 NOV RT, ASTM D4024 Bell End Flange, NOV Fiber Glass Green Thread EPOXY HP 16 or eq., CL150, FF 18-20 x BLE NOV RT, ASTM D4024 Bell End Flange, NOV Fiber Glass Green Thread HP or eq., CL150, FF x Bell, 1-1.5 Bell End Flange, NOV Fiber Glass Green Thread HP or eq., CL150, FF x BLE NOV RT, ASTM D4024 2-16

Gate Valves

PIPE SPEC: 1BJA1

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Globe Valves			
Check Valves			
	8-8	- -	Swing Chk VIv , American Valve or eq. , CL125 , FF , Bltd Bonnet , Epoxy Coated A536
Ball Valves			
			Ball VIv SP FB , American Valve B16.10 or eq. , CL150 , FF , Lever Operator , A 126
	0.75-10	-	Teflon Fused
	2-2	-	Ball VIv FB , PBM or eq. , CL150 , FF , Lever Operator , B61, C92200
Butterfly Valves			
	3-6	-	Bfly VIv Lug Type , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Lever Operator , A536 Gr.65-45-12 Bfly VIv Lug Type , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Gear
	8-18	-	Operator , A536 Gr.65-45-12

PIPE SPEC: 1BKA1

CHEMICAL INJECTION

MATERIAL: Alloy (N08020)

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 600F RATING CLASS: 150, ASME B16.5 - 2013

RATING CLASS: 150, ASMI CORROSION ALLOWANCE: 0.0000 in

DESCRIPTION:

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	290
100	290
200	260
300	230
400	200
500	170
600	140

GENERAL NOTES

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- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE SPIRAL WOUND ALLOY 20/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-4	-	Calc	Pipe , B36.19M , PE , B 729 UNS N08020 Annld , SMLS
	0.5-4	-	Calc	Nipple , B36.19M , PBE , B 729 UNS N08020 Annld , 6" Long, SMLS
	0.5-4	-	Calc	Nipple , B36.19M , PBE , B 729 UNS N08020 Annld , 3" Long, SMLS
	0.5-4	-		Nipple , B36.19M , PE/TE , B 729 UNS N08020 Annld , 3" Long, SMLS
	0.5-4	-		Nipple , B36.19M , PE/TE , B 729 UNS N08020 Annld , 6" Long, SMLS
Large Bore Fittings				
	0.5-4	-	1	45 Deg. Elbow , B16.11 , CL3000 , SWE , B 462 UNS N08020 AnnId
	0.5-4	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , B 462 UNS N08020 AnnId
	0.5-4	-		Cap , B16.11 , CL3000 , FTE , B 462 UNS N08020 AnnId
	0.5-4	-		Cplg. , B16.11 , CL3000 , SWE , B 462 UNS N08020 AnnId
	0.5-4	-		Equal Tee , B16.11 , CL3000 , SWE , B 462 UNS N08020 AnnId
	0.75-4	-	MATCH	Cap , B16.9 , BE , B 462 UNS N08020 AnnId
	1-4	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , B 462 UNS N08020 AnnId
	1-4	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , B 462 UNS N08020 AnnId
	1-4	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , B 462 UNS N08020 Annid
Small Bore Fittings				
		_	_	
Bolts				
	0.5-4			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	0.5-4	·		Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.175" non compressed thickness
	0.5-4			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760, 0.125" non compressed thickness
	0.5-4			Sp. Wound Gskt , B16.20 , CL150 , RF , Alloy 20, Graphite Fill, CS CR, A20 IR , 0.125" non compressed thickness
	0.5-4			Sp. Wound Gskt, B16.20, CL300, RF, Alloy 20, Graphite Fill, CS CR, A20 IR, 0.125" non compressed thickness
Flanges	0.5-4	1		0.123 Horr compressed trickness
Flanges	0.5-4		1	SW Flg. , B16.5 , CL150 , RF , B 462 UNS N08020 AnnId
	0.5-4	<u>-</u>		SW Fig. , B16.5 , CL130 , RF , B 462 UNS N08020 Annid
	0.5-4	-		Blind Flg. , B16.5 , CL150 , RF , B 462 UNS N08020 Annid
	0.5-4	-	MATCH	SW Flg. , B16.5 , CL150 , FF , B 462 UNS N08020 Annid
Gate Valves	0.5-4	<u>-</u>	IVIATOR	SW Fig. , B10.5 , CL150 , FF , B 402 ONS N08020 Allilla
Oale valves			<u> </u>	
Globe Valves				
Check Valves	-	T	-1	
Clieck valves	1	<u> </u>	<u> </u>	Swing Chk VIv , Bonney Forge Red. Port or eq. , CL800 , SWE , Bltd Bonnet , B 462
	0.5-2	-		UNS N08020 AnnId
Ball Valves				
	•	•	,	<u> </u>



PIPE SPEC:

1BKA1

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Ball VIv LP FB , App. Mfg. , CL600 , SWE , Three Piece , Lever Operator , A 351 Gr.

0.5-2 - CN7M

Butterfly Valves

PIPE SPEC: 1BMA1

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DESCRIPTION: LOW PRESSURE GENERAL SERVICE MATERIAL: Carbon Steel / Stainless Steel (304L)

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

200

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -20 230 100 230

195

GENERAL NOTES

- 1 PRESSURE RATINGS FOR BUTTERFLY VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.

 MANUFACTURER'S RECOMEND PRESSURE-TEMPERATURE RESTRICTIONS SHALL BE CONSULTED.
- 2 INSTALLERS MUST BE TRAINED IN THE INSTALLATION OF THE VICTAULIC VIC-PRESS SYSTEM AND UTILIZE ALL PROCEDURES INCLUDING MARKING OF THE PIPE TO ENSURE PROPER INSERTION DEPTH UPON PRESSING
- 3 GROOVED-END PIPE AND FITTINGS SHALL BE VICTAULIC OR EQUAL. MECHANICAL COUPLINGS SHALL BE RIGID TYPE VICTAULIC STYLE 489 STAINLESS STEEL OR EQUAL.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (FPDM)
- 5 FOR STD PIPE, ALL PIPE GROOVE DIMENSIONS AND PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PUBLISHED PIPE ROLL GROOVING STANDARDS. PIPE NPS 14 AND LARGER SHALL BE PREPARED TO VICTAULIC AGS GROOVE SPECIFICATIONS WITH WEDGE SHAPED ROLL GROOVES
- 6 VICTAULIC FLANGE WASHERS ARE REQUIRED BETWEEN VIC FLANGES AND SERRATED FACES (SUCH AS B16.5 FLANGE FACES AND FLANGED VALVES). A FLANGE GASKET MUST THEN USED BETWEEN THE FLANGE WASHER AND THE SERRATED FACE, NO GASKET IS REQUIRED BETWEEN THE VIC FLANGE AND THE VICTAULIC FLANGE WASHER. A FLANGE WASHER IS ALSO REQUIRED BETWEEN RUBBER FACED BUTTERFLY VALVES AND VIC FLANGES
- 7 BOLTS AND NUTS ARE SUPPLIED WITH GROOVED COUPLING (E.G., VIC STYLE 177) PURCHASE
- 8 DIELECTRIC UNIONS ARE NOT REQUIRED WHEN JOINING SMALL BORE STAINLESS STEEL THREADED BRANCH CONNECTIONS TO A LARGE BORE VICTAULIC CARBON STEEL SYSTEM. APPLIES TO SERVICE WATER, POTABLE WATER, CLOSED COOLING WATER, PLANT DRAINS, AND NITROGEN SYSTEMS. IN ADDITION, PIPE DOPE SHALL BE USED AT THE THREADED CONNECTION FROM STAINLESS TO CARBON STEEL.
- 9 FOR CLASS 300 FLANGE ADAPTER, THE FLANGES SHALL BE USED ONLY TO MATCH CLASS 300 FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT
- 10 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , BEV x GRV , A 53 Gr. B , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , MGE , A 53 Gr. B , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , BE , A 53 Gr. B , SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 3" Long, SMLS
				Transition Nipple, Victaulic Grooved, PE x MGE, A 312 Gr. TP304L, Style P587
	1-2	-	S-10S	
	2-6	1-5	S-STD	Swage Nipple, Victaulic Grooved, FTE x MGE, A 53 Gr. B, No. 55
	2-6	1-5	S-STD	Swage Nipple, Victaulic Grooved, MGE x FTE, A 53 Gr. B, No. 54
	2-6	1-5	S-STD	Swage Nipple, Victaulic Grooved, MGE, A 53 Gr. B, No. 53
	2-3	-	S-STD	Adapter Nipple, Victaulic Grooved, GRV x BEV, A 53 Gr. B, No. 42, 4" long
	2-12	-	S-STD	Adapter Nipple, Victaulic Grooved, GRV x THD, A 53 Gr. B, No. 40
	2-3	-	S-STD	Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 4" long
	4-8	-	S-STD	Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 6" long
	4-8	-	S-STD	Adapter Nipple , Victaulic Grooved , GRV x BEV , A 53 Gr. B , No. 42, 6" long

 Kiewit PIPE SPEC: **1BMA1 Date:** 8/4/2016 5:31:06 PM 10-12 S-STD Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 8" long S-STD 10-12 Adapter Nipple, Victaulic Grooved, GRV x BEV, A 53 Gr. B, No. 42, 8" long 14-24 S-STD Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. W43, 8" long Adapter Nipple, Victaulic Grooved, GRV x BEV, A 53 Gr. A, No. W42, 8" long 14-24 S-STD Large Bore Fittings 2-4 S-STD Female Adapter, Victaulic Vic-Press, MGE x FTE, A536 Gr 65-45-12, No 80 2-10 1-8 Red. Coupling, Victaulic Grooved, FGE, A536 Gr 65-45-12, Style 750 2-12 Rigid Coupling, Victaulic Grooved, FGE, A536 Gr.65-45-12, QuickVic, Style 107 2.5-12 S-STD 11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 13 2.5-12 S-STD 22.5 Deg Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 12 S-STD 45 Deg Lateral, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 30 2.5-12 2.5-12 S-STD 45 Deg LR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 110 S-STD 2.5-12 45 Deg SR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 11 2.5-24 S-STD 45 Deg. LR Elbow, B16.9, BE, A 234 Gr. WPB, SMLS S-STD 45 Deg. SR Elbow, B16.9, BE, A 234 Gr. WPB, SMLS 2.5-24 2.5-12 S-STD 90 Deg LR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 100 2.5-12 S-STD 90 Deg SR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 10 2.5-24 S-STD 90 Deg. LR Elbow, B16.9, BE, A 234 Gr. WPB, SMLS 2.5-24 S-STD 90 Deg. SR Elbow, B16.9, BE, A 234 Gr. WPB, SMLS 2.5-12 S-STD Cap, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 60 Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS 2.5-24 2-22 S-STD Concentric Reducer, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 50 2.5-12 2-10 S-STD 2.5-12 S-STD Cross, Victaulic Grooved, MGE, A 53 Gr. B, No. 35 2-22 2.5-24 S-STD Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS Eccentric Reducer, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 51 2.5-12 2-10 S-STD 2.5-24 S-STD Eq. Tee, B16.9, BE, A 234 Gr. WPB, SMLS Red. Tee, B16.9, BE, A 234 Gr. WPB, SMLS 2.5-24 2-22 S-STD 2.5-12 2-10 S-STD Reducing Tee, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 25 Rigid Coupling, Victaulic Grooved, FGE, A 403 Gr. WP304L, Style 489, Type E 2.5-12 Gasket Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 20 $\,$ S-STD 2.5-12 2.5-24 Threadolet, MSS SP-97, CL3000, FTE, A105 0.5-2True Y, Victaulic Grooved, MGE, A 53 Gr. B, No. 33 2.5-12 S-STD 2-10 S-STD 45 Deg Red. Lateral, Victaulic Grooved, MGE, A 53 Gr. B, No. 30-R 3-12 6-24 2.5-18 S-STD Weldolet, MSS SP-97, BE, A105, SMLS 14-24 S-STD 11.25 Deg Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W13 S-STD 22.5 Deg Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W12 14-24 14-24 S-STD 45 Deg Lateral, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W30 S-STD 14-24 45 Deg LR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W110 14-24 4-20 S-STD 45 Deg Red. Lateral, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W30-R 14-24 S-STD 45 Deg SR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W11 S-STD 90 Deg LR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W100 14-24 S-STD 90 Deg SR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W10 14-24 S-STD Cap , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W60 14-24 Concentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W50 14-24 6-20 S-STD Cross, Victaulic Grooved, MGE, A 53 Gr. B, AGS, Style W35 14-24 S-STD 14-24 6-20 S-STD Eccentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W51 Reducing Tee , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W25 14-24 6-20 S-STD Rigid Coupling, Victaulic Grooved, FGE, A536 Gr.65-45-12, AGS, Style W07 14-24 Tee, Victaulic Grooved, MGE, A536 Gr.65-45-12, AGS, Style W20 14-24 S-STD 14-24 S-STD True Y , Victaulic Grooved , MGE , A 53 Gr. B , AGS, Style W33 Small Bore Fittings 0.5-2 S-10S 45 Deg Elbow, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P591 45 Deg Street Elbow, Victaulic Vic-Press, VPS x PE, A 312 Gr. TP304L, Style 0.5-2 S-10S P543 90 Deg Elbow, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P586 0.5-2 S-10S 90 Deg Street Elbow, Victaulic Vic-Press, VPS x PE, A 312 Gr. TP304L, Style 0.5-2 S-10S Cap, Victaulic Vic-Press, PE, A 312 Gr. TP304L, Style P540 0.5-2 S-10S Female Adapter, Victaulic Vic-Press, FTE x VPS, A 312 Gr. TP304L, Style P599 0.5-2 0.5-2 S-10S 0.5-2 0.5-2 S-10S Male Adapter, Victaulic Vic-Press, MTE x VPS, A 312 Gr. TP304L, Style P596 Plug Square Head, B16.11, MTE, A 182 Gr. F304L 0.5-2 S-10S 0.5-2 PressFit Coupling, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P597

0.5-2

0.5-2

0.5-2

0.5-1

S-10S

S-10S

S-10S

Reducing Tee, Victaulic Vic-Press, FTE x VPS, A 312 Gr. TP304L, Style P588

Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P592

Union, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P584

PIPE SPEC: 1BMA1

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	0.5-2	-	S-10S	Weld Adapter , Victaulic Vic-Press , PE x VPS , A 312 Gr. TP304L , Style P561
	0.75-2 0.75-2	0.5-1.5 0.5-1.5	S-10S S-10S	Concentric Reducer, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P594 Reducing Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP304L, Style P593
Bolts	2.24			Con Corous ACME D40 24 / D40 2 2 A402 D7
	2-24			Cap Screw , ASME B18.2.1 / B18.2.2 , A193 B7 Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex ,
Gaskets	0.5-24			Xylan Coated
Gaskets				Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Neoprene Rubber, 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , Thick Flat Ring , Garlock 3200 , Non-
	0.5-24			Asbestos , 0.0625" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , FF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Seal Ring, Victaulic, Seal Ring, EPDM Victaulic Gr.E, 0.0625" non compressed
	0.5-24			thickness
	0.5-24			Sp. Wound Gskt, B16.20, CL150, FF, 304 SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
Flanges				
	0.5-2	-	S-10S	Flg. Adapter, Victaulic Pressfit, CL150, RFFE X VPS, A 182 Gr. F304L, Style P595
				Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 , Style
	2.5-12 0.5-2	-	S-STD	741 SW Flg. , B16.5 , CL150 , RF , A105
	0.5-12	-		Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. 45R Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 , Style
	14-24	-		W741 Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. W45R,
	14-24	-	S-STD	Galvanized
	0.5-24 2-12	-	S-STD	Blind Flg. , B16.5 , CL150 , RF , A105 Flg. Adapter , Victaulic Grooved , CL300 , FFFE X MGE , A 53 Gr. B , No. 45F
	0.5-2	- -	3-310	Thd. Flg., B16.5, CL150, FF, A 182 Gr. F304L
	2-12	-	S-STD S-STD	Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 53 Gr. B , No. 45F
	2-12	-		Flg. Adapter , Victaulic Grooved , CL300 , RF x MGE , A 53 Gr. B , No. 46R Van Stone Flg. , Victaulic Pressfit , CL150 , RFFE X VPS , A 403 Gr. F304L , Style
Gate Valves	0.5-2	<u>-</u>	S-10S	P565
Oute varves	. [<u> </u>		Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F304L Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-		A 216 Gr. WCB
	8-24	-		Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A 216 Gr. WCB
Globe Valves				
	0.5-2	-		Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F304L
	2.5-6	-		Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB
	8-24	_		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
Check Valves	0-24	-		210 GI. WCB
	0.5-2	-		Swing Chk VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , A 182 Gr. F304L
	2-12	-		Victaulic Chk VIv , Victaulic Grooved or eq. , MGE , A536 Gr.65-45-12 , Series 716H/716
	2.5-24	-		Check Valve Swing LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , A 216 Gr. WCB
	6-24	-		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr. WCB
Ball Valves				
	0.5-2	-		Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M , Series P569
	0.75-2	-		Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS x MGE , Lever Operator , A 351 Gr. CF8M , Series P569
	2.5-6	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two or Three Piece Metal Seated , Lever Operator , A 216 Gr. WCB
	2.5-6	-		Ball VIv LP FB , Victaulic Grooved or eq. , 1000 psi , MGE , Lever Operator , A536 Gr.65-45-12 , Series 726
	8-12	-		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
	14-24	_		Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 216 Gr. WCB
	14-24	-		Geal Operator, A 210 Gr. WOD

PIPE SPEC: 1BMA1

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Butterfly Valves			
	<u> </u>	•	Butterfly VIv , Victaulic Grooved Series 761 , MGE , Lever Operator , A536 Gr.65-45-
	2-12	-	12
			Butterfly Valve Lug Type, Bray API 609 Cat. B, CL150, Lugged FF w/ Integral
	2.5-6	-	Gaskets , Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem
			Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets,
	2.5-6	-	Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem
			Butterfly Valve Lug Type, Bray, CL150, FF w/Integral Gaskets, Gear Operator, A
	8-20	-	216 Gr. WCB , 316 SS Trim
			Butterfly VIv, Victaulic Grooved Series W761, MGE, Gear Side mounted
	14-24	-	Handwheel (Without Z offset), A536 Gr.65-45-12

PIPE SPEC: 1BMA8

DESCRIPTION: LOW PRESSURE GENERAL SERVICE MATERIAL:

Carbon Steel (Galvanized) / Stainless Steel (304L)

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	230
100	230
200	195

GENERAL NOTES

Date: 8/4/2016 5:32:03 PM

- 1 PRESSURE RATINGS FOR BUTTERFLY VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES. MANUFACTURER'S RECOMEND PRESSURE-TEMPERATURE RESTRICTIONS SHALL BE CONSULTED.
- 2 INSTALLERS MUST BE TRAINED IN THE INSTALLATION OF THE VICTAULIC VIC-PRESS SYSTEM AND UTILIZE ALL PROCEDURES INCLUDING MARKING OF THE PIPE TO ENSURE PROPER INSERTION DEPTH UPON PRESSING
- 3 GROOVED-END PIPE AND FITTINGS SHALL MEET VICTAULIC SPECIFICATIONS. MECHANICAL COUPLINGS SHALL BE VICTAULIC RIGID TYPE OR EQUAL.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E
- 5 FOR STD PIPE, ALL PIPE GROOVE DIMENSIONS AND PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PUBLISHED PIPE ROLL GROOVING STANDARDS. PIPE NPS 14 AND LARGER SHALL BE PREPARED TO VICTAULIC AGS GROOVE SPECIFICATIONS WITH WEDGE SHAPED ROLL GROOVES
- 6 VICTAULIC FLANGE WASHERS ARE REQUIRED BETWEEN VIC FLANGES AND SERRATED FACES (SUCH AS B16.5 FLANGE FACES AND FLANGED VALVES). A FLANGE GASKET MUST THEN USED BETWEEN THE FLANGE WASHER AND THE SERRATED FACE, NO GASKET IS REQUIRED BETWEEN THE VIC FLANGE AND THE VICTAULIC FLANGE WASHER. A FLANGE WASHER IS ALSO REQUIRED BETWEEN RUBBER FACED BUTTERFLY VALVES AND VIC **FLANGES**
- 7 BOLTS AND NUTS ARE SUPPLIED WITH GROOVED COUPLING (E.G., VIC STYLE 177) PURCHASE
- 8 DIELECTRIC UNIONS ARE NOT REQUIRED WHEN JOINING SMALL BORE STAINLESS STEEL THREADED BRANCH CONNECTIONS TO A LARGE BORE VICTAULIC CARBON STEEL SYSTEM. APPLIES TO SERVICE WATER, POTABLE WATER, CLOSED COOLING WATER, PLANT DRAINS, AND NITROGEN SYSTEMS. IN ADDITION, PIPE DOPE SHALL BE USED AT THE THREADED CONNECTION FROM STAINLESS TO CARBON STEEL.
- 9 FOR CLASS 300 FLANGE ADAPTER, THE FLANGES SHALL BE USED ONLY TO MATCH CLASS 300 FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT
- 10 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-24	-	S-STD	Pipe, B36.10M, MGE, A 53 Gr. B Galvanized, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple , B36.19M , PE/TE , A 312 Gr. TP304 , 3" Long, SMLS
	0.5-2	-	S-STD	Nipple, B36.19M, TBE, A 53 Gr. B, 6" Long, SMLS, Galvanized
	0.5-2	-	S-STD	Nipple, B36.19M, TBE, A 53 Gr. B, 3" Long, SMLS, Galvanized
				Transition Nipple, Victaulic Grooved, PE x MGE, A 312 Gr. TP304L, Style P587
	1-2	-	S-10S	
				Adapter Nipple, Victaulic Grooved, GRV x THD, A 53 Gr. B, No. 40, Galvanized
	2-12	-	S-STD	
				Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 4" long, Galvanized
	2-3	-	S-STD	
				Swage Nipple, Victaulic Grooved, FTE x MGE, A 53 Gr. B Galvanized, No. 55
	2-6	1-5	S-STD	
				Swage Nipple, Victaulic Grooved, MGE x FTE, A 53 Gr. B Galvanized, No. 54
	2-6	1-5	S-STD	



PIPE SPEC:	1BMA8	Date:	8/4/2016 5:32:03	M Kiewit	
	2-6	1-5	S-STD	Swage Nipple , Victaulic Grooved , MGE , A 53 Gr. B Galvanized , No. 53 Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 43, 6" long, Galvanized	
	4-8	-	S-STD	Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 43, 8" long, Galvanized	
	10-12	-	S-STD		
	14-24	-	S-STD	Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. B Galvanized, AGS, Style W43	
Large Bore Fittings				Female Adapter , Victaulic Grooved , MGE x FTE , A536 Gr 65-45-12, Galvanized ,	
	2-4	-	S-STD	No 80	
	2-10	1-8		Red. Coupling, Victaulic Grooved, FGE, A536 Gr 65-45-12, Galvanized, Style 750	
	2-12	-		Rigid Coupling , Victaulic Grooved , FGE , A536 Gr.65-45-12 , QuickVic, Style 107	
	2.5-12	-	S-STD	11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 13	
	2.5-12	-	S-STD	22.5 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 12	
	2.5-12	-	S-STD	45 Deg Lateral , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 30	
	2.5-12	-	S-STD	45 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 110	
	2.5-12	-	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 1	
	2.5-12	_	S-STD	90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 100	
	2.5-12	_	S-STD	90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 1	
	2.5-12	-	S-STD	Cap, Victaulic Grooved, MGE, A536 Gr.65-45-12 Galvanized, No. 60	
	2.5-12	2-10	S-STD	Concentric Reducer , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 50	
	2.5-12	-	S-STD	Cross, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, No. 35 Eccentric Reducer, Victaulic Grooved, MGE, A536 Gr.65-45-12 Galvanized, No.	
	2.5-12	2-10	S-STD	51	
	2.5-12	2-10	S-STD	Reducing Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 25 Rigid Coupling , Victaulic Grooved , FGE , A 403 Gr. WP304L , Style 489, Type E	
	2.5-12 2.5-12	-	S-STD	Gasket Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 20	
	2.5-12	- -	S-STD	True Y, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, No. 33	
	3-12	2-10	S-STD	45 Deg Red. Lateral , Victaulic Grooved , MGE , A 53 Gr. B, Galvanized , No. 30-R	
	14-24	-	S-STD	11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W13	
	14-24	-	S-STD	22.5 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W12	
	14-24	-	S-STD	45 Deg Lateral, Victaulic Grooved, MGE, A 234 Gr. WPB Galvanized, AGS, Style W30	
	14-24	-	S-STD	45 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W110	
	14-24	4-20	S-STD	45 Deg Red. Lateral , Victaulic Grooved , MGE , A 234 Gr. WPB Galvanized , AGS, Style W30-R	
	14-24	_	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W11	
				90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS,	
	14-24	-	S-STD	Style W100 90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS,	
	14-24 14-24	- -	S-STD S-STD	Style W10 Cap , Victaulic Grooved , MGE , A 234 Gr. WPB Galvanized , AGS, Style W60	
	14-24 14-24	6-20 -	S-STD S-STD	Concentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W50 Cross, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, AGS, Style W35 Eccentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB Galvanized, AGS,	
	14-24	6-20	S-STD	Style W51 Reducing Tee, Victaulic Grooved, MGE, A 234 Gr. WPB Galvanized, AGS, Style	
	14-24	6-20	S-STD	W25	
	14-24	-		Rigid Coupling , Victaulic Grooved , FGE , A536 Gr.65-45-12 Galvanized , AGS, Style W07	
	14-24	-	S-STD	Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W20	
Small Bore Fittings	14-24	<u> </u>	S-STD	True Y , Victaulic Grooved , MGE , A 53 Gr. B, Galvanized , AGS, Style W33	
	0.5-2	-	S-10S	45 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P591 45 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP304L , Style	
	0.5-2	-	S-10S	P543	
	0.5-2	-	S-10S	90 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P586	
	0.5-2	-	S-10S	90 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP304L , Style P542	
	0.5-2	-	S-10S	Cap , Victaulic Vic-Press , PE , A 312 Gr. TP304L , Style P540	



PIPE SPEC:	1BMA8	Date	: 8/4/2016 5:32:03	B PM Wiewit
	0.5-2 0.5-2 0.5-2	0.5-2 - -	S-10S S-10S	Male Adapter , Victaulic Vic-Press , MTE x VPS , A 312 Gr. TP304L , Style P596 Plug Square Head , B16.11 , MTE , A 182 Gr. F304L PressFit Coupling , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P597
	0.5-2 0.5-2 0.5-2	0.5-1 - -	S-10S S-10S S-10S	Reducing Tee , Victaulic Vic-Press , FTE x VPS , A 312 Gr. TP304L , Style P588 Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P592 Union , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P584
	0.5-2	-		Weld Adapter , Victaulic Vic-Press , PE x VPS , A 312 Gr. TP304L , Style P561
Daka	0.75-2 0.75-2	0.5-1.5 0.5-1.5	S-10S S-10S	Concentric Reducer , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P594 Reducing Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP304L , Style P593
Bolts	0.5-24 0.5-24			Cap Screw , ASME B18.2.1 / B18.2.2 , A193 B7 Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex , Xylan Coated
Gaskets				Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , Thick Flat Ring , Garlock 3200 , Non-
	0.5-24 0.5-24			Asbestos - Non Metal Flat Gskt , B16.21 , CL300 , FF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, Neoprene Rubber, 0.125" non compressed thickness
	0.5-24			Seal Ring , Victaulic , Seal Ring , EPDM Victaulic Gr.E , 0.0625" non compressed thickness
	0.5-24			Sp. Wound Gskt, B16.20, CL150, FF, 304 SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, 304 SS CR, 0.175"
Flanges	0.5-24	1	<u> </u>	non compressed thickness
3.1	0.5-2 0.5-2	-		Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L
	0.5-24	-		Blind Flg., B16.5, CL150, RF, A105, Galvanized
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B, Galvanized , No. 45R
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 53 Gr. B, Galvanized , No. 45F Van Stone Flg. , Victaulic Pressfit , CL150 , RFFE X VPS , A 403 Gr. F304L , Style
	0.5-2	-	S-10S	P565
	14-24	-		Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 Galvanized , Style W741 Flg. Adapter , Victaulic Grooved , CL300 , FFFE X MGE , A 53 Gr. B , No. 46F,
	2-12	-	S-STD	Galvanized Flg. Adapter , Victaulic Pressfit , CL150 , RFFE X VPS , A 182 Gr. F304L , Style
	0.5-2 0.5-2	-	S-10S S-STD	P595 Thd. Flg. , B16.5 , CL150 , RF , A105 , Galvanized
	14-24	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. W45R, Galvanized
	2.5-12	-		Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 Galvanized , Style 741
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL300 , RF x MGE , A 53 Gr. B , No. 46R, Galvanized
Gate Valves				Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F304L Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-		A 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
Globe Valves	8-24	-	<u> </u>	216 Gr. WCB
C.O.O.O. Val. VOC	0.5-2	-	1	Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F304L
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	8-24			Globe Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A 216 Gr. WCB
Check Valves				
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , FTE , Bltd Bonnet , A 351 Gr. CF3M Victaulic Chk Vlv , Victaulic Grooved or eq. , MGE , A536 Gr.65-45-12 , Series
	2-12	-		716H/716 Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.
	2.5-24	-		WCB Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr.
Ball Valves	6-24	<u>-</u>		WCB
<u> </u>			•	1

PIPE SPEC:	1BMA8	Date: 8/4/2016 5:32:03	PM Wiewit
	0.5-2	-	Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M , Series P569
	0.75-2	-	Ball VIv LP FB, Victaulic Vic-Press or eq., VPS x MGE, Lever Operator, A 351 Gr. CF8M, Series P569
	2.5-6	-	Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two or Three Piece Metal Seated, Lever Operator, A 216 Gr. WCB Ball Vlv LP FB, Victaulic Grooved or eq., 1000 psi, MGE, Lever Operator, A536
	2.5-6	-	Gr.65-45-12, Series 726 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Trun. Mount. Ball,
	8-12	-	Gear Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball ,
Butterfly Valves	14-24	<u>.</u>	Gear Operator , A 216 Gr. WCB
Butterny valves	1	l l	Butterfly VIv , Victaulic Grooved Series 761 , MGE , Lever Operator , A536 Gr.65-45-
	2-12	-	12 Butterfly Valve Lug Type , Bray API 609 Cat. B , CL150 , Lugged FF w/ Integral
	2.5-6	-	Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets,
	2.5-6	-	Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem
	8-20	-	Butterfly Valve Lug Type, Bray, CL150, FF w/Integral Gaskets, Gear Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem Butterfly VIv, Victaulic Grooved Series W761, MGE, Gear Side mounted
	14-24	-	Handwheel (Without Z offset), A536 Gr.65-45-12

PIPE SPEC: 1BMB1

Date: 8/4/2016 5:32:59 PM



DESCRIPTION: LOW PRESSURE GENERAL SERVICE MATERIAL: Carbon Steel / Stainless Steel (316L)

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES

 TEMP. F
 PRESS. PSIG

 -20
 230

 100
 230

 200
 195

GENERAL NOTES

- 1 PRESSURE RATINGS FOR BUTTERFLY VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.

 MANUFACTURER'S RECOMEND PRESSURE-TEMPERATURE RESTRICTIONS SHALL BE CONSULTED.
- 2 INSTALLERS MUST BE TRAINED IN THE INSTALLATION OF THE VICTAULIC VIC-PRESS SYSTEM AND UTILIZE ALL PROCEDURES INCLUDING MARKING OF THE PIPE TO ENSURE PROPER INSERTION DEPTH UPON PRESSING
- 3 GROOVED-END PIPE AND FITTINGS SHALL MEET VICTAULIC SPECIFICATIONS. MECHANICAL COUPLINGS SHALL BE VICTAULIC RIGID TYPE OR EQUAL.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E (EPDM).
- 5 FOR STD PIPE, ALL PIPE GROOVE DIMENSIONS AND PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PUBLISHED PIPE ROLL GROOVING STANDARDS. PIPE NPS 14 AND LARGER SHALL BE PREPARED TO VICTAULIC AGS GROOVE SPECIFICATIONS WITH WEDGE SHAPED ROLL GROOVES
- 6 VICTAULIC FLANGE WASHERS ARE REQUIRED BETWEEN VIC FLANGES AND SERRATED FACES (SUCH AS B16.5 FLANGE FACES AND FLANGED VALVES). A FLANGE GASKET MUST THEN USED BETWEEN THE FLANGE WASHER AND THE SERRATED FACE, NO GASKET IS REQUIRED BETWEEN THE VIC FLANGE AND THE VICTAULIC FLANGE WASHER. A FLANGE WASHER IS ALSO REQUIRED BETWEEN RUBBER FACED BUTTERFLY VALVES AND VIC FLANGES
- 7 BOLTS AND NUTS ARE SUPPLIED WITH GROOVED COUPLING (E.G., VIC STYLE 177) PURCHASE
- 8 DIELECTRIC UNIONS ARE NOT REQUIRED WHEN JOINING SMALL BORE STAINLESS STEEL THREADED BRANCH CONNECTIONS TO A LARGE BORE VICTAULIC CARBON STEEL SYSTEM. APPLIES TO SERVICE WATER, POTABLE WATER, CLOSED COOLING WATER, PLANT DRAINS, AND NITROGEN SYSTEMS. IN ADDITION, PIPE DOPE SHALL BE USED AT THE THREADED CONNECTION FROM STAINLESS TO CARBON STEEL.
- 9 FOR CLASS 300 FLANGE ADAPTER, THE FLANGES SHALL BE USED ONLY TO MATCH CLASS 300 FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT
- 10 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP316L , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , BE , A 53 Gr. B , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , BEV x GRV , A 53 Gr. B , SMLS
	2.5-24	-	S-STD	Pipe , B36.10M , MGE , A 53 Gr. B , SMLS
	0.5-2	-	S-STD	Nipple, B36.19M, PE/TE, A 53 Gr. B, 6" Long, SMLS
	0.5-2	-	S-STD	Nipple , B36.19M , PE/TE , A 53 Gr. B , 3" Long, SMLS
	0.5-2	-	S-STD	Nipple , B36.19M , TBE , A 53 Gr. B , 6" Long, SMLS
	0.5-2	-	S-STD	Nipple , B36.19M , TBE , A 53 Gr. B , 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 3" Long, SMLS
				Transition Nipple, Victaulic Grooved, PE x MGE, A 312 Gr. TP316L, Style P587
	1-2	-	S-10S	
	2-3	-	S-STD	Adapter Nipple, Victaulic Grooved, GRV x BEV, A 53 Gr. B, No. 42, 4" long
	2-12	-	S-STD	Adapter Nipple, Victaulic Grooved, GRV x THD, A 53 Gr. B, No. 40
	2-3	-	S-STD	Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 4" long
	2-6	1-5	S-STD	Swage Nipple, Victaulic Grooved, FTE x MGE, A 53 Gr. B, No. 55

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	2-6	1-5	S-STD	Swage Nipple , Victaulic Grooved , MGE x FTE , A 53 Gr. B , No. 54
	2-6	1-5	S-STD X S-10S	Swage Nipple , Victaulic Grooved , MGE , A 53 Gr. B , No. 53
	4-8	-	S-STD	Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 43, 6" long
	4-8 10-12	-	S-STD S-STD	Adapter Nipple, Victaulic Grooved, GRV x BEV, A 53 Gr. B, No. 42, 6" long Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 8" long
	10-12	- -	S-STD	Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 45, 8 long Adapter Nipple , Victaulic Grooved , GRV x BEV , A 53 Gr. B , No. 42, 8" long
				Adapter Nipple , Victaulic Grooved , GRV x BEV , A 53 Gr. B , No. W42, 8" long
	14-24 14-24	- -	S-STD S-STD	Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. B , No. W43, 8" long
Large Bore Fittings	2-4	<u>-</u>	S-STD	Female Adapter , Victaulic Vic-Press , MGE x FTE , A536 Gr 65-45-12 , No 80
	2-10	1-8		Red. Coupling, Victaulic Grooved, FGE, A536 Gr 65-45-12, Style 750
	2-12	-	e etd	Rigid Coupling, Victaulic Grooved, FGE, A536 Gr.65-45-12, QuickVic, Style 107 11.25 Deg Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 13
	2.5-12 2.5-12	<u>-</u>	S-STD S-STD	22.5 Deg Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12, No. 13
	2.5-12	- -	S-STD	45 Deg Lateral , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 30
	2.5-12	-	S-STD	45 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 110
	2.5-12	-	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 11
	2.5-12	-	S-STD	90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 100
	2.5-12	-	S-STD	90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 10
	2.5-12	-	S-STD	Cap , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 60
	2.5-12	2-10	S-STD	Concentric Reducer , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 50
	2.5-12	-	S-STD	Cross, Victaulic Grooved, MGE, A 53 Gr. B, No. 35
	2.5-12	2-10	S-STD	Eccentric Reducer , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 51
	2.5-12	2-10	S-STD	Reducing Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 25 Rigid Coupling , Victaulic Grooved , FGE , A 403 Gr. WP304L , Style 489, Type E Gasket
	2.5-12 2.5-12	<u>-</u>	S-STD	Gasket Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 20
	2.5-12	0.5-2	3-310	Threadolet, MSS SP-97, CL3000, FTE, A105
	2.5-12	-	S-STD	True Y, Victaulic Grooved, MGE, A 53 Gr. B, No. 33
	3-12	2-10	S-STD	45 Deg Red. Lateral , Victaulic Grooved , MGE , A 53 Gr. B , No. 30-R
	6-24	2.5-18	S-STD	Weldolet , MSS SP-97 , BE , A105 , SMLS
	14-24	-	S-STD	11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W13
	14-24	-	S-STD	22.5 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W12
	14-24	-	S-STD	45 Deg Lateral , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W30
	14-24	-	S-STD	45 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W110
	14-24	4-20	S-STD	45 Deg Red. Lateral , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W30-R
	14-24	-	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W11
	14-24	-	S-STD	90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W100
	14-24 14-24	-	S-STD S-STD	90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W10 Cap , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W60
	14-24 14-24	6-20 -	S-STD S-STD	Concentric Reducer , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W50 Cross , Victaulic Grooved , MGE , A 53 Gr. B , AGS, Style W35
	14-24	6-20	S-STD	Eccentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W51
	14-24	6-20	S-STD	Reducing Tee , Victaulic Grooved , MGE , A 234 Gr. WPB , AGS, Style W25
	14-24	-		Rigid Coupling, Victaulic Grooved, FGE, A536 Gr.65-45-12, AGS, Style W07
	14-24	-	S-STD	Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 , AGS, Style W20
Small Para Eittings	14-24	-	S-STD	True Y , Victaulic Grooved , MGE , A 53 Gr. B , AGS, Style W33
Small Bore Fittings	0.5-2	-	S-10S	45 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P571 45 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP316L , Style
	0.5-2	-	S-10S	P563
	0.5-2	-	S-10S	90 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P568 90 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP316L , Style
	0.5-2 0.5-2	-	S-10S S-10S	P562 Cap , Victaulic Vic-Press , PE , A 312 Gr. TP316L , Style P560
		0.5.2		
	0.5-2	0.5-2	S-10S	Female Adapter, Victaulic Vic-Press, FTE x VPS, A 312 Gr. TP316L, Style P579
	0.5-2 0.5-2	0.5-2	S-10S	Male Adapter , Victaulic Vic-Press , MTE x VPS , A 312 Gr. TP316L , Style P576 Plug Square Head , B16.11 , MTE , A 182 Gr. F316L
	0.5-2 0.5-2	-	S-10S	PressFit Coupling, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P597
	0.5-2	0.5-1	S-10S	Reducing Tee , Victaulic Vic-Press , FTE x VPS , A 312 Gr. TP316L , Style P578
	0.5-2	-	S-10S	Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P572
	0.5-2	-	S-10S	Union , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P585
	0.75-2	0.5-1.5	S-10S	Concentric Reducer, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P574
Bolts	0.75-2	0.5-1.5	S-10S	Reducing Tee , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P573
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	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex , Xylan Coated
Gaskets				
	0.5-24			Non Metal Flat Gskt, B16.21, CL150, FF, Neoprene Rubber, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Neoprene Rubber, 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , Thick Flat Ring , Garlock 3200 , Non-
	0.5-24			Asbestos - Non Metal Flat Gskt , B16.21 , CL300 , FF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Neoprene Rubber , 0.125" non
	0.5-24			compressed thickness Seal Ring , Victaulic , Seal Ring , EPDM Victaulic Gr.E , 0.0625" non compressed
	0.5-24			thickness Sp. Wound Gskt , B16.20 , CL150 , FF , 304 SS, Graphite Fill, 304 SS CR , 0.175"
	0.5-24			non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, 304 SS CR, 0.175"
Flanges	0.5-24	T		non compressed thickness
rialiges	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL300 , FFFE X MGE , A 53 Gr. B , No. 45F
	14-24	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. W45R, Galvanized
	2.5-12	-		Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 , Style 741
	0.5-2	-	S-10S	Van Stone Flg. , Victaulic Pressfit , CL150 , RFFE X VPS , A 403 Gr. F316L , Style P566
	0.5.0		C 100	Flg. Adapter , Victaulic Pressfit , CL150 , RFFE X VPS , A 182 Gr. F316L , Style
	0.5-2 0.5-2	-	S-10S	P595 Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L
	0.5-2	-	S-STD	SW Flg. , B16.5 , CL150 , RF , A105
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. 45R
	0.5-2 2-12	-	S-STD	Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F316L Flg. Adapter , Victaulic Grooved , CL300 , RF x MGE , A 53 Gr. B , No. 46R Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12 , Style
	14-24	-		W741
	0.5-24 2-12	-	S-STD	Blind Flg. , B16.5 , CL150 , RF , A105 Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 53 Gr. B , No. 45F
Gate Valves				rig. Haapter, Violadine Greeved, GE100, TTTE / MGE, MGE GI. B, TVC. 101
	0.5-2	-		Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F304L Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-		A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, Gear Operator, A
	8-24	-	1	216 Gr. WCB
Globe Valves				Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F304L Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	-		, A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A
Chook Volvos	8-24	-		216 Gr. WCB
Check Valves				
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , FTE , Bltd Bonnet , A 351 Gr. CF3M Victaulic Chk Vlv , Victaulic Grooved or eq. , MGE , A536 Gr.65-45-12 , Series
	2-12	-		716H/716 Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.
	2.5-24	-		WCB Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr.
Dell Velice	6-24	-		WCB
Ball Valves				Ball VIv LP FB , Victaulic Vic-Press or eq. , VPS , Lever Operator , A 351 Gr. CF8M ,
	0.5-2	-		Series P569 Ball VIv LP FB, Victaulic Vic-Press or eq., VPS x MGE, Lever Operator, A 351 Gr.
	0.75-2	-		CF8M, Series P569 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two or Three Piece Metal
	2.5-6	-		Seated, Lever Operator, A 216 Gr. WCB Ball VIv LP FB, Victaulic Grooved or eq., 1000 psi, MGE, Lever Operator, A536
	2.5-6	-		Gr.65-45-12, Series 726 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two piece Trun. Mount. Ball,
	8-12	-		Gear Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball ,
	14-24	<u>-</u>		Gear Operator , A 216 Gr. WCB
Butterfly Valves				Duttorfly Viv. Violandia Orogand Caria 704 MOE Language A 500 C of 15
	2-12	-		Butterfly VIv , Victaulic Grooved Series 761 , MGE , Lever Operator , A536 Gr.65-45-12 Butterfly Valve Wafer Type , Bray Controls or eq. , CL150 , FF w/Integral Gaskets ,
	2.5-6	-		Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem
	2.5-6	-		Butterfly Valve Lug Type , Bray API 609 Cat. B , CL150 , Lugged FF w/ Integral Gaskets , Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem

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Butterfly Valve Lug Type , Bray , CL150 , FF w/Integral Gaskets , Gear Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem
Butterfly VIv , Victaulic Grooved Series W761 , MGE , Gear Side mounted

Handwheel (Without Z offset) , A536 Gr.65-45-12

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DESCRIPTION: LOW PRESSURE GENERAL SERVICE MATERIAL:

Carbon Steel (Galvanized) / Stainless Steel (316L)

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	230
100	230
200	195

GENERAL NOTES

- 1 PRESSURE RATINGS FOR BUTTERFLY VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES. MANUFACTURER'S RECOMEND PRESSURE-TEMPERATURE RESTRICTIONS SHALL BE CONSULTED.
- 2 INSTALLERS MUST BE TRAINED IN THE INSTALLATION OF THE VICTAULIC VIC-PRESS SYSTEM AND UTILIZE ALL PROCEDURES INCLUDING MARKING OF THE PIPE TO ENSURE PROPER INSERTION DEPTH UPON PRESSING
- 3 GROOVED-END PIPE AND FITTINGS SHALL MEET VICTAULIC SPECIFICATIONS. MECHANICAL COUPLINGS SHALL BE VICTAULIC RIGID TYPE OR EQUAL.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VICTAULIC GRADE E
- 5 FOR STD PIPE, ALL PIPE GROOVE DIMENSIONS AND PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PUBLISHED PIPE ROLL GROOVING STANDARDS. PIPE NPS 14 AND LARGER SHALL BE PREPARED TO VICTAULIC AGS GROOVE SPECIFICATIONS WITH WEDGE SHAPED ROLL GROOVES
- 6 VICTAULIC FLANGE WASHERS ARE REQUIRED BETWEEN VIC FLANGES AND SERRATED FACES (SUCH AS B16.5 FLANGE FACES AND FLANGED VALVES). A FLANGE GASKET MUST THEN USED BETWEEN THE FLANGE WASHER AND THE SERRATED FACE, NO GASKET IS REQUIRED BETWEEN THE VIC FLANGE AND THE VICTAULIC FLANGE WASHER. A FLANGE WASHER IS ALSO REQUIRED BETWEEN RUBBER FACED BUTTERFLY VALVES AND VIC **FLANGES**
- 7 BOLTS AND NUTS ARE SUPPLIED WITH GROOVED COUPLING (E.G., VIC STYLE 177) PURCHASE
- 8 DIELECTRIC UNIONS ARE NOT REQUIRED WHEN JOINING SMALL BORE STAINLESS STEEL THREADED BRANCH CONNECTIONS TO A LARGE BORE VICTAULIC CARBON STEEL SYSTEM. APPLIES TO SERVICE WATER, POTABLE WATER, CLOSED COOLING WATER, PLANT DRAINS, AND NITROGEN SYSTEMS. IN ADDITION, PIPE DOPE SHALL BE USED AT THE THREADED CONNECTION FROM STAINLESS TO CARBON STEEL.
- 9 FOR CLASS 300 FLANGE ADAPTER, THE FLANGES SHALL BE USED ONLY TO MATCH CLASS 300 FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT
- 10 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	S-10S	Pipe , B36.19M , PE , A 312 Gr. TP316L , SMLS
	2.5-24	-	S-STD	Pipe, B36.10M, MGE, A 53 Gr. B Galvanized, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PBE, A 312 Gr. TP316L, 3" Long, SMLS
	0.5-2	-	S-10S	Nipple, B36.19M, PE/TE, A 312 Gr. TP316L, 6" Long, SMLS
	0.5-2	-	S-10S	Nipple , B36.19M , PE/TE , A 312 Gr. TP316L , 3" Long, SMLS
	0.5-2	-	S-STD	Nipple, B36.19M, TBE, A 53 Gr. B, 6" Long, SMLS, Galvanized
	0.5-2	-	S-STD	Nipple, B36.19M, TBE, A 53 Gr. B, 3" Long, SMLS, Galvanized
				Transition Nipple, Victaulic Vic-Press, MGE x PE, A 312 Gr. TP316L, Style P577
	1-2	-	S-10S	
				Adapter Nipple, Victaulic Grooved, GRV x THD, A 53 Gr. B, No. 40, Galvanized
	2-12	-	S-STD	
				Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. A, No. 43, 4" long, Galvanized
	2-3	-	S-STD	
				Swage Nipple, Victaulic Grooved, FTE x MGE, A 53 Gr. B Galvanized, No. 55
	2-6	1-5	S-STD	
				Swage Nipple, Victaulic Grooved, MGE x FTE, A 53 Gr. B Galvanized, No. 54
	2-6	1-5	S-STD	



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	2-6	1-5	S-STD	Swage Nipple , Victaulic Grooved , MGE , A 53 Gr. B Galvanized , No. 53 Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 43, 6" long, Galvanized
	4-8	-	S-STD	Adapter Nipple , Victaulic Grooved , MGE , A 53 Gr. A , No. 43, 8" long, Galvanized
	10-12	-	S-STD	
	14-24	_	S-STD	Adapter Nipple, Victaulic Grooved, MGE, A 53 Gr. B Galvanized, AGS, Style W43
Large Bore Fittings				Female Adapter , Victaulic Grooved , MGE x FTE , A536 Gr 65-45-12, Galvanized ,
	2-4	-	S-STD	No 80
	2-10	1-8		Red. Coupling, Victaulic Grooved, FGE, A536 Gr 65-45-12, Galvanized, Style 750
	2-12	-		Rigid Coupling , Victaulic Grooved , FGE , A536 Gr.65-45-12 , QuickVic, Style 107
	2.5-12	-	S-STD	11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 13
	2.5-12	-	S-STD	22.5 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 12
	2.5-12	-	S-STD	45 Deg Lateral, Victaulic Grooved, MGE, A536 Gr.65-45-12 Galvanized, No. 30 45 Deg LR Elbow, Victaulic Grooved, MGE, A536 Gr.65-45-12 Galvanized, No.
	2.5-12	-	S-STD	110
	2.5-12	-	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 1
	2.5-12	-	S-STD	90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 100
	2.5-12	-	S-STD	90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 1
	2.5-12 2.5-12	- 2-10	S-STD S-STD	Cap , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 60 Concentric Reducer , Victaulic Grooved , MGE , A536 Gr.65-45-12 , No. 50
	2.5-12	-	S-STD	Cross, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, No. 35
	2.5-12	2-10	S-STD	Eccentric Reducer , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 51
	2.5-12	2-10	S-STD	Reducing Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 25 Rigid Coupling , Victaulic Grooved , FGE , A 403 Gr. WP304L , Style 489, Type E
	2.5-12 2.5-12	-	S-STD	Gasket Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , No. 20
	2.5-12	-	S-STD S-STD	True Y, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, No. 33
	3-12	2-10	S-STD	45 Deg Red. Lateral , Victaulic Grooved , MGE , A 53 Gr. B, Galvanized , No. 30-R
	14-24	-	S-STD	11.25 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W13
	14-24	-	S-STD	22.5 Deg Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W12
	14-24	-	S-STD	45 Deg Lateral , Victaulic Grooved , MGE , A 234 Gr. WPB Galvanized , AGS, Style W30
	14-24	-	S-STD	45 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W110
	14-24	4-20	S-STD	45 Deg Red. Lateral, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, AGS, Styl W30-R
	14-24	-	S-STD	45 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W11
	14-24	<u>-</u>	S-STD	90 Deg LR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W100
				90 Deg SR Elbow , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS
	14-24 14-24	-	S-STD S-STD	Style W10 Cap , Victaulic Grooved , MGE , A 234 Gr. WPB Galvanized , AGS, Style W60
	14-24 14-24	6-20 -	S-STD S-STD	Concentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB, AGS, Style W50 Cross, Victaulic Grooved, MGE, A 53 Gr. B, Galvanized, AGS, Style W35
	14-24	6-20	S-STD	Eccentric Reducer, Victaulic Grooved, MGE, A 234 Gr. WPB Galvanized, AGS, Style W51
	14-24	6-20	S-STD	Reducing Tee , Victaulic Grooved , MGE , A 234 Gr. WPB Galvanized , AGS, Style W25
	14-24	-		Rigid Coupling, Victaulic Grooved, FGE, A536 Gr.65-45-12 Galvanized, AGS, Style W07
	14-24	-	S-STD	Tee , Victaulic Grooved , MGE , A536 Gr.65-45-12 Galvanized , AGS, Style W20
Small Bore Fittings	14-24	-	S-STD	True Y , Victaulic Grooved , MGE , A 53 Gr. B, Galvanized , AGS, Style W33
	0.5-2	-	S-10S	45 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P571 45 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP316L , Style
	0.5-2	-	S-10S	P563
	0.5-2	-	S-10S	90 Deg Elbow , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P568 90 Deg Street Elbow , Victaulic Vic-Press , VPS x PE , A 312 Gr. TP316L , Style
	0.5-2 0.5-2	-	S-10S S-10S	P562 Cap , Victaulic Vic-Press , PE , A 312 Gr. TP316L , Style P560
		0.5.2		
	0.5-2	0.5-2	S-10S	Female Adapter , Victaulic Vic-Press , FTE x VPS , A 312 Gr. TP316L , Style P579

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	0.5-2 0.5-2 0.5-2	0.5-2 - -	S-10S S-10S	Male Adapter , Victaulic Vic-Press , MTE x VPS , A 312 Gr. TP316L , Style P576 Plug Square Head , B16.11 , MTE , A 182 Gr. F316L PressFit Coupling , Victaulic Vic-Press , VPS , A 312 Gr. TP316L , Style P507	
	0.5-2 0.5-2 0.5-2	0.5-1 - -	S-10S S-10S S-10S	Reducing Tee, Victaulic Vic-Press, FTE x VPS, A 312 Gr. TP316L, Style P578 Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P572 Union, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P585	
	0.75-2 0.75-2 0.75-2	0.5-1.5 0.5-1.5	S-10S S-10S S-10S	Concentric Reducer, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P574 Reducing Tee, Victaulic Vic-Press, VPS, A 312 Gr. TP316L, Style P573	
Bolts					
	0.5-24 0.5-24			Cap Screw , ASME B18.2.1 / B18.2.2 , A193 B7 Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex , Xylan Coated	
Gaskets					
	0.5-24			Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Neoprene Rubber , 0.125" non	
	0.5-24			compressed thickness	
	0.5-24			Non Metal Flat Gskt, B16.21, CL150, Thick Flat Ring, Garlock 3200, Non-Asbestos - Non Metal Flat Gskt, B16.21, CL300, FF, Neoprene Rubber, 0.125" non	
	0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , Neoprene Rubber , 0.125" non	
	0.5-24			compressed thickness Seal Ring, Victaulic, Seal Ring, EPDM Victaulic Gr.E, 0.0625" non compressed	
	0.5-24			thickness Sp. Wound Gskt, B16.20, CL150, FF, 304 SS, Graphite Fill, 304 SS CR, 0.175"	
	0.5-24			non compressed thickness Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, 304 SS CR , 0.175"	
Flanges	0.5-24	 		non compressed thickness	
ridiiyes	0.5-2	-		Thd. Flg. , B16.5 , CL150 , FF , A 182 Gr. F316L	
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B, Galvanized , No. 45R	
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , FFFE X MGE , A 53 Gr. B, Galvanized , No. 45F	
	0.5-2	-	S-10S	Van Stone Flg., Victaulic Pressfit, CL150, RF, A 403 Gr. WP316L, Style P566	
	14-24	-	S-STD	Flg. Adapter , Victaulic Grooved , CL150 , RF x MGE , A 53 Gr. B , No. W45R, Galvanized	
	0.5-2	-	S-10S	Flg. Adapter , Victaulic Pressfit , CL150 , RFFE X VPS , A 182 Gr. F316L , Style P575	
	2-12	-	S-STD	Flg. Adapter, Victaulic Grooved, CL300, FFFE X MGE, A 53 Gr. B, No. 46F, Galvanized	
	2-12	-	S-STD	Flg. Adapter , Victaulic Grooved , CL300 , RF x MGE , A 53 Gr. B , No. 46R, Galvanized Flg. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12	
	14-24 0.5-2	- -		Galvanized , Style W741 Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F316L	
	0.5-24	-		Blind Fig. , B16.5 , CL150 , RF , A162 GI. F316L Blind Fig. , B16.5 , CL150 , RF , A105 , Galvanized Fig. Adapter , Victaulic Grooved , CL150 , RFFE X FGE , A536 Gr.65-45-12	
	2.5-12 0.5-2	-	S-STD	Galvanized, Style 741 Thd. Flg., B16.5, CL150, RF, A105, Galvanized	
Gate Valves					
	0.5-2	-		Gate VIv , Bonney Forge RP or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator	
	2.5-6	-		A 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A	
Globe Valves	8-24	.		216 Gr. WCB	
Giobe vaives	0.5-2	-		Globe VIv , Bonney Forge Red. Port or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F316L	
	2.5-6	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB	
	8-24	-		Globe Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Gear Operator , A 216 Gr. WCB	
Check Valves					
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , FTE , Bltd Bonnet , A 351 Gr. CF3M Victaulic Chk VIv , Victaulic Grooved or eq. , MGE , A536 Gr.65-45-12 , Series	
	2-12	-		716H/716 Check Valve Swing LP, B16.10 App. Mfg., CL150, RF, Bltd Bonnet, A 216 Gr.	
	2.5-24	-		WCB Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL150 , FFTBE , A 216 Gr.	
Ball Valves	6-24	 .		WCB	
Dan Vaives	0.5-2	_		Ball VIv LP FB, Victaulic Vic-Press or eq., VPS, Lever Operator, A 351 Gr. CF8M Series P569	

0.5-2

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	0.75-2	-	Ball VIv LP FB, Victaulic Vic-Press or eq., VPS x MGE, Lever Operator, A 351 Gr. CF8M, Series P569 Ball Valve LP FB, B16.10 App. Mfg., CL150, RF, Two or Three Piece Metal
	2.5-6	-	Seated , Lever Operator , A 216 Gr. WCB Ball VIv LP FB , Victaulic Grooved or eq. , 1000 psi , MGE , Lever Operator , A536
	2.5-6	-	Gr.65-45-12 , Series 726 Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Two piece Trun. Mount. Ball ,
	8-12	-	Gear Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL150 , RF , Three piece Trun. Mount. Ball ,
Butterfly Valves	14-24	-	Gear Operator , A 216 Gr. WCB
Dutterily valves	ļ		Butterfly VIv, Victaulic Grooved Series 761, MGE, Lever Operator, A536 Gr.65-45-
	2-12	-	12
	2.5-6	-	Butterfly Valve Wafer Type, Bray Controls or eq., CL150, FF w/Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type, Bray API 609 Cat. B, CL150, Lugged FF w/ Integral
	2.5-6	-	Gaskets , Lever Operator , A 216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem Butterfly Valve Lug Type , Bray , CL150 , FF w/Integral Gaskets , Gear Operator , A
	8-20	-	216 Gr. WCB , EPDM / BUNA-N Seat, SS Stem Butterfly VIv , Victaulic Grooved Series W761 , MGE , Gear Side mounted
	14-24	-	Handwheel (Without Z offset), A536 Gr.65-45-12

DESCRIPTION: GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

1 10 01 // 11 10 11	OI LOII ILD IIV NOTLO
TEMP. F	PRESS. PSIG
-20	740
100	740
200	680
300	655
400	635
500	605
600	570
650	550
700	530
750	505
800	410

GENERAL NOTES

Date: 8/4/2016 5:34:51 PM

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 106 Gr. B, 6" Long, SMLS
	1.5-2	-	S-XXS	Nipple, B36.10M, BE x PE, A 106 Gr. B, 6" Long, SMLS
Large Bore Fittings				
	0.75-24	-		Flatolet , MSS SP-97 , BE , A105 , SMLS
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, FTE, A105
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL3000, SWE, A105
	1-24	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		45 Deg Latrolet, MSS SP-97, CL6000, SWE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-48	1-42	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	3-3	1.5-2	S-XXS	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS



PIPE SPEC:	1DAA1	Date:	8/4/2016 5:34:51 F	PM Kiewit	
	3-6 3-6 3-6 3-6	2.5-4 2.5-4 2.5-4 2.5-4	MATCH MATCH MATCH MATCH	Con. Swage, MSS SP-95, BBE, A 234 Gr. WPB Con. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB Ecc. Swage, MSS SP-95, BBE, A 234 Gr. WPB Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB	
	6-10	0.75-0.75	WATCH	Elbolet , Manuf. Std , CL3000 , SWE , A105	
	6-48 6-24	2.5-24 3-3	MATCH MATCH X S-XXS	Weldolet, MSS SP-97, BE, A105, SMLS Weldolet, MSS SP-97, BE, A105, SMLS	
Small Bore Fittings		3-3	WATCH X 3-XX3		
	0.5-2 0.5-2	<u>-</u> -		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105 45 Deg. Elbow , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105	
	0.5-2 0.5-2	<u>-</u>		Cap , B16.11 , CL3000 , SWE , A105 Cap , B16.11 , CL6000 , FTE , A105	
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105	
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105	
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105	
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL6000 , SWE , A105	
	0.5-2	- -		Flatolet , MSS SP-97 , CL3000 , SWE , A105	
	0.5-2	-		Flatolet , MSS SP-97 , CL6000 , SWE , A105	
	0.5-2	-		Flatolet, MSS SP-97, CL9000, SWE, A105	
	0.5.0.5			Male Connector , 0.5 x 0.5in Swagelok or Eq , MNPT x CTBE , A 182 Gr. F316 , SS-	
	0.5-0.5	-		810-1-8 Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810	
	0.5-0.5	-		1-8W	
	0.5-0.5	-		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P	
	0.5-2	0.25-1.5		Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105	
	0.5-2 0.5-2	-		Union , MSS SP-83 , CL3000 , FTE , A105 Union , MSS SP-83 , CL3000 , SWE , A105	
	0.5-2	-		Union , MSS SP-83 , CL6000 , FTE , A105	
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A105	
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB	
	0.75-2 0.75-2	0.5-1.5 0.5-1.5	MATCH MATCH	Con. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB Con. Swage , MSS SP-95 , TBE , A 234 Gr. WPB	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A 234 Gr. WPB	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , TBE , A 234 Gr. WPB	
	0.75.0.75			Male Connector , 0.75 x 0.5in Swagelok or Eq , MNPT x CTBE , A 182 Gr. F316 , SS	
	0.75-0.75	-		810-1-12 Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-	
	0.75-0.75	-		810-1-12W	
	0.75-0.75	0.5-0.5		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W	
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A105	
	0.75-2 0.75-2	0.5-1.5 0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105 Red. Tee , B16.11 , CL6000 , SWE , A105	
	0.70 2	0.0 1.0		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1	
Bolts	1-1	-	T	16W	
Boits	0.5-48			L Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H	
	0.5.49			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
Gaskets	0.5-48			Cad Plated	
	0.5-48			Insulating Gskt Set, B16.21, CL300, FF, Per Specification 81.33.08, 0.125" non compressed thickness	
	0.5-48			Insulating Gskt Set, B16.21, CL300, RF, Per Specification 81.33.08, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, NM Comp. Gskt., 0.125" non	
	0.5-48			compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , NM Comp. Gskt. , 0.125" non	
	0.5-48			compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non	
	0.5-48			compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175"	
Element	0.5-48	T	1	non compressed thickness	
Flanges	0.5-24	_		 Blind Flg. , B16.5 , CL300 , RF , A105	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , FF , A105	
	22-22	-	MATCH	WN Flg. , MSS-SP-44-NB , CL300 , RF , A105	
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A105	
	8-12 1-16	-	MATCH MATCH	WN Flg. , B16.5 , CL600 , RF , A105 WN Ori Flg 0.5" Thd , B16.36 , CL300 , RF , A105 , 2 Taps , 180deg apart	
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , FF , A105	
	26-48	-		Blind Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N	
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , RF , A105	
	26-48 26-48	- -	MATCH MATCH	WN Flg. , B16.47 Sr. A , CL300 , FF , A105 WN Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N	
	22-22		MATCH	WN Fig. , MSS-SP-44-NB , CL300 , FF , A105	
Gate Valves					

PIPE SPEC:	1DAA1	Date: 8/4/201	6 5:34:51 PM	® Kiewit
	0.5-2	-	1	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 05 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	- -	A G	Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 105 Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator,
	2.5-6 2.5-6	- N	G MATCH A G	A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A
Globe Valves	8-36 8-36	- - <u>N</u>	G	216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A 216 Gr. WCB
2.383 14.100	0.5-2 0.5-2	- -	A	Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 105 Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	2.5-6	- N	ЛАТСН , G	Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator
	2.5-6 8-36	- -	G 2 G	A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A
Check Valves	8-36 0.5-2	- N		216 Gr. WCB Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 105
	0.5-2 2.5-20	- - N	C C MATCH 2	Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 105 Check Valve Tilting Disc , B16.10 App. Mfg. , CL600 , BE , Pressure Seal Bonnet , A 216 Gr. WCB
	2.5-24	- N	MATCH V C	Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 216 Gr. VCB Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 216 Gr.
	2.5-24 4-24	-	C	WCB Check Valve Tilting Disc , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 216 Gr. WCB
Pall Valvas	6-24		C	Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL300 , FTE , A 216 Gr. WCB
Ball Valves	0.5-2	-	C	Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 105 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator
	0.5-2 0.5-2	-	, В А	A 105 Ball Valve, B16.10 App. Mfg., CL300, RF, Three Piece Fltg. Ball, Lever Operator, A 105
	2.5-24	-	G B	Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Three piece Trun. Mount. Ball, Gear Operator, A 216 Gr. WCB Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Two piece Fltg. Ball, Lever
Butterfly Valves	2.5-6	-	C	Operator , A 216 Gr. WCB

3-6

Butterfly Valve Wafer Type, Bray API 609 Cat. B, CL300, FFTBE w/Integral Gaskets, Lever Operator, A 216 Gr. WCB, EPDM / BUNA-N Seat, SS Stem

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 400F RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

	OI LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
-20	740
100	740
200	680
300	655
400	635

GENERAL NOTES

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- 1 UNDERGROUND VALVES SHALL BE PROVIDED WITH A VALVE BOX AS A MINIMUM.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	S-80	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	S-80	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	S-80	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.75-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.75-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.75-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	-		Plug Hex Head, B16.11, MTE, A105



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	1-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
Bolts				
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				
	0.5-24 0.5-24 0.5-24			Non Metal Flat Gskt , B16.21 , CL300 , FF , NM Comp. Gskt. , 0.175" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , NM Comp. Gskt. , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness
Flanges				
	0.5-24 0.5-2 2.5-24 2.5-24 0.5-2	- - - -	MATCH MATCH MATCH MATCH	Blind Flg. , B16.5 , CL300 , RF , A105 SW Flg. , B16.5 , CL300 , FF , A105 WN Flg. , B16.5 , CL300 , FF , A105 WN Flg. , B16.5 , CL300 , RF , A105 SW Flg. , B16.5 , CL300 , RF , A105
Gate Valves				
	-			•
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator
	2.5-6 2.5-6	-	MATCH	, A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB
	8-12	-		Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
	8-12	<u>-</u>	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A 216 Gr. WCB
Check Valves				
	_	1	_	
Ball Valves				
	_	•	1	
Butterfly Valves				

UNDERGROUND FUEL GAS

MATERIAL: Carbon Steel

DESCRIPTION:

EXAMINATION: Per ASME B31.1 - 2010 TEMPERATURE LIMIT: -20F to 220F

RATING CLASS: 300, ASME B16.5 -2009

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2010 STRESS RELIEF: Per ASME B31.1 - 2010

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	740
100	740
200	680
220	675

GENERAL NOTES

1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.

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- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples		1		
	0.75-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	0.75-2	-	S-80	Pipe , B36.10M , MTE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.75-0.75	-	S-80	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.75-0.75	-	S-80	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.75-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.75-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
Large Bore Fittings				
	1-24	0.75-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A105
	1-24	0.75-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	1-24	0.25-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.75-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-		Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	2.5-24	-		Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	2.5-24	2.5-22	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
Small Bore Fittings				
	0.75-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.75-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.75-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	1-2	0.75-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	1-2	0.75-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	1-2	0.75-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-24	_	_	Cad Plated
Gaskets			1	

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Insulating Gskt Set, B16.21, CL300, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness

PIPE SPEC: 1DAA7 Peter 9/

PIPE SPEC:	IDAA7	Date: 8/4/2016 5:37:50 PM
		Insulating Gskt Set , B16.21 , CL60
	0.5-24	Full Length Sleeves, Steel ZP and C LineBacker or equal , 300 deg F or



	0.5-24 0.5-24 0.5-24			Insulating Gskt Set, B16.21, CL600, RF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL600, FF, 304 SS Winding, Graphite Fill, CS CR, 800 deg F or better, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL600, RF, 304 SS Winding, Graphite Fill, CS CR,
	0.5-24			800 deg F or better , 0.175" non compressed thickness
Flanges				
,	0.75-2	-	MATCH	SW Flg. , B16.5 , CL600 , RF , A105
	2.5-24	-	MATCH	WN Flg., B16.5, CL600, RF, A105
	2.5-24	-	MATCH	WN Flg., B16.5, CL300, RF, A105
	0.75-2	-	MATCH	SW Flg., B16.5, CL300, RF, A105
	0.75-24	-		Blind Flg., B16.5, CL600, RF, A105
	0.75-24	-		Blind Flg., B16.5, CL300, RF, A105
Gate Valves				
Total VI	1	1	1	
Globe Valves				
Check Valves				
Oliook fulfoo	ı	ı	I	
Ball Valves				
		•		
Butterfly Valves				

DESCRIPTION: GENERAL SERVICE
MATERIAL: 1.25Cr-0.5Mo
EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

THO CHANGE IF SPE	CIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	750
100	750
200	750
300	720
400	695
500	665
600	605
650	590
700	570
750	530
800	510
850	485
900	450
950	320
1000	215
1050	145
1100	95

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P11 , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P11 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P11, 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P11, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P11, 12" Long, SMLS
Large Bore Fittings				
	2.5-12	0.5-2		45 Deg Latrolet, Bonney Forge, CL3000, SWE, A 182 Gr. F11 Cl. 2
	2.5-12	0.5-2		45 Deg Latrolet , Bonney Forge , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A234 Grade WP11 Cl. 1, SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F11 Cl. 2
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F11 Cl. 2
	3-48	2.5-40	MATCH	Con. Reducer , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	3-48	2.5-40	MATCH	Ecc. Reducer, B16.9, BE, A234 Grade WP11 Cl. 1, SMLS
	3-48	2.5-40	MATCH	Red. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	6-48	2.5-42	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F11 Cl. 2
Small Bore Fittings				

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PIPE SPEC:	1DBA1	Date:	: 8/4/2016 5:39:04	PM Wiewit
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2	- - - - - - - - 0.5-1.5	MATCH MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Cap , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 Cap , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Con. Swage , MSS SP-95 , PBE , A234 Grade WP11 Cl. 1 , SMLS Ecc. Swage , MSS SP-95 , PBE , A234 Grade WP11 Cl. 1 , SMLS Flatolet , Bonney Forge , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.75-1 0.75-2 0.75-2 0.75-2	0.5-0.5 - 0.5-1.5 0.5-1.5		Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A 182 Gr. F11 Cl. 2 Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2 Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts	0.5.40			Ctd Dtr 9 Ol had Jan Nt. ACME D40 04 O / D40 00 A 400 D40 / A 404 0
Gaskets	0.5-48	Γ		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
	0.5-48 0.5-48			Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS, Graphite Fill, CS CR, 304 SS IR , 0.175" Thick , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL600 , RF , 304 SS, Graphite Fill, CS CR, 304 SS IR , 0.175" Thick , 0.175" non compressed thickness
Flanges	0.5-24 30-48 0.5-2 30-48 30-48 0.5-2 2.5-24	- - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH	Blind Flg. , B16.5 , CL300 , RF , A 182 Gr. F11 Cl. 2 Blind Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F11 Cl. 2 SW Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 Cl. 2 WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F11 Cl. 2 WN Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F11 Cl. 2 SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F11 Cl. 2 WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 Cl. 2 WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F11 Cl. 2
Gate Valves	0.5-2 0.5-2 0.5-2 2.5-6 2.5-6 8-36	- - - - -	MATCH MATCH	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F11 Cl. 2 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F11 Cl. 2 Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 182 Gr. F11 Cl. 2 Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 217 Gr. WC6 Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator , A 217 Gr. WC6 Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 217 Gr. WC6 Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 217 Gr. WC6
Globe Valves				
	0.5-2 0.5-2 2.5-6 2.5-6 8-36	- - - -	MATCH	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F11 Cl. 2 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F11 Cl. 2 Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, A 217 Gr. WC6 Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 217 Gr. WC6 Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A 217 Gr. WC6 Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A 217 Gr. WC6
	8-36	<u>-</u> _	MATCH	217 Gr. WC6
Check Valves	0.5-2 0.5-2 2.5-24	- - -	MATCH	Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 182 Gr. F11 Cl. 2 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 182 Gr. F11 Cl. 2 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 217 Gr. WC6 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 217 Gr.
Ball Valves	2.5-24	<u>-</u>	1	WC6
שמוו אמואפט		<u>l</u>	1	
Butterfly Valves				
			·	

PIPE SPEC: 1DBB1

DESCRIPTION: GENERAL SERVICE MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ST TO CHAINGE IF SI	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	750
100	750
200	750
300	730
400	705
500	665
600	605
650	590
700	570
750	530
800	510
850	485
900	450
950	385
1000	265
1050	175
1100	110

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P22 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P22, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P22 , 3" Long, SMLS
Large Bore Fittings				
	2.5-16	0.5-2		45 Deg Latrolet , Bonney Forge , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-16	0.5-2		45 Deg Latrolet, Bonney Forge, CL6000, SWE, A 182 Gr. F22 Cl. 1
	2.5-16	0.5-2		45 Deg Latrolet, Bonney Forge, CL9000, SWE, A 182 Gr. F22 Cl. 1
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F22 Cl. 1
	3-18	-		45 Deg Latrolet , Bonney Forge , BE , A 182 Gr. F22 Cl. 1
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	3-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP22 Cl. 1, SMLS
	3-48	2.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	3-6	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP22 Cl. 1 , SMLS
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	3-48	2.5-42	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1

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PIPE SPEC:

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Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	_		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2			Cap , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
		-		• • • • • • • • • • • • • • • • • • • •
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg., B16.11, CL6000, SWE, A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg., B16.11, CL9000, SWE, A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Flatolet, MSS SP-97, CL3000, SWE, A105
	0.5-2	-		Flatolet , MSS SP-97 , CL6000 , SWE , A105
	0.5-2	-		Flatolet , MSS SP-97 , CL9000 , SWE , A105
	0.5-0.75	_		Plug Round Head , 0.5in Swagelok or Eq , CTBE , 316 SS , SS-810-P
	0.5-0.75	-		
	0.75.0.75			Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A 182 Gr. F22 Cl. 3
	1-2	0.5-1.5	MATCH	Con. Swage, MSS SP-95, PBE, A 234 Gr. WP22 Cl. 1, SMLS
	1-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A 234 Gr. WP22 Cl. 1, SMLS
				Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-
	1-1	-		16W
	1-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	1-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	1-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
Bolts	1-2	0.0-1.0		1.00, D10.11, OL0000, OVVL, A 102 Ol. 1 22 Ol. 1
Boits	0.5-48			
Gaskets	0.3-40			Std Bit & ZHVYHEX Nt., ASINIE B10.31.27 B10.2.2, A 193 B107 A 194 3
Odaketa				Insulating Gskt Set , B16.21 , CL150 , RF , Per Specification 81.33.08 , 0.125"
	0.5-48			compressed thickness
	0.5-48			•
	0.5.40			Insulating Gskt Set, B16.21, CL300, RF, Per Specification 81.33.08, 0.125"
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
	0.5-48			0.175" Thick, 0.175" non compressed thickness
				Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
	0.5-48			0.175" Thick, 0.175" non compressed thickness
Flanges				·
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F22 Cl. 3
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F22 Cl. 3
	30-48	_		Blind Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F22 Cl. 3
	30-48	_	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A 182 Gr. F11 Cl. 2
	0.5-2		MATCH	
		-	IVIATOR	SW Flg. , B16.5 , CL600 , RF , A 182 Gr. F22 Cl. 3
	0.5-24	-		Blind Flg. , B16.5 , CL300 , RF , A 182 Gr. F22 Cl. 3
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F22 Cl. 3
	30-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F11 Cl. 2
Gate Valves				
				Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F22 Cl. 3
				Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182
	0.5-2	-		Gr. F22 Cl. 3
				Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator,
	0.5-2	-		A 182 Gr. F22 Cl. 3
	-			Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator,
	2.5-6	_		A 217 Gr. WC9
	2.0 0			Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator ,
	2.5-6		MATCH	A 217 Gr. WC9
	۷.۵-۵	-	IVIATOR	
	0.00			Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A
	8-36	-		217 Gr. WC9
	_			Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A
	8-36	<u>-</u>	MATCH	217 Gr. WC9
Globe Valves				
				Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator ,
	0.5-2	-		A 182 Gr. F22 Cl. 3
				Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182
	0.5-2	-		Gr. F22 Cl. 3
	-			Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator
	2.5-6	-	MATCH	, A 217 Gr. WC9
	∠.J⁻∪	-	IVIA I OIT	•
	250			Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	-		, A 217 Gr. WC9
				Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A
	8-24	-		217 Gr. WC9
				Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A
	8-24	-	MATCH	217 Gr. WC9
Check Valves				
				Check Valve Pistn Lft, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, A 182 Gr. F22

Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 182 Gr. F22 Cl. 3

0.5-2

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	0.5-2 2.5-24	-	MATCH	Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 182 Gr. F22 Cl. 3 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 217 Gr. WC9 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 217 Gr.
	2.5-24	-	1	WC9
Ball Valves				
-			T	
Butterfly Valves				

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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

THO CHANGE IF SI	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	720
100	720
200	600
300	540
400	495
500	465
600	440
650	430
700	420
750	415
800	405
850	395
900	390
950	380
1000	355
1050	325
1100	255

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- ${\tt 4~GASKET~THICKNESS~AFTER~COMPRESSION~IS~APPROXIMATELY~1/8"}.$
- 5 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	2.5-24	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL3000, SWE, A 182 Gr. F304/304L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SML

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	2.5-6 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 3-24 3-24	0.5-2 - 0.5-2 0.5-2 0.5-2 0.5-2 2.5-22 2.5-42 2.5-22	MATCH MATCH MATCH MATCH MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Red. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
Small Bore Fittings	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2	- - - - - - - - - - 0.5-1.5		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Plug Hex Head , B16.11 , MTE , A 182 Gr. F304/304L Dual Cert. Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Square Head , MSS SP-114 , MTE , A 182 Gr. F304L
	1-2 1-2 1-1 1-2 1-2	0.5-1.5 0.5-1.5 - 0.5-1.5 0.5-1.5	MATCH MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1 16W Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	0.5-24 0.5-24			Insulating Gskt Set, B16.21, CL300, FF, Per Specification 81.33.08, 0.125" non compressed thickness Insulating Gskt Set, B16.21, CL300, RF, Per Specification 81.33.08, 0.125" non compressed thickness
	0.5-24			Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non compressed thickness
	0.5-24			Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , Red Rubber or EPDM , 0.125" non
	0.5-24 0.5-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL600 , FF , NM Comp. Gskt. , 0.125" non compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
	0.5-24			Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304L SS, Graphite Fill, 304 SS CR, 0.175"
	0.5-24			non compressed thickness Sp. Wound Cold B16.20 CL300 FF , 304L SS, Graphite Fill, 304 SS CR , 0.175

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

MATCH

0.5-24

0.5-2

0.5-2

2.5-24

0.5-24

2.5-24

2.5-24

2.5-24

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2.5-24

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0.5-24

2.5-24

0.5-2

0.5-2

Flanges

Gate Valves

WN Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert.
Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3
Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3

WN OriFlg0.75"SW tap , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 1 $\,$

Sp. Wound Gskt, B16.20, CL300, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175"

SW Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert.

SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304/304L Dual Cert.

WN Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert.

Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.

WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F304/304L Dual Cert.

WN Flg., B16.5, CL600, FF, A 182 Gr. F304/304L Dual Cert.

WN Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert.

SW Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert.

WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F304/304L Dual Cert.

SW Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert.

non compressed thickness

PIPE SPEC:	1DCA1	- Dat	t e: 8/4/2016 5:41:54	PM Kiewit
	0.5-2 2.5-6	-		Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8 Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8
	2.5-6	-	MATCH	Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A
	8-24 8-24	-	MATCH	351 Gr. CF8 Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351
	0.5-2	-		Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator
	2.5-6	-	MATCH	, A 351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6 8-24	-		, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8
	8-24	-	MATCH	Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF3
Check Valves				
	0.5-2 0.5-2	<u>-</u> -	•	Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr. CF8 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 351 Gr.
	2.5-24 2.5-24	- -	MATCH	CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr. CF8
	6-24	<u>-</u>		Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL300 , FFTBE , A 351 Gr. CF3
Ball Valves				
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator
	0.5-2	-		, A 351 Gr. CF3 Ball Valve , B16.10 App. Mfg. , CL300 , RF , Three Piece Fltg. Ball , Lever Operator ,
	0.75-2	-		A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Two piece Fltg. Ball, Lever
	2.5-4	-		Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Two piece Trun. Mount. Ball ,
	6-12	-		Gear Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball ,
	14-24	-		Gear Operator , A 351 Gr. CF8

Butterfly Valves



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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OF TO CHAINGE IF S	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	720
100	720
200	600
300	540
400	495
500	465
600	440
650	430
700	420
750	415
800	405
850	395
900	390
950	380
1000	355
1050	325
1100	255

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 6 E HAS BEEN SELECTED BASED ON INSPECTION ACCORDANCE WITH BASE MATERIAL SPECIFICATION. E MAY BE INCREASED DEPENDING ON LEVEL OF INSPECTION. CONSULT THE EXACT CODE LANGUAGE FOR THIS CHANGE. ANY CHANGES TO INSPECTION SHALL BE ENGINEER APPROVED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304/304L Dual Cert. , EFW (E = 0.8)
	2.5-24	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP304/304L Dual Cert., EFW (E = 0.8)
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304/304L Dual Cert. , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304/304L Dual Cert. , 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet, Manuf. Std, CL6000, SWE, A 182 Gr. F304/304L Dual Cert.
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.

PIPE SPEC:	1DCA2	Date: 8/4/2016 5:43:13		® Kiewit
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS
	2.5-6 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24	0.5-2 - 0.5-2 0.5-2 0.5-2 0.5-2	MATCH MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.
	3-24 3-24	2.5-22 2.5-22	MATCH MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
Small Bore Fittings	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 1-2	- - - - - - - - 0.5-1.5 - 0.5-1.5	MATCH MATCH	45 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. 45 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow, B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Cap, B16.11, CL3000, FTE, A 182 Gr. F304/304L Dual Cert. Cap, B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. Cap, B16.11, CL6000, FTE, A 182 Gr. F304/304L Dual Cert. Cap, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Cplg., B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. Cplg., B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Cplg., B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Equal Tee, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Reducing Insert, MSS SP-79, CL3000, PE x SWE, A 182 Gr. F304L Union, MSS SP-83, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. Union, MSS SP-83, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W Con. Swage, MSS SP-95, PBE, A 403 Gr. WP304/304L Dual Cert., SMLS Ecc. Swage, MSS SP-95, PBE, A 403 Gr. WP304/304L Dual Cert., SMLS
	1-1 1-2 1-2 2-2	- 0.5-1.5 0.5-1.5		Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1 16W Red. Tee, B16.11, CL3000, SWE, A 182 Gr. F304/304L Dual Cert. Red. Tee, B16.11, CL6000, SWE, A 182 Gr. F304/304L Dual Cert. Plug Square Head, MSS SP-114, MTE, A 182 Gr. F304L
Bolts				
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets	0.5-24 0.5-24			Insulating Gskt Set , B16.21 , CL300 , FF , Per Specification 81.33.08 , 0.125" non compressed thickness Insulating Gskt Set , B16.21 , CL300 , RF , Per Specification 81.33.08 , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non
	0.5-24 0.5-24			compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, Neoprene Rubber, 0.125" non compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL150 , FF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
	0.5-24			Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, FF, 304L SS, Graphite Fill, 304 SS CR, 0.175"
	0.5-24			non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175"
Flanges	0.5-24	Ī	T	non compressed thickness
	0.5-2 2.5-24 0.5-24 0.5-2 2.5-24 2.5-24	- - - - -	MATCH MATCH MATCH MATCH MATCH	SW Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert. Blind Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL300, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert.
		_	MATCH	WN OriFlg0.75"SW tap , B16.36 , CL300 , RF , A 182 Gr. F304/304L Dual Cert. , 1 Tap
	0.5-24	-		
	2.5-24 0.5-2	-	MATCH MATCH	WN Flg., B16.5, CL150, RF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert
Gate Valves	2.5-24	- - -	MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert. SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304/304L Dual Cert.
Gate Valves	2.5-24 0.5-2	- - - -	MATCH MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert. SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304/304L Dual Cert. Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3
Gate Valves	2.5-24 0.5-2 0.5-2 0.5-2	- - - - -	MATCH MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304/304L Dual Cert. SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304/304L Dual Cert. Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
Gate Valves	2.5-24 0.5-2 0.5-2	- - - - - - -	MATCH MATCH	SW Flg., B16.5, CL150, FF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL300, FF, A 182 Gr. F304/304L Dual Cert. Gate Valve, App. Mfg., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve, App. Mfg., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3

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	8-36	-		Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8
	8-36	-	MATCH	Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A 351 Gr. CF3
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351
	0.5-2	-		Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator
	2.5-6	-	MATCH	, A 351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	-		, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A
	8-24	-		351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bitd Bonnet , Gear Operator , A
Chask Values	8-24	-	MATCH	351 Gr. CF3
Check Valves	L			
	0.5-2 0.5-2	- -		Check Valve Pistn Lft, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, A 351 Gr. CF8 Check Valve Pistn Lft, App. Mfg., CL800, SWE, Bltd Bonnet, A 351 Gr. CF3 Check Valve Swing LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, A 351 Gr.
	2.5-24	-	MATCH	CF3 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr.
	2.5-24	-		CF8
	6-24	-		Check Valve Wafer Dual PI LP, B16.10 App. Mfg., CL300, FFTBE, A 351 Gr. CF3
Ball Valves				
	0.5-2	-	•	Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE, Three Piece Fltg. Ball, Lever Operator, A 351 Gr. CF3 Ball Valve, B16.10 App. Mfg., CL300, RF, Three Piece Fltg. Ball, Lever Operator,
	0.75-2	-		A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Two piece Fltg. Ball, Lever
	2.5-6	-		Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Two piece Trun. Mount. Ball ,
	8-12	-		Gear Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball ,
	14-24			Gear Operator, A 351 Gr. CF8
Butterfly Valves				
	-	-	-	

PIPE SPEC: 1DCB6

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 400F

RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

71 10 017 11 10 11	OI LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
-20	600
100	600
200	510
300	455
400	420

GENERAL NOTES

Date: 8/4/2016 5:44:33 PM

1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.

(16) Kiewit

- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 UNDERGROUND VALVES SHALL BE PROVIDED WITH A VALVE BOX AS A MINIMUM.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-24	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304L , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304L , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304L, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304L, 12" Long, SMLS
Large Bore Fittings				
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304L
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304L
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304L
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304L
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304L
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304L
	6-24	2.5-18	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F304L
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304L

PIPE SPEC:	1DCB6	- Date:	8/4/2016 5:44:33	PM Kiewit	
	0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2	- - - 0.5-1.5 0.5-1.5 0.5-1.5 0.5-1.5	MATCH MATCH	Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304L Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304L Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304L Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL6000 , PE x SWE , A 182 Gr. F304L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304L Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304L	
Bolts	0.5.04			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
Gaskets	0.5-24	<u> </u>	<u> </u>	Cad Plated	
Gaskets	0.5-24 0.5-24			Insulating Gskt Set, B16.21, CL300, FF, Per Specification 81.33.08, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, NM Comp. Gskt., 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, NM Comp. Gskt., 0.125" non	
	0.5-24 0.5-24			compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness	
Flanges	0.0 24			Tion compressed triotriess	
	0.5-2 2.5-24 0.5-24 0.5-2 2.5-24	- - - -	MATCH MATCH MATCH MATCH	SW Flg., B16.5, CL300, FF, A 182 Gr. F304L WN Flg., B16.5, CL300, RF, A 182 Gr. F304L Blind Flg., B16.5, CL300, RF, A 182 Gr. F304L SW Flg., B16.5, CL300, RF, A 182 Gr. F304L WN Flg., B16.5, CL300, FF, A 182 Gr. F304L	
Gate Valves	2.5-24	<u> </u>	WATCH	WN Fig. , B10.5 , CL300 , FF , A 162 GI. F304L	
Cate varves					
Globe Valves					
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F304L Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator	
	2.5-6	-	MATCH	, A 351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator	
	2.5-6 8-24	-	MATCH	, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF3	
	8-24	<u>-</u>	,	Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8	
Check Valves					
Ball Valves					

Butterfly Valves

PIPE SPEC:

1DCD1 **Date:** 8/4/2016 5:45:55 PM

DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

Per ASME B31.1 - 2014

EXAMINATION: TEMPERATURE LIMIT: -20F to 1100F **RATING CLASS:** 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESCRIPTION:

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CI IO CIIANOL II	SI LOII ILD IN NOTES
TEMP. F	PRESS. PSIG
-20	720
100	720
200	620
300	560
400	515
500	480
600	450
650	440
700	435
750	425
800	420
850	420
900	415
950	385
1000	365
1050	360
1100	305

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP316/316L Dual Cert. , SMLS
	2.5-24	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP316/316L Dual Cert., SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP316/316L Dual Cert. , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP316/316L Dual Cert. , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert.
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert.
	2.5-24	-	MATCH	45 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-24	-	MATCH	90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS



PIPE SPEC:	1DCD1	Date:	8/4/2016 5:45:55	PM Wiewit		
	2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 3-24 3-24	0.5-2 0.5-2 0.5-2 0.5-2 2.5-22 2.5-22	MATCH MATCH MATCH	Eq. Tee, B16.9, BE, A 403 Gr. WP316/316L Dual Cert. Sockolet, MSS SP-97, CL3000, SWE, A 182 Gr. F316/316L Dual Cert. Sockolet, MSS SP-97, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F316/316L Dual Cert. Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F316/316L Dual Cert. Con. Reducer, B16.9, BE, A 403 Gr. WP316/316L Dual Cert. Ecc. Reducer, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.		
Small Bore Fittings	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.		
Oman Bore Fittings	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2	- - - - - - - - - - 0.5-1.5		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL3000 , FTE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W		
	1-2 1-2 1-1 1-2 1-2 2-2	0.5-1.5 0.5-1.5 - 0.5-1.5 0.5-1.5	MATCH MATCH	Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1 16W Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Plug Square Head , MSS SP-114 , MTE , A 182 Gr. F304L		
Bolts						
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated		
Gaskets	0.0 2 1			Caa i iatou		
Flanges	0.5-24 0.5-24 0.5-24			Non Metal Flat Gskt , B16.21 , CL300 , FF , NM Comp. Gskt. , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL300 , RF , NM Comp. Gskt. , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness		
	2.5-24 2.5-24 10-24 0.5-24 0.5-2 0.5-2	- - - - -	MATCH MATCH MATCH MATCH MATCH	WN Flg., B16.5, CL300, RF, A 182 Gr. F316/316L Dual Cert. WN Flg., B16.5, CL300, FF, A 182 Gr. F316/316L Dual Cert. WN Ori Flg 0.75" Thd, B16.36, CL300, RF, A 182 Gr. F316/316L Dual Cert., 2 Taps, 180deg apart Blind Flg., B16.5, CL300, RF, A 182 Gr. F316/316L Dual Cert. SW Flg., B16.5, CL300, RF, A 182 Gr. F316/316L Dual Cert. SW Flg., B16.5, CL300, FF, A 182 Gr. F316/316L Dual Cert.		
Gate Valves						
	0.5-2 0.5-2 0.5-2 2.5-6 2.5-6 8-36	- - - -	MATCH	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3M Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF3M Gate Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8M		
	0.26		NAATOLI	Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A		
Globe Valves	8-36	<u>-</u>	MATCH	351 Gr. CF3M		
	0.5-2 0.5-2 2.5-6 2.5-6 8-24	- - - - -	MATCH	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8M Globe Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A 351 Gr. CF8M Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A		
Chook Volves	8-24	<u>-</u>	MATCH	351 Gr. CF3M		
Check Valves	0.5-2	-	l	Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr. CF8M		

® Kiewit PIPE SPEC: 1DCD1 **Date:** 8/4/2016 5:45:55 PM 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3M Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 351 Gr. 2.5-24 MATCH CF3M Check Valve Swing LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr. 2.5-24 Check Valve Wafer Dual PI LP , B16.10 App. Mfg. , CL300 , FFTBE , A 351 Gr. 6-24 CF3M **Ball Valves** Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever 0.5-2 Operator, A 351 Gr. CF3M Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator 0.5-2 , A 351 Gr. CF8M Ball Valve , B16.10 App. Mfg. , CL300 , RF , Three Piece Fltg. Ball , Lever Operator , 0.75-2 A 351 Gr. CF8M Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Two piece Fltg. Ball , Lever 2.5-6 Operator, A 351 Gr. CF8M Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Two piece Trun. Mount. Ball , 8-12 Gear Operator, A 351 Gr. CF8M Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball , <u>14</u>-24 Gear Operator , A 351 Gr. CF8M

Butterfly Valves

PIPE SPEC: 1DCD2

Date: 8/4/2016 5:47:13 PM



DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

JI TO CHANGE IF S	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	720
100	720
200	620
300	560
400	515
500	480
600	450
650	440
700	435
750	425
800	420
850	420
900	415
950	385
1000	365
1050	360
1100	305

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 7 E HAS BEEN SELECTED BASED ON INSPECTION ACCORDANCE WITH BASE MATERIAL SPECIFICATION. E MAY BE INCREASED DEPENDING ON LEVEL OF INSPECTION. CONSULT THE EXACT CODE LANGUAGE FOR THIS CHANGE. ANY CHANGES TO INSPECTION SHALL BE ENGINEER APPROVED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe, B36.19M, PE, A 312 Gr. TP316/316L Dual Cert., EFW (E = 0.8)
	2.5-48	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP316/316L Dual Cert., EFW (E = 0.8)
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP316/316L Dual Cert., 12" Long, SMLS
Large Bore Fittings				

PIPE SPEC:	1DCD2	Date:	8/4/2016 5:47:13	PM Kiewit
	1-12 2.5-24 2.5-24 2.5-24 2.5-24	0.5-2 - - - -	MATCH MATCH MATCH MATCH	45 Deg Latrolet, Manuf. Std, CL6000, SWE, A 182 Gr. F316/316L Dual Cert. 45 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert. 90 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert. 90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP316/316L Dual Cert. Cap, B16.9, BE, A 403 Gr. WP316/316L Dual Cert.
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS
Small Page Eittinge	2.5-6 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 3-24 3-24 3-24	0.5-2 - 0.5-2 0.5-2 0.5-2 2.5-22 2.5-22 2.5-22	MATCH MATCH MATCH MATCH MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP316/316L Dual Cert. , SMLS Eq. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F316/316L Dual Cert. Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F316/316L Dual Cert. Con. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Ecc. Reducer , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert. Red. Tee , B16.9 , BE , A 403 Gr. WP316/316L Dual Cert.
Small Bore Fittings	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 1-2 1-1	- - - - - - - - - - - - - - - - - - -	MATCH MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL3000 , FTE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F316/316L Dual Cert. Cap , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F316/316L Dual Cert. Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP316/316L Dual Cert. , SMLS Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1
Bolts	1-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F316/316L Dual Cert. Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
Gaskets	0.5-24			Cad Plated
Flanges	0.5-24 0.5-24 0.5-24 0.5-24 0.5-24 0.5-24 0.5-24			Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.125" non compressed thickness Insulating Gskt Set, B16.21, CL150, RF, Per Specification 81.33.08, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, NM Comp. Gskt., 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, RF, NM Comp. Gskt., 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, FF, NM Comp. Gskt., 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL300, RF, NM Comp. Gskt., 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL150, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304L SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness
	0.5-2 0.5-2 2.5-24 0.5-24 2.5-24 10-24 0.5-2 0.5-2 2.5-24	- - - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert. SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL150 , RF , A 182 Gr. F316/316L Dual Cert. Blind Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL150 , FF , A 182 Gr. F316/316L Dual Cert. WN Ori Flg 0.75" Thd , B16.36 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. , 2 Taps , 180deg apart SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert. SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F316/316L Dual Cert. WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F316/316L Dual Cert.
Gate Valves	2.5-24 0.5-2 0.5-2 0.5-2 2.5-6	- - - -	MATCH	WN Flg., B16.5, CL300, FF, A 182 Gr. F316/316L Dual Cert. Gate Valve, App. Mfg., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M Gate Valve, App. Mfg., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3M Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8M Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8M

 Kiewit PIPE SPEC: 1DCD2 **Date:** 8/4/2016 5:47:13 PM Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, 2.5-6 MATCH A 351 Gr. CF3M Gate Valve LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, Gear Operator, A 8-24 351 Gr. CF8M Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A 8-24 MATCH 351 Gr. CF3M Globe Valves Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, 0.5-2 A 351 Gr. CF3M Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 0.5-2 Gr. CF3M Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator 2.5-6 **MATCH** , A 351 Gr. CF3M Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8M 2.5-6 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Gear Operator , A 8-24 351 Gr. CF8M Globe Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Gear Operator, A 8-24 MATCH 351 Gr. CF3M **Check Valves** Check Valve Pistn Lft , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , A 351 Gr. 0.5-2 CF8M Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3M 0.5-2 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 351 Gr. **MATCH** 2.5-24 CF3M Check Valve Swing LP, B16.10 App. Mfg., CL300, RF, Bltd Bonnet, A 351 Gr. 2.5-24 CF8M Check Valve Wafer Dual PI LP, B16.10 App. Mfg., CL300, FFTBE, A 351 Gr. 6-24 **Ball Valves** Ball Valve LP FB, App. Mfg., CL600, SWE x FTE, Three Piece Fltg. Ball, Lever 0.5-2 Operator, A 351 Gr. CF3M Ball Valve LP FB, App. Mfg., CL600, SWE, Three Piece Fltg. Ball, Lever Operator , A 351 Gr. CF8M 0.5-2 Ball Valve , B16.10 App. Mfg. , CL300 , RF , Three Piece Fltg. Ball , Lever Operator , 0.75-2 A 351 Gr. CF8M Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Two piece Fltg. Ball , Lever 2.5-6 Operator, A 351 Gr. CF8M Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Two piece Trun. Mount. Ball, 8-12 Gear Operator, A 351 Gr. CF8M

14-24

Butterfly Valves

Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball ,

Gear Operator , A 351 Gr. CF8M

PIPE SPEC: 1EAA1

DESCRIPTION: GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	1480
100	1480
200	1360
300	1310
400	1265
500	1205
600	1135
650	1100
700	1060
750	1015
800	825

GENERAL NOTES

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- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	28-28	-	0.725" min	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. B, 12" Long, SMLS
	0.75-2	-	Calc	Nipple, B36.10M, BE x PE, A 106 Gr. B, 6" Long, SMLS
	0.75-2	-	Calc	Nipple, B36.10M, BE x PE, A 106 Gr. B, 3" Long, SMLS
	1.5-2	-	S-XXS	Nipple, B36.10M, BE x PE, A 106 Gr. B, 6" Long, SMLS
Large Bore Fittings				
	0.5-24	0.25-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.5-2		45 Deg Latrolet, MSS SP-97, CL6000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	1-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-28	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-28	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-28	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105



PIPE SPEC:	1EAA1	- Date:	: 8/4/2016 5:48:38 P	M Kiewit		
	3-3	1.5-2	S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS		
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB		
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB		
	6-48	2.5-24	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS		
	6-24	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A105 , SMLS		
	28-28	18-26	0.725" min X MATCH			
	28-28 28-28	22-22	0.725" min X S-60	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS Eq. Tee, B16.9, BE, A 234 Gr. WPB, SMLS		
	28-28	- 22-24	0.725" min X MATCH	·		
	28-28	2.5-20	0.725" min X MATCH			
Small Bore Fittings	0.5.2			45 Dog Elbour D46 44 Cl 2000 SWE A405		
	0.5-2 0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105 45 Deg. Elbow , B16.11 , CL6000 , SWE , A105		
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A105		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A105		
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105		
	0.5-2 0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105 Cap , B16.11 , CL6000 , FTE , A105		
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105		
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A105		
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105		
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105		
	0.5-2	-		Cplg. , B16.11 , CL9000 , SWE , A105		
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105		
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL9000 , SWE , A105		
	0.5-2	- -		Flatolet , MSS SP-97 , CL3000 , SWE , A105		
	0.5-2	-		Flatolet , MSS SP-97 , CL6000 , SWE , A105		
				Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-		
	0.5-0.5	-		1-8W		
	0.5-0.5	-		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P		
	0.5-2 0.5-2	0.25-1.5		Reducing Insert, MSS SP-79, CL3000, PE x SWE, A105 Union, MSS SP-83, CL3000, SWE, A105		
	0.5-2 0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105		
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB		
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB		
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , TBE , A 234 Gr. WPB		
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB		
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PE/TE , A 234 Gr. WPB		
	0.75-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, TBE, A 234 Gr. WPB		
	0.75-0.75	_		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W		
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A105		
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105		
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105		
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A105		
	1-1	-		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W		
Bolts						
Gaskets	0.5-48	Ι		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H		
Guoricio				Insulating Gskt Set, B16.21, CL600, FF, Per Specification 81.33.08, 0.125" non		
	0.5-48			compressed thickness		
	O F 40			Insulating Gskt Set, B16.21, CL600, RF, Per Specification 81.33.08, 0.125" non		
	0.5-48			compressed thickness Non Metal Flat Gskt, B16.21, CL600, FF, NM Comp. Gskt., 0.125" non		
	0.5-48			compressed thickness		
				Non Metal Flat Gskt , B16.21 , CL600 , RF , NM Comp. Gskt. , 0.175" non		
	0.5-48			compressed thickness		
				Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 0.175" non		
Flanges	0.5-48	Ι		compressed thickness		
i. iai.igoo	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL600 , FF , A105		
	4-16	-	MATCH	WN Ori Flg 0.75" Thd , B16.36 , CL600 , RF , A105 , 2 Taps , 180deg apart		
	26-48	-	MATCH	WN Flg., B16.47 Sr. B, CL600, RF, A105/A105N		
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL600 , FF , A105		
	0.5-2 2.5-24	-	MATCH	SW Flg. , B16.5 , CL600 , RF , A105		
	2.5-24 2.5-24	-	MATCH MATCH	WN Flg. , B16.5 , CL600 , RF , A105 WN Flg. , B16.5 , CL600 , FF , A105		
	2.5-24 26-48	- -	IVIATOR	WN Fig. , B16.5 , CL600 , FF , A105 Blind Flg. , B16.47 Sr. B , CL600 , RF , A105/A105N		
	0.75-24	-		Blind Flg. , B16.5 , CL600 , RF , A105/A105N		
Γ	1-8	-	MATCH	WN Ori Flg 0.5" Thd , B16.36 , CL600 , RF , A105 , 2 Taps , 180deg apart		
Gate Valves				Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A		
	0.5-2	-		Gate valve , App. Mrg. , CL800 , SWE X FTE , Bitd Bonnet , Handwheel Operator , A		
	0.0 2			Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105		
	0.5-2	-				
	0.5.0			Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator ,		
	0.5-2	-		A 105		

® Kiewit PIPE SPEC: 1EAA1 **Date:** 8/4/2016 5:48:38 PM Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, 2.5-6 A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Gear Operator, A 2.5-36 **MATCH** 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator , 2.5-6 **MATCH** A 216 Gr. WCB Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 8-48 216 Gr. WCB Globe Valves Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, 0.5-2 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105 0.5-2 Angle Globe Valve, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel 0.75-2 Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator 2.5-6 , A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Gear Operator, A 2.5-12 **MATCH** 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator 2.5-6 **MATCH** , A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 216 Gr. WCB 8-48 **Check Valves** Check Valve Swing LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 105 0.5-2 0.5-2 Check Valve Swing, App. Mfg., CL600, SWE, Bltd Bonnet, A 105 Check Valve Swing LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , A 216 Gr. **MATCH** 2.5-24 Check Valve Swing LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, A 216 Gr. 2.5-24 **Ball Valves** Ball Valve LP FB, App. Mfg., CL600, SWE x FTE, Three Piece Fltg. Ball, Lever 0.5-2 Operator, A 105 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 105 0.5-2 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Two or Three Piece Metal Seated , 0.5-2 Gear Operator, A 105 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Two or Three Piece Metal Seated , 0.5-2 Gear Operator, A 105 Ball Valve, B16.10 App. Mfg., CL600, RF, Three Piece Fltg. Ball, Lever Operator, 0.75-2 Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball , 2.5-4 Lever Operator , A 216 Gr. WCB Ball Valve LP FB, B16.10 App. Mfg., CL600, RF, Three piece Trun. Mount. Ball, 6-12 Gear Operator, A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball ,

Gear Operator , A 216 Gr. WCB

14-24

Butterfly Valves

PIPE SPEC: 1EAA6

DESCRIPTION: GENERAL UG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 400F

TEMPERATURE LIMIT: -20F to 400F RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

, , , o o, ,, ,, , o = 1, o,	2011 122 111110120
TEMP. F	PRESS. PSIG
-20	1480
100	1480
200	1360
300	1310
400	1265

GENERAL NOTES

Date: 8/4/2016 5:50:09 PM

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 UNDERGROUND VALVES SHALL BE PROVIDED WITH A VALVE BOX AS A MINIMUM.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
Large Bore Fittings				
	0.5-24	0.25-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	0.5-24	0.25-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.75-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105
	0.75-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Cap , B16.11 , CL6000 , SWE , A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.75-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.75-2	-		Union , MSS SP-83 , CL6000 , SWE , A105
	1-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105



PIPE SPEC: 1EAA6

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	1-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
Bolts				
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				
	0.5-24 0.5-24 0.5-24			Non Metal Flat Gskt , B16.21 , CL600 , FF , NM Comp. Gskt. , 0.175" non compressed thickness Non Metal Flat Gskt , B16.21 , CL600 , RF , NM Comp. Gskt. , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL600 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness
Flanges	1			
r anges	0.5-24 2.5-24 0.5-2 0.5-2 2.5-24	- - - -	MATCH MATCH MATCH MATCH	Blind Flg. , B16.5 , CL600 , RF , A105 WN Flg. , B16.5 , CL600 , RF , A105 SW Flg. , B16.5 , CL600 , RF , A105 SW Flg. , B16.5 , CL600 , FF , A105 WN Flg. , B16.5 , CL600 , FF , A105
Gate Valves				, , , , , , , , , , , , , , , , , , ,
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator
	2.5-6 2.5-6	-	MATCH	, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A
	8-24	-		216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bitd Bonnet, Gear Operator, A
	8-24	-	MATCH	216 Gr. WCB
Check Valves				
Ball Valves				
Butterfly Valves			I	

PIPE SPEC: 1EAC1

DESCRIPTION: GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE II	SELCII ILD IN NOTES
TEMP. F	PRESS. PSIG
-20	1480
100	1480
200	1360
300	1310
400	1265
500	1205
600	1135
650	1100
700	1060
750	1015
800	825

GENERAL NOTES

Date: 8/4/2016 5:51:32 PM

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. C , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. C , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. C , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. C , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL6000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPC
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPC
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A105
	3-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPC , SMLS
	3-48	2.5-42	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPC, SMLS
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	6-48	2.5-18	MATCH	Weldolet, MSS SP-97, BE, A105, SMLS
Small Bore Fittings				



PIPE SPEC:	1EAC1	Date	: 8/4/2016 5:51:32	PM Wiewit	
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2	- - - - - - - - - - - - - - - - - - -	MATCH MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A105 45 Deg. Elbow , B16.11 , CL6000 , SWE , A105 45 Deg. Elbow , B16.11 , CL9000 , SWE , A105 90 Deg. Elbow , B16.11 , CL3000 , SWE , A105 90 Deg. Elbow , B16.11 , CL6000 , SWE , A105 90 Deg. Elbow , B16.11 , CL6000 , SWE , A105 90 Deg. Elbow , B16.11 , CL9000 , SWE , A105 Cplg. , B16.11 , CL3000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Cplg. , B16.11 , CL9000 , SWE , A105 Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL9000 , SWE , A105 Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL9000 , SWE , A105 Cap , B16.11 , CL3000 , FTE , A105 Cap , B16.11 , CL3000 , SWE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11	
Bolts	0.75-1 0.75-2 0.75-2 0.75-2 0.75-2	0.5-0.5 - 0.5-1.5 0.5-1.5 0.5-1.5		Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A105 Red. Tee , B16.11 , CL3000 , SWE , A105 Red. Tee , B16.11 , CL6000 , SWE , A105 Red. Tee , B16.11 , CL9000 , SWE , A105 Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W	
DOILS	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H	
Gaskets	0.5-48 0.5-48 0.5-48			Insulating Gskt Set, B16.21, CL600, FF, Per Specification 81.33.08, 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL600, FF, NM Comp. Gskt., 0.175" non compressed thickness Non Metal Flat Gskt, B16.21, CL600, RF, NM Comp. Gskt., 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 0.175" non	
Flanges	0.5-48	<u> </u>	T	compressed thickness	
Flanges	0.5-2 2.5-24 30-48 30-48 0.5-2 30-48 0.5-24 2.5-24	- - - - - - -	MATCH MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL600 , RF , A105 WN Flg. , B16.5 , CL600 , RF , A105 WN Flg. , B16.47 Sr. A , CL600 , RF , A105/A105N WN Flg. , B16.47 Sr. A , CL600 , FF , A105 SW Flg. , B16.5 , CL600 , FF , A105 Blind Flg. , B16.47 Sr. A , CL600 , RF , A105/A105N Blind Flg. , B16.5 , CL600 , RF , A105 WN Flg. , B16.5 , CL600 , FF , A105	
Gate Valves				Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A	
	0.5-2 0.5-2 0.5-2 2.5-6 2.5-6 8-48	- - - -	MATCH	Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A 216 Gr. WCB	
	0.40		NAATOU	Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A	
Globe Valves	8-48	<u> </u>	MATCH	216 Gr. WCB	
	0.5-2 0.5-2 2.5-6 2.5-6 8-10	- - - -	MATCH	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Gear Operator, A	
	8-10	-	MATCH	216 Gr. WCB	
Check Valves	0.5-2	-		Check Valve Pistn Lft , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 105	

®Kiewit PIPE SPEC: 1EAC1 **Date:** 8/4/2016 5:51:32 PM 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 105 Check Valve Swing LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, A 216 Gr. 2.5-24 MATCH **WCB** Check Valve Swing LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 216 Gr. 2.5-24 WCB **Ball Valves** Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever 0.5-2 Operator, A 105 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator 0.5-2 Ball Valve , B16.10 App. Mfg. , CL600 , RF , Three Piece Fltg. Ball , Lever Operator , 0.75-2 Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball , 2.5-4 Lever Operator , A 216 Gr. WCB Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball , 6-12 Gear Operator , A 216 Gr. WCB **Butterfly Valves**

PIPE SPEC: 1EBA1

DESCRIPTION: GENERAL SERVICE MATERIAL: 1.25Cr-0.5Mo

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

IECT TO CHANGE IF	SPECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	1500
100	1500
200	1500
300	1445
400	1385
500	1330
600	1210
650	1175
700	1135
750	1065
800	1015
850	975
900	900
950	640
1000	430
1050	290
1100	190

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P11 , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P11 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P11, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 335 Gr. P11, 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 12" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F11 Cl. 2
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F11 Cl. 2
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	3-48	-	MATCH	Cap , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	3-48	2.5-42	MATCH	Con. Reducer , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	3-48	2.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS

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	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
Small Boro Eittings	6-48	2.5-42	MATCH T	Weldolet , MSS SP-97 , BE , A 182 Gr. F11 Cl. 2
Small Bore Fittings	0.5-2	_		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	-		Cplg., B16.11, CL9000, SWE, A 182 Gr. F11 Cl. 2
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2 Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	- 0.5-1.5		Red. Tee, B16.11, CL3000, SWE, A 182 Gr. F11 Cl. 2
	0.5-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	0.5-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	0.75-2	0.5-1.5	MATCH	Con. Swage, MSS SP-95, PBE, A234 Grade WP11 Cl. 1, SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A234 Grade WP11 Cl. 1 , SMLS Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Hex Head, B16.11, MTE, A105 Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-
Bolts	1-1	-		16W
Gaskets	0.5-48	<u> </u>	1	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
Cashels	L			Sp. Wound Gskt , B16.20 , CL600 , FF , 304 SS, Graphite Fill, CS CR, 304 SS IR ,
	0.5-48			0.175" Thick , 0.175" non compressed thickness
	0.5-48			Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness
	0.5-48			Sp. Wound Gskt, B16.20, CL900, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness
Flanges				
	2.5-24	-	MATCH	WN Flg., B16.5, CL900, RF, A 182 Gr. F11 Cl. 2
	30-48	-		Blind Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F11 Cl. 2
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 Cl. 2
	30-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F11
	0.5-2 0.5-2	-	MATCH MATCH	SW Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 Cl. 2
	0.5-24	<u>-</u>	MATCH	SW Flg. , B16.5 , CL900 , RF , A 182 Gr. F11 Cl. 2 WN Flg. , B16.5 , CL600 , FF , A 182 Gr. F11 Cl. 2
	30-48	-	MATCH	WN Fig. , B16.5 , CL600 , FF , A 162 G1. F11 Cl. 2 WN Fig. , B16.47 Sr. A , CL900 , RF , A 182 Gr. F11
	0.5-24	-	W/ CI OII	Blind Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 Cl. 2
Gate Valves	0.0 2 1			Billia Fig. , B16.8 , G2666 , RC , 7C 102 G1. F FF 61. 2
	•		•	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F11 Cl. 2
				Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182
	0.5-2	-		Gr. F11 Cl. 2
				Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator,
	0.5-2	-		A 182 Gr. F11 Cl. 2
	2.5-6	_		Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 217 Gr. WC6
	2.0-0	-		Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator ,
	2.5-6	-	MATCH	A 217 Gr. WC6 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A
	8-36	-		217 Gr. WC6
	8-36	<u>-</u>	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 217 Gr. WC6
Globe Valves				Clobe Value Mart Otal OLOGO CIME ETE DIVID A LI LI LI LI
	0.5-2	-		Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F11 Cl. 2
				Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182
	0.5-2	-		Gr. F11 Cl. 2
				Globe Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator
	2.5-6	-	MATCH	, A 217 Gr. WC6 Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator
	2.5-6	-		, A 217 Gr. WC6
	8-24	-		Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A 217 Gr. WC6
			8.4A.T.O.L.	Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Gear Operator, A
Check Valves	8-24	-	MATCH	217 Gr. WC6
CHOOK TUITES	ļ	1	ļ	L L L L L L L L L L L L L L L L L L L
	0.5-2	-		F11 Cl. 2
	0.5-2	_		Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 182 Gr. F11 Cl. 2
	0.5-2	-		Check valve Figurett, App. Ivily., CLOUD, SVVE, DILU DUTILIEL, A 182 Gf. FTT Cl. 2

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	2.5-24	-	MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , A 217 Gr. WC6
	2.5-24	-		Check Valve Swing LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 217 Gr. WC6
Ball Valves				
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE, Two or Three Piece Metal Seated, Gear Operator, A 182 Gr. F11 Cl. 2 Ball Valve LP FB, App. Mfg., CL600, SWE, Two or Three Piece Metal Seated
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE, Two or Three Piece Metal Seated, Lever Operator, A 182 Gr. F11 Cl. 2 Ball Valve LP FB, App. Mfg., CL600, BE, Two or Three Piece Metal Seated, Gear
	2.5-6	-	MATCH	Operator , A 217 Gr. WC6
	2.5-6	-	MATCH	Ball Valve LP FB, App. Mfg., CL600, BE, Two or Three Piece Metal Seated, Lever Operator, A 217 Gr. WC6
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL600 , RF , Two or Three Piece Metal Seated , Gear Operator , A 217 Gr. WC6
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL600 , RF , Two or Three Piece Metal Seated , Lever Operator , A 217 Gr. WC6
Butterfly Valves				
	3-6	-		Butterfly Valve Lug Type , Bray , CL600 , Lugged FF w/ Integral Gaskets , Lever Operator , A 217 Gr. WC6 , Metal Seat
	3-6	-		Butterfly Valve Lug Type , Bray , CL600 , FF w/Integral Gaskets , Lever Operator , A 217 Gr. WC6 , Metal Seat
	8-24	-		Butterfly Valve, Bray, CL600, FF w/Integral Gaskets, Gear Operator, A 217 Gr. WC6, Metal Seat
	8-24	-		Butterfly Valve , Bray , CL600 , Lugged FF w/ Integral Gaskets , Gear Operator , A 217 Gr. WC6 , Metal Seat

PIPE SPEC: 1EBB1

DESCRIPTION: GENERAL SERVICE MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE IF SPI	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	1500
100	1500
200	1500
300	1455
400	1410
500	1330
600	1210
650	1175
700	1135
750	1065
800	1015
850	975
900	900
950	755
1000	535
1050	350
1100	220

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.2.1
- 5 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.
- 6 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P22 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 335 Gr. P22, 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P22 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 335 Gr. P22, 3" Long, SMLS
	0.75-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 3" Long, SMLS
	0.75-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Bonney Forge , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	1-12	0.5-2		45 Deg Latrolet, Bonney Forge, CL6000, SWE, A 182 Gr. F22 Cl. 1
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	1-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	1-42	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS

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	2.5-48 2.5-28 2.5-28 2.5-24 2.5-24 3-3 6-48 6-24	1-42 0.5-2 0.5-2 0.5-2 0.5-2 1.5-2 2.5-24 3-3	MATCH S-XXS MATCH MATCH X S-XXS	Red. Tee, B16.9, BE, A 234 Gr. WP22 Cl. 1, SMLS Sockolet, MSS SP-97, CL3000, SWE, A 182 Gr. F22 Cl. 1 Sockolet, MSS SP-97, CL6000, SWE, A 182 Gr. F22 Cl. 1 Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F22 Cl. 1 Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F22 Cl. 1 Con. Reducer, B16.9, BE, A 234 Gr. WP22 Cl. 1, SMLS Weldolet, MSS SP-97, BE, A 182 Gr. F22 Cl. 1 Weldolet, MSS SP-97, BE, A 182 Gr. F22 Cl. 1	
Small Bore Fittings	0.5-2 0.75-2		MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 45 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , FTE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Flatolet , MSS SP-97 , CL5000 , SWE , A 182 Gr. F22 Flatolet , MSS SP-97 , CL5000 , SWE , A 182 Gr. F22 Flatolet , MSS SP-97 , CL5000 , SWE , A 182 Gr. F22 Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P Con. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Square Head , B16.11 , MTE , A 105 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F22 Cl. 1	
Bolts	1-1	-		16W	
Gaskets	0.5-48	T	1	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3	
Guoricio	0.5-48 0.5-48 0.5-48			Sp. Wound Gskt, B16.20, CL600, FF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL900, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness	
Flanges	26-48 26-48 0.5-2 0.5-24 2.5-24 0.5-24 26-48 2.5-24 0.5-2	- - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	Blind Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.47 Sr. A , CL900 , RF , A 182 Gr. F11 SW Flg. , B16.5 , CL600 , RF , A 182 Gr. F22 Cl. 3 Blind Flg. , B16.5 , CL600 , RF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL600 , FF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL600 , FF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F11 WN Flg. , B16.5 , CL900 , RF , A 182 Gr. F22 Cl. 3	
Gate Valves	0.5-2	<u>-</u>	MATCH	SW Flg. , B16.5 , CL900 , RF , A 182 Gr. F22 Cl. 3	
	0.5-2 0.5-2 0.5-2 2.5-6 2.5-6 8-36	- - - -	МАТСН	Gate Valve, App. Mfg., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Gate Valve, App. Mfg., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 217 Gr. WC9 Gate Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator, A 217 Gr. WC9 Gate Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 217 Gr. WC9	
	8-36	-	MATCH	Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 217 Gr. WC9	
Globe Valves				Globe Valve , Manf. Std. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator ,	
	0.5-2 0.5-2	-		A 182 Gr. F22 Cl. 3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator	

(®) Kiewit **PIPE SPEC: 1EBB1 Date:** 8/4/2016 5:54:29 PM Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator 2.5-6 , A 217 Gr. WC9 Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 8-24 217 Gr. WC9 Globe Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 8-24 MATCH 217 Gr. WC9 **Check Valves** Check Valve Pistn Lft , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 182 Gr. F22 0.5-2 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 182 Gr. F22 Cl. 3 Check Valve Swing LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , A 217 Gr. 2.5-24 MATCH Check Valve Swing LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, A 217 Gr. 2.5-24 Check Valve Swing LP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , A 2.5-24 MATCH 217 Gr. WC9 **Ball Valves** Ball Valve LP FB , App. Mfg. , CL600 , SWE , Two or Three Piece Metal Seated , 0.5-2 Gear Operator , A 182 Gr. F22 Cl. 3 Ball Valve LP FB , App. Mfg. , CL600 , BE , Two or Three Piece Metal Seated , Gear 2.5-6 **MATCH** Operator, A 217 Gr. WC9 Ball Valve LP FB , App. Mfg. , CL600 , BE , Two or Three Piece Metal Seated , 2.5-6 MATCH Lever Operator, A 217 Gr. WC9 Ball Valve LP FB , App. Mfg. , CL600 , RF , Two or Three Piece Metal Seated , Gear 2.5-6 Operator, A 217 Gr. WC9 Ball Valve LP FB, App. Mfg., CL600, RF, Two or Three Piece Metal Seated, 2.5-6 Lever Operator, A 217 Gr. WC9 **Butterfly Valves** Butterfly Valve Lug Type, Bray, CL600, FF w/Integral Gaskets, Lever Operator, A 3-6 217 Gr. WC9, Metal Seat Butterfly Valve Lug Type , Bray , CL600 , FF w/Integral Gaskets , Lever Operator , A 3-6 217 Gr. WC9, Metal Seat Butterfly Valve, Bray, CL600, FF w/Integral Gaskets, Gear Operator, A 217 Gr. 8-24 WC9, Metal Seat Butterfly Valve, Bray, CL600, Lugged FF w/ Integral Gaskets, Gear Operator, A

217 Gr. WC9 , Metal Seat

8-24

PIPE SPEC: 1EBD1

DESCRIPTION: HOT REHEAT STEAM MATERIAL: 9Cr-1Mo-V

EXAMINATION: Per ASME B31.1 - 2014 TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE IF	SPECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	1500
100	1500
200	1500
300	1455
400	1410
500	1330
600	1210
650	1175
700	1135
750	1065
800	1015
850	975
900	900
950	775
1000	725
1050	720
1100	605

GENERAL NOTES

Date: 8/4/2016 5:55:56 PM

- 1 SPECIAL WALL PIPE SHALL CONFORM TO ASTM A530.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.

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- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.2.1
- 7 TRANSITIONS FROM P91 LARGE BORE PIPE TO P22 ARE SHOWN ON MECHANICAL DETAILS AND THE ISOMETRIC. THE CONTRACTOR/MANUFACTURER SHALL FOLLOW THOSE DESIGN DOCUMENTS.
- 8 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.
- 9 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE **MANUFACTURER**

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P91 , SMLS
	2.5-28	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P91 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P91, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P91, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P91, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P91, 3" Long, SMLS
	0.75-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 3" Long, SMLS
	0.75-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 6" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P91 , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91
	2 5-28	-	MATCH	45 Deg LR Flbow B16.9 BE A 234 Gr WP91 SMLS

PIPE SPEC:	1EBD1	Date:	8/4/2016 5:55:56 P	M Kiewit	
	2.5-28	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	2.5-28	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	2.5-28	1-26	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP91 , SMLS	
	2.5-28	1-26	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WP91, SMLS	
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP91 , SMLS	
	2.5-28	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	2.5-28	1-26	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	2.5-28 2.5-28	0.5-2 0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91 Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91	
	2.5-28	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F91	
	3-3	1.5-2	S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	6-28	1-20	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F91	
	6-28	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A 182 Gr. F91	
Small Bore Fittings	0.5-2			45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F91 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105	
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2 0.5-2	- -		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F91 Plug Hex Head , B16.11 , MTE , A 182 Gr. F91	
	0.75-2	- 0.5-1.5	MATCH	Con. Swage, MSS SP-95, PBE, A 234 Gr. WP91, SMLS	
	0.75-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A 234 Gr. WP91, SMLS	
	0.75-2	0.5-1.5	1017 (1 01 1	Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F91	
Bolts	0.5-28			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3	
Gaskets					
	0.5.00			Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,	
	0.5-28			0.175" Thick, 0.175" non compressed thickness	
	0.5-28			Sp. Wound Gskt, B16.20, CL900, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness	
Flanges	0.0 20				
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL600 , FF , A 182 Gr. F91	
	26-28	-		Blind Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F91	
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F91	
	0.5-24	-	MATOLI	Blind Flg. , B16.5 , CL600 , RF , A 182 Gr. F91	
	0.5-24	-	MATCH	WN Flg. , B16.5 , CL900 , RF , A 182 Gr. F91	
	26-28 26-28	- -	MATCH MATCH	WN Flg. , B16.47 Sr. A , CL600 , RF , A 182 Gr. F91 WN Flg. , B16.47 Sr. A , CL900 , RF , A 182 Gr. F91	
Gate Valves					
	0.5.0			Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A	
	0.5-2	-		182 Gr. F91	
	0.5-2	-		Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182 Gr. F91	
				Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator ,	
	0.5-2	-		A 182 Gr. F91	
	2.5-6	_		Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator ,	
	۵-د.∠	-		A 217-C12A Gate Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator,	
	2.5-6	-	MATCH	A 217-C12A	
	5 €			Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A	
	8-30	-		217-C12A	
	8-28		MATCH	Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 217-C12A	
Globe Valves	0-20	<u> </u>	WATCH	Z17-G1ZA	
	!		•	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator,	
	0.5-2	-		A 182 Gr. F91	
				Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182	
		-		Gr. F91 Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator	
	0.5-2			- Sman, veny, it is to to door wild in the Difficultier dallowneer Coefaior	
	0.5-2 2.5-6	-	MATCH	, A 217-C12A	
	2.5-6	-	MATCH	, A 217-C12A Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator	
		- -	MATCH	, A 217-C12A Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 217-C12A	
	2.5-6	- -	MATCH	, A 217-C12A Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator	
	2.5-6 2.5-6 8-12	- - -		, A 217-C12A Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator, A 217-C12A Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 217-C12A Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Gear Operator, A	
Check Valves	2.5-6 2.5-6	- - -	MATCH MATCH	, A 217-C12A Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 217-C12A Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A 217-C12A	

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	0.5-2	-		Check Valve Swing, App. Mfg., CL600, SWE, Bltd Bonnet, A 182 Gr. F91 Check Valve Swing LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, A 182 Gr.
	0.5-2	-		F91
	2.5-24	-		Check Valve Swing LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 217-C12A
	2.5-24	<u>-</u>	MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , A 217-C12A
Ball Valves				
	0.5-2	-		Ball Valve LP FB, App. Mfg., CL600, SWE, Two or Three Piece Metal Seated, Lever Operator, A 182 Gr. F91
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Two or Three Piece Metal Seated , Gear Operator , A 182 Gr. F91
	2.5-6	-	MATCH	Ball Valve LP FB , App. Mfg. , CL600 , BE , Two or Three Piece Metal Seated , Gear Operator , A 217-C12A
	2.5-6	-	MATCH	Ball Valve LP FB , App. Mfg. , CL600 , BE , Two or Three Piece Metal Seated , Lever Operator , A 217-C12A
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL600 , RF , Two or Three Piece Metal Seated , Gear Operator , A 217-C12A
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL600 , RF , Two or Three Piece Metal Seated , Lever Operator , A 217-C12A
Butterfly Valves				
	3-6	-		Butterfly Valve Lug Type, Bray, CL600, FFTBE, Lever Operator, A 217-C12A, Metal Seat Butterfly Valve, Bray, CL600, FFTBE, Gear Operator, A 217-C12A, Metal Seat
	8-28	-		butterny valve, bray, OLOOO, FFTBE, Gear Operator, A 217-C12A, Metal Seat



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DESCRIPTION: DEMINERALIZED WATER, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CI TO CHANGE IF S	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	1440
100	1440
200	1200
300	1075
400	995
500	930
600	885
650	865
700	845
750	825
800	810
850	790
900	780
950	765
1000	710
1050	650
1100	515

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	2.5-24	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP304/304L Dual Cert., SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
				Nipple, B36.19M, BE x PE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	1.5-2	-	S-XXS	
Large Bore Fittings				
-	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304L
	1-12	0.5-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	-	MATCH	90 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.

PIPE SPEC:	1ECA1	Date:	: 8/4/2016 5:57:31 F	M Kiewit
	2.5-24 2.5-24 2.5-24	- - 2-22	MATCH MATCH MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-6 2.5-24	0.5-2 2-22	MATCH MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-6 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 3-3 6-24 6-24	0.5-2 - 2-22 0.5-2 0.5-2 0.5-2 1.5-2 2.5-18 3-3	MATCH MATCH MATCH S-XXS MATCH MATCH X S-XXS	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SMLS Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Red. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert. Weldolet , MSS SP-97 , BE , A 182 Gr. F304/304L Dual Cert. Weldolet , MSS SP-97 , BE , A 182 Gr. F304/304L Dual Cert.
Small Bore Fittings	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 1-1	- - - - - - - - - 0.5-1.5 0.5-1.5	MATCH MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. 45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert. Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304/304L Dual Cert. , SMLS Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A 182 Gr. F304/304L Dual Cert. Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert. Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304/304L Dual Cert.
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets	0.5-24 0.5-24 0.5-24			Non Metal Flat Gskt , B16.21 , CL600 , FF , NM Comp. Gskt. , 0.125" non compressed thickness Non Metal Flat Gskt , B16.21 , CL600 , RF , NM Comp. Gskt. , 0.125" non compressed thickness Sp. Wound Gskt , B16.20 , CL600 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
Flanges	2.5-24 0.5-2 2.5-24 0.5-2 0.5-24	- - - -	MATCH MATCH MATCH MATCH	WN Flg., B16.5, CL600, RF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL600, FF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL600, FF, A 182 Gr. F304/304L Dual Cert. SW Flg., B16.5, CL600, RF, A 182 Gr. F304/304L Dual Cert. Blind Flg., B16.5, CL600, RF, A 182 Gr. F304/304L Dual Cert.
Gate Valves	0.5-2 0.5-2 0.5-2 2.5-6 2.5-6 8-36 8-36	- - - - -	MATCH MATCH	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3 Gate Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF8 Gate Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 351 Gr. CF8
Globe Valves	0.5-2 0.5-2 2.5-6	- - -	МАТСН	Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3

M Kiewit 1ECA1 **PIPE SPEC: Date:** 8/4/2016 5:57:31 PM Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator 2.5-6 , A 351 Gr. CF8 Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Gear Operator, A 8-36 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A 8-36 MATCH 351 Gr. CF3 **Check Valves** Check Valve Pistn Lft , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 351 Gr. CF8 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 351 Gr. CF3 0.5-2 Check Valve Swing LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , A 351 Gr. 2.5-24 MATCH Check Valve Swing LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , A 351 Gr. 2.5-24 **Ball Valves** Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever 0.5-2 Operator, A 351 Gr. CF3 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3 0.5-2 Ball Valve , B16.10 App. Mfg. , CL600 , RF , Three Piece Fltg. Ball , Lever Operator , 0.75-2 A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball , 2.5-4 Lever Operator, A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL600 , RF , Three piece Trun. Mount. Ball , 6-12 Gear Operator , A 351 Gr. CF8

Butterfly Valves

PIPE SPEC: 1ECB6

GENERAL UG SERVICE

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 400F

TEMPERATURE LIMIT: -20F to 400F RATING CLASS: 600, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESCRIPTION:

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

01 10 017 110 11	OI LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
-20	1440
100	1440
200	1240
300	1120
400	1025

GENERAL NOTES

Date: 8/4/2016 5:58:56 PM

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	2.5-24	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304L , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PBE , A 312 Gr. TP304L , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304L , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304L , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PE/TE , A 312 Gr. TP304L , 12" Long, SMLS
Large Bore Fittings				
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL3000 , SWE , A 182 Gr. F304L
	1-12	0.75-2		45 Deg Latrolet , Manuf. Std , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304L
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304L , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304L , SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304L
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F304L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304L
	2.5-24	0.75-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304L
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304L
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304L
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304L
	6-24	2.5-18	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F304L
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304L
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304L



PIPE SPEC:	1ECB6	– Date:	8/4/2016 5:58:56	PM Wiewit
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2	- - - 0.5-1.5 0.5-1.5 0.5-1.5 0.5-1.5 - -	MATCH MATCH	Cap , B16.11 , CL6000 , SWE , A 182 Gr. F304L Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304L Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F304L Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304L , SMLS Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL6000 , PE x SWE , A 182 Gr. F304L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304L Union , MSS SP-83 , CL6000 , SWE , A 182 Gr. F304L
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	0.5-24			Insulating Gskt Set, B16.21, CL600, FF, Per Specification 81.33.08, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL600, FF, NM Comp. Gskt., 0.125" non
	0.5-24 0.5-24			compressed thickness Non Metal Flat Gskt, B16.21, CL600, RF, NM Comp. Gskt., 0.125" non compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL600 , RF , 304L SS, Graphite Fill, 304 SS CR , 0.175" non compressed thickness
Flanges				
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL600 , RF , A 182 Gr. F304L
	0.75-24	-	MATOLI	Blind Flg. , B16.5 , CL600 , RF , A 182 Gr. F304L
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL600 , RF , A 182 Gr. F304L
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL600 , FF , A 182 Gr. F304L
Gate Valves	2.5-24	-	MATCH I	WN Flg. , B16.5 , CL600 , FF , A 182 Gr. F304L
Gate valves				
Globe Valves				
	0.5-2	-		Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 182 Gr. F304L
	2.5-6	-	MATCH	Globe Valve LP, B16.10 App. Mfg., CL600, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve LP, B16.10 App. Mfg., CL600, RF, Bltd Bonnet, Handwheel Operator
	2.5-6	-		, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL600 , BE , Bltd Bonnet , Gear Operator , A
	8-24	-	MATCH	351 Gr. CF3 Globe Valve LP , B16.10 App. Mfg. , CL600 , RF , Bltd Bonnet , Gear Operator , A
	8-24	-	1	351 Gr. CF8
Check Valves				
Ball Valves				

Butterfly Valves

PIPE SPEC: 1FAA1

GENERAL AG SERVICE

0.5-2

DESCRIPTION: MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 900, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	2220
100	2220
200	2035
300	1965
400	1900
500	1810
600	1705
650	1650
700	1590
750	1520
800	1235

GENERAL NOTES

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1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION

(®) Kiewit

- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

45 Deg. Elbow, B16.11, CL6000, SWE, A105

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	_	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2	•	45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105
	3-48	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-48	2.5-22	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-48	2.5-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-48	2.5-22	MATCH	Weldolet, MSS SP-97, BE, A105, SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
				45 D. Ell. D40 44 OL0000 OME 4405

PIPE SPEC:	1FAA1	Date:	8/4/2016 6:00:26	PM Wiewit	
	0.5-2 1-1 1-2 1-2 1-2	- - - - - - - - - - 0.5-1.5 0.5-1.5 0.5-1.5	MATCH MATCH	45 Deg. Elbow, B16.11, CL9000, SWE, A105 90 Deg. Elbow, B16.11, CL3000, SWE, A105 90 Deg. Elbow, B16.11, CL6000, SWE, A105 90 Deg. Elbow, B16.11, CL9000, SWE, A105 90 Deg. Elbow, B16.11, CL9000, SWE, A105 Cap, B16.11, CL3000, FTE, A105 Cap, B16.11, CL3000, SWE, A105 Cap, B16.11, CL6000, SWE, A105 Cap, B16.11, CL6000, SWE, A105 Cap, B16.11, CL9000, SWE, A105 Cplg., B16.11, CL3000, SWE, A105 Cplg., B16.11, CL6000, SWE, A105 Cplg., B16.11, CL6000, SWE, A105 Equal Tee, B16.11, CL5000, SWE, A105 Equal Tee, B16.11, CL9000, SWE, A105 Equal Tee, B16.11, CL9000, SWE, A105 Union, MSS SP-83, CL3000, SWE, A105 Union, MSS SP-83, CL5000, SWE, A105 Union, MSS SP-83, CL9000, SWE, A105 Con. Swage, MSS SP-95, PBE, A 234 Gr. WPB Ecc. Swage, MSS SP-95, PBE, A 234 Gr. WPB Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W Plug Hex Head, B16.11, MTE, A105 Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-16W Red. Tee, B16.11, CL3000, SWE, A105 Red. Tee, B16.11, CL5000, SWE, A105 Red. Tee, B16.11, CL5000, SWE, A105 Red. Tee, B16.11, CL9000, SWE, A105 Red. Tee, B16.11, CL9000, SWE, A105	
Bolts	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H	
Gaskets	0.5-48 0.5-48 2.5-24			Sp. Wound Gskt , B16.20 , CL900 , FF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL900 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL1500 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness	
	26-48 0.5-2 26-48 0.5-24 26-48 2.5-24 0.5-2 2.5-24	- - - - - - -	MATCH MATCH MATCH MATCH MATCH MATCH MATCH	Blind Flg. , B16.47 Sr. A , CL900 , RF , A105 SW Flg. , B16.5 , CL900 , RF , A105 WN Flg. , B16.47 Sr. A , CL900 , RF , A105 Blind Flg. , B16.5 , CL900 , RF , A105 WN Flg. , B16.47 Sr. A , CL900 , FF , A105 WN Ori Flg 0.75" Thd , B16.36 , CL1500 , RF , A105 , 2 Taps , 180deg apart WN Flg. , B16.5 , CL900 , RF , A105 SW Flg. , B16.5 , CL900 , FF , A105 WN Flg. , B16.5 , CL900 , FF , A105	
Gate Valves				Gate Valve , App. Mfg. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel	
Globe Valves	0.5-2 0.5-2 0.5-2 2.5-4 2.5-4 6-48 6-48	- - - - -	MATCH MATCH	Operator , A 105 Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel Operator , A 105 Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB	
GIODE VAIVES	0.5-2 0.5-2 0.5-2 2.5-4 2.5-4 6-14 6-48	- - - - - -	MATCH MATCH	Globe Valve , Manf. Std. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 105 Globe Valve , Manf. Std. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel Operator , A 105 Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB	
Check Valves			17.7.1.011		
	0.5-2 0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL900 , RF , Welded Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 105	

PIPE SPEC:

1FAA1

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	2.5-24	-	MATCH	Check Valve Swing SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , A 216 Gr. WCB
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1FAC1

DESCRIPTION: GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F

RATING CLASS: 900, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	2220
100	2220
200	2035
300	1965
400	1900
500	1810
600	1705
650	1650
700	1590
750	1520
800	1235

GENERAL NOTES

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- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. C , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. C , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. C, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. C, 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS



PIPE SPEC: 1FAC1

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Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A105
	0.5-2	-		Cplg., B16.11, CL3000, SWE, A105
	0.5-2	-		Cplg., B16.11, CL6000, SWE, A105
	0.5-2	-		Cplg., B16.11, CL9000, SWE, A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.5-2	-		Union, MSS SP-83, CL6000, SWE, A105
	0.5-2	-		Union, MSS SP-83, CL9000, SWE, A105
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB
	0.75-0.75	-		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A105
	1-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	1-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
	1-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A105
Bolts				
0-1-4-	0.5-24	1	_	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				Sp. Wound Gskt , B16.20 , CL900 , FF , 304 SS, Graphite Fill, CS CR , 0.175" non
	0.5-24			compressed thickness
	0.5-24			Sp. Wound Gskt , B16.20 , CL900 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non
	0.5-24			compressed thickness
Flanges	0.5-24			Compressed trickness
i langes	0.5-2	_	MATCH	SW Flg. , B16.5 , CL900 , RF , A105
	2.5-24	_	MATCH	WN Flg. , B16.5 , CL900 , RF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL900 , FF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL900 , FF , A105
	0.5-24	-	WATCH	Blind Flg. , B16.5 , CL900 , RF , A105
Gate Valves	0.0 2 1			Billia Fig. , B10.0 , GE300 , IX. , A100
				Gate Valve , App. Mfg. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 105
				Gate Valve, App. Mfg., CL1500, SWE, Welded Bonnet, Handwheel Operator, A
	0.5-2	_		105
				Gate Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel
	0.5-2	_		Operator , A 105
	5.5 _			Gate Valve SP, B16.10 App. Mfg., CL900, BE, Pressure Seal Bonnet, Handwheel
	2.5-4	_	MATCH	Operator , A 216 Gr. WCB
	2.0			Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel
	2.5-4	_		Operator , A 216 Gr. WCB
				Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear Operator
	6-24	_		, A 216 Gr. WCB
	0 2 .			Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear
	6-24	-	MATCH	Operator , A 216 Gr. WCB
Globe Valves				
	<u> </u>	•	•	Globe Valve, Manf. Std., CL1500, SWE x FTE, Welded Bonnet, Handwheel
	0.5-2	-		Operator , A 105
				Globe Valve, Manf. Std., CL1500, SWE, Welded Bonnet, Handwheel Operator, A
	0.5-2	_		105
	5.5 _			Globe Valve LP, B16.10 App. Mfg., CL900, RF, Welded Bonnet, Handwheel
	0.5-2	_		Operator, A 105
	0.0 2			Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet ,
	2.5-4	_	MATCH	Handwheel Operator , A 216 Gr. WCB
	2.0 1			Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet ,
	2.5-4	_		Handwheel Operator, A 216 Gr. WCB
	2.0 7			Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear
	6-24	_		Operator, A 216 Gr. WCB
	U 27			Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear
	6-24	-	MATCH	Operator, A 216 Gr. WCB
Check Valves	· - · · · · · · · · · · · · · · ·			
	0.5-2	-	•	Check Valve Pistn Lft , App. Mfg. , CL900 , RF , Welded Bonnet , A 105
	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 105
	-			Check Valve Swing SP, B16.10 App. Mfg., CL900, BE, Pressure Seal Bonnet, A
	2.5-24	-	MATCH	216 Gr. WCB
Ball Valves				
Butterfly Valves				

PIPE SPEC: 1FBB1

DESCRIPTION: GENERAL SERVICE

MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F RATING CLASS: 900, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ST TO CHANGE IF SP	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	2250
100	2250
200	2250
300	2185
400	2115
500	1995
600	1815
650	1765
700	1705
750	1595
800	1525
850	1460
900	1350
950	1160
1000	800
1050	525
1100	330

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- ${\bf 6}$ PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P22 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 3" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , Bonney Forge , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	1-12	0.5-2		45 Deg Latrolet , Bonney Forge , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	2-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP22 Cl. 1, SMLS
	2.5-24	2-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP22 Cl. 1, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F22 Cl. 1

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PIPE SPEC: 1FBB1

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			0, 1,2010 01001201	
	3-3 6-24 6-24	1.5-2 2.5-20 3-3	S-XXS MATCH MATCH X S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1 Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg. , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P
	0.75-2	0.5-1.5	MATCH	Con. Swage, MSS SP-95, PBE, A 234 Gr. WP22 Cl. 1, SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS
	0.75 2	0.5 1.5	WATOH	Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Square Head , B16.11 , MTE , A 105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	1-1	-		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
Gaskets				
				Sp. Wound Gskt, B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
	0.5-24			0.175" Thick, 0.175" non compressed thickness
	0.5-24			Sp. Wound Gskt, B16.20, CL900, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness
Flanges	0.0 24			C.176 THICK, C.176 HOT COMPRESSED WHOMESS
3	0.5-2	-	MATCH	SW Flg. , B16.5 , CL1500 , RF , A 182 Gr. F22 Cl. 3
	2.5-24	-	MATCH	WN Flg., B16.5, CL1500, RF, A 182 Gr. F22 Cl. 3
	2.5-24	-	MATCH	WN Flg., B16.5, CL900, RF, A 182 Gr. F22 Cl. 3
	0.5-2	-	MATCH	SW Flg., B16.5, CL900, RF, A 182 Gr. F22 Cl. 3
	0.5-24	<u>-</u>	1	Blind Flg. , B16.5 , CL900 , RF , A 182 Gr. F22 Cl. 3
Gate Valves				Gate Valve , App. Mfg. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
				Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F22 Cl. 3
				Gate Valve LP, B16.10 App. Mfg., CL900, RF, Welded Bonnet, Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
	0.5.4		MATOLI	Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Handwheel
	2.5-4	-	MATCH	Operator , A 217 Gr. WC9 Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel
	2.5-4	-		Operator , A 217 Gr. WC9
				Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear Operator
	6-24	-		, A 217 Gr. WC9
	6-24	_	MATCH	Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear Operator , A 217 Gr. WC9
Globe Valves	0-24	<u> </u>	WATCH	Operator, A 217 Gr. WC9
	1	<u> </u>	1	Globe Valve , Manf. Std. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
				Globe Valve , Manf. Std. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F22 Cl. 3
				Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
	0.5.4			Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet ,
	2.5-4	-		Handwheel Operator , A 217 Gr. WC9 Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet ,
	2.5-4	-	MATCH	Handwheel Operator , A 217 Gr. WC9
	6-24	_	MATCH	Globe Valve SP, B16.10 App. Mfg., CL900, BE, Pressure Seal Bonnet, Gear Operator, A 217 Gr. WC9
			(1 0.1	Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear
Check Valves	6-24	<u>-</u> I	1	Operator , A 217 Gr. WC9
- Control	1	1	!	Check Valve Pistn Lft , App. Mfg. , CL900 , RF , Welded Bonnet , A 182 Gr. F22 Cl.
	0.5-2	-		3
				Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 182 Gr. F22
	0.5-2	-		Cl. 3
	2.5-24		MATCH	Check Valve Swing SP, B16.10 App. Mfg., CL900, BE, Pressure Seal Bonnet, A 217 Gr. WC9
Ball Valves	2.0-24	<u> </u>	IVIATOR	217 OI. WVO9
	1	1	ı	1

		-		
PIPE SPEC:	SPEC: 1FBB1		8/4/2016 6:03:23	PM Kiewit
	0.5-2	-		Ball Valve LP FB , App. Mfg. , CL900 , SWE , Two or Three Piece Metal Seated , Gear Operator , A 182 Gr. F22 Cl. 3 Ball Valve LP FB , App. Mfg. , CL900 , SWE , Two or Three Piece Metal Seated ,
	0.5-2	-		Lever Operator , A 182 Gr. F22 Cl. 3
	2.5-6	-	MATCH	Ball Valve LP FB , App. Mfg. , CL900 , BE , Two or Three Piece Metal Seated , Gear Operator , A 217 Gr. WC9
	2.5-6	-	MATCH	Ball Valve LP FB , App. Mfg. , CL900 , BE , Two or Three Piece Metal Seated , Lever Operator , A 217 Gr. WC9
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL900 , RF , Two or Three Piece Metal Seated , Gear Operator , A 217 Gr. WC9
	2.5-6	<u>-</u>		Ball Valve LP FB , App. Mfg. , CL900 , RF , Two or Three Piece Metal Seated , Lever Operator , A 217 Gr. WC9
Butterfly Valves				

PIPE SPEC: 1FBD1

DESCRIPTION: HOT REHEAT MATERIAL: 9Cr-1Mo-V **EXAMINATION:** Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F **RATING CLASS:** 900, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE IF 3	FECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	2250
100	2250
200	2250
300	2185
400	2115
500	1995
600	1815
650	1765
700	1705
750	1595
800	1525
850	1460
900	1350
950	1160
1000	1090
1050	1080
1100	905

GENERAL NOTES

Date: 8/4/2016 6:04:54 PM

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 TRANSITIONS FROM P91 LARGE BORE PIPE TO P22 ARE SHOWN ON MECHANICAL DETAILS AND THE ISOMETRIC. THE CONTRACTOR/MANUFACTURER SHALL FOLLOW THOSE DESIGN DOCUMENTS.
- 6 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 7 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.
- 8 SPECIAL WALL PIPE SHALL CONFORM TO ASTM A530.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P91 , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P91 , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 3" Long, SMLS
	1.5-2	-	S-XXS	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-24	2-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP91 , SMLS
	2.5-24	2-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP91 , SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS



PIPE SPEC:	1FBD1	Date:	8/4/2016 6:04:54 F	M Kiewit
Small Para Fittings	2.5-24 2.5-24 2.5-24 2.5-24 2.5-24 3-3 6-24 6-24	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 1.5-2 2.5-18 3-3	S-XXS MATCH MATCH X S-XXS	Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91 Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91 Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F91 Threadolet , MSS SP-97 , CL3000 , FTE , A 182 Gr. F91 Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F91 Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS Weldolet , MSS SP-97 , BE , A 182 Gr. F91 Weldolet , MSS SP-97 , BE , A 182 Gr. F91
Small Bore Fittings	0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 1-1		MATCH MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F91 45 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 45 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 90 Deg. Elbow , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cap , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cap , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cap , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F91 Cplg. , B16.11 , CL5000 , SWE , A 182 Gr. F91 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Equal Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P Con. Swage , MSS SP-95 , PBE , A 234 Gr. WP91 , SMLS Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP91 , SMLS Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP91 , SMLS Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP91 , SMLS Rale Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Square Head , B16.11 , MTE , A 105 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Red. Tee , B16.11 , CL5000 , SWE , A 182 Gr. F91 Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
Gaskets	0.5-24			Sp. Wound Gskt , B16.20 , CL1500 , RF , 304 SS, Graphite Fill, CS CR, 304 SS IR , 0.175" Thick , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL900 , RF , 304 SS, Graphite Fill, CS CR, 304 SS IR , 0.175" Thick , 0.175" non compressed thickness
Flanges	2.5-24 0.5-24 0.5-2 2.5-24 0.5-2	- - - -	MATCH MATCH MATCH MATCH	WN Flg., B16.5, CL900, RF, A 182 Gr. F91 Blind Flg., B16.5, CL900, RF, A 182 Gr. F91 SW Flg., B16.5, CL1500, RF, A 182 Gr. F91 WN Flg., B16.5, CL1500, RF, A 182 Gr. F91 SW Flg., B16.5, CL900, RF, A 182 Gr. F91
Gate Valves	0.5-2 0.5-2 0.5-2 2.5-4 2.5-4 6-24	- - - -	MATCH	Gate Valve , App. Mfg. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Gate Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Handwheel Operator , A 217-C12A Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel Operator , A 217-C12A Gate Valve , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Gear Operator , A 217-C12A Gate Valve , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear Operator , A 217-C12A Gate Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , Gear
Globe Valves	0.5-2 0.5-2 0.5-2 0.5-2 2.5-4	- - - -	MATCH	Operator , A 217-C12A Globe Valve , Manf. Std. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Globe Valve , Manf. Std. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Welded Bonnet , Handwheel Operator , A 182 Gr. F91 Globe Valve LP , B16.10 App. Mfg. , CL900 , RF , Pressure Seal Bonnet , Handwheel Operator , A 217-C12A Globe Valve SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet ,
	2.5-4 6-24 6-24	- -	MATCH MATCH	Handwheel Operator, A 217-C12A Globe Valve SP, B16.10 App. Mfg., CL900, BE, Pressure Seal Bonnet, Gear Operator, A 217-C12A Globe Valve LP, B16.10 App. Mfg., CL900, RF, Pressure Seal Bonnet, Gear Operator, A 217-C12A
Check Valves	V 2 T			Sportion, ITEM STERN

PIPE SPEC:

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	0.5-2	-		Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 182 Gr. F91 Check Valve Swing SP , B16.10 App. Mfg. , CL900 , BE , Pressure Seal Bonnet , A
	2.5-24	-	MATCH	217-C12A
Ball Valves				
				Ball Valve LP FB , App. Mfg. , CL900 , SWE , Two or Three Piece Metal Seated ,
	0.5-2	-		Gear Operator , A 182 Gr. F91
				Ball Valve LP FB , App. Mfg. , CL900 , SWE , Two or Three Piece Metal Seated ,
	0.5-2	-		Lever Operator , A 182 Gr. F91
				Ball Valve LP FB , App. Mfg. , CL900 , BE , Two or Three Piece Metal Seated , Gear
	2.5-6	-	MATCH	Operator , A 217-C12A
				Ball Valve LP FB , App. Mfg. , CL900 , BE , Two or Three Piece Metal Seated ,
	2.5-6	-	MATCH	Lever Operator, A 217-C12A
				Ball Valve LP FB , App. Mfg. , CL900 , RF , Two or Three Piece Metal Seated , Gear
	2.5-6	-		Operator , A 217-C12A
				Ball Valve LP FB , App. Mfg. , CL900 , RF , Two or Three Piece Metal Seated ,
	2.5-6	-		Lever Operator , A 217-C12A
Butterfly Valves				

1GAA1 **PIPE SPEC:**

GENERAL AG SERVICE

0.5-2

Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 800F RATING CLASS: 1500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0625 in

DESCRIPTION:

MATERIAL:

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

.CT TO CHANGE II	SELCII ILD IN NOTES
TEMP. F	PRESS. PSIG
-20	3705
100	3705
200	3395
300	3270
400	3170
500	3015
600	2840
650	2745
700	2655
750	2535
800	2055

GENERAL NOTES

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1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION

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- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

45 Deg. Elbow, B16.11, CL6000, SWE, A105

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-24	2.5-18	MATCH	Weldolet, MSS SP-97, BE, A105, SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	^ - ^			4- D - EU - D4044 OL0000 OME 440-

® Kiewit **PIPE SPEC:** 1GAA1 **Date:** 8/4/2016 6:06:28 PM 45 Deg. Elbow, B16.11, CL9000, SWE, A105 0.5-2 0.5-2 90 Deg. Elbow, B16.11, CL3000, SWE, A105 0.5-2 90 Deg. Elbow, B16.11, CL6000, SWE, A105 0.5-2 90 Deg. Elbow, B16.11, CL9000, SWE, A105 0.5-2 Cap, B16.11, CL3000, FTE, A105 0.5-2 Cap, B16.11, CL3000, SWE, A105 Cap, B16.11, CL6000, FTE, A105 0.5-2 0.5-2 Cap, B16.11, CL6000, SWE, A105 0.5-2 Cap, B16.11, CL9000, SWE, A105 0.5-2 Cplg., B16.11, CL3000, SWE, A105 0.5-2 Cplg., B16.11, CL6000, SWE, A105 0.5-2 Cplg., B16.11, CL9000, SWE, A105 Equal Tee, B16.11, CL3000, SWE, A105 0.5-2 0.5-2 Equal Tee, B16.11, CL6000, SWE, A105 Equal Tee, B16.11, CL9000, SWE, A105 0.5-2 0.5-2 Union, MSS SP-83, CL3000, SWE, A105 Union, MSS SP-83, CL6000, SWE, A105 0.5-2 Union, MSS SP-83, CL9000, SWE, A105 0.5-20.75-2 0.5-1.5 **MATCH** Con. Swage, MSS SP-95, PBE, A 234 Gr. WPB **MATCH** Ecc. Swage, MSS SP-95, PBE, A 234 Gr. WPB 0.75-2 0.5-1.5 Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W 0.75-0.75 0.75-2 Plug Hex Head, B16.11, MTE, A105 Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-1-1 1-2 0.5-1.5 Red. Tee, B16.11, CL3000, SWE, A105 Red. Tee, B16.11, CL6000, SWE, A105 1-2 0.5-1.5 1-2 0.5-1.5 Red. Tee, B16.11, CL9000, SWE, A105 Bolts 0.5-24 Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H Gaskets Sp. Wound Gskt, B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR, 0.175" non compressed thickness 0.5-24 Flanges 0.5-24 Blind Flg., B16.5, CL1500, RF, A105 **MATCH** SW Flg., B16.5, CL1500, RF, A105 0.5-2 2.5-24 **MATCH** WN Flg., B16.5, CL1500, RF, A105 **Gate Valves** Gate Valve, App. Mfg., CL1500, SWE x FTE, Welded Bonnet, Handwheel 0.5 - 2Operator, A 105 Gate Valve, App. Mfg., CL1500, SWE, Welded Bonnet, Handwheel Operator, A 0.5-2 Gate Valve LP, B16.10 App. Mfg., CL1500, RF, Welded Bonnet, Handwheel 0.5-2 Operator, A 105 Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, 2.5-4 **MATCH** Handwheel Operator, A 216 Gr. WCB Gate Valve, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, Handwheel 2.5-4 Operator, A 216 Gr. WCB Gate Valve, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, Gear 6-24 Operator, A 216 Gr. WCB Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear **MATCH** 6-24 Operator, A 216 Gr. WCB Globe Valves Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Welded Bonnet, Handwheel 0.5 - 2Operator, A 105 Globe Valve, Manf. Std., CL1500, SWE x FTE, Welded Bonnet, Handwheel 0.5-2 Operator, A 105 Globe Valve, Manf. Std., CL1500, SWE, Welded Bonnet, Handwheel Operator, A 0.5-2 Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, 2.5-4 Handwheel Operator, A 216 Gr. WCB Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, 2.5-4 **MATCH** Handwheel Operator, A 216 Gr. WCB Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear **MATCH** Operator, A 216 Gr. WCB 6-24 Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCB 6-24 **Check Valves** 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL1500 , RF , Welded Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 105 0.5-2 Check Valve Swing SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, A MATCH 216 Gr. WCB 2.5-24 **Ball Valves Butterfly Valves**

1GAC1 **PIPE SPEC:**

GENERAL AG SERVICE

Carbon Steel

0.5-2

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 800F RATING CLASS: 1500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0625 in

DESCRIPTION:

MATERIAL:

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	3705
100	3705
200	3395
300	3270
400	3170
500	3015
600	2840
650	2745
700	2655
750	2535
800	2055

GENERAL NOTES

Date: 8/4/2016 6:07:54 PM

1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION

(16) Kiewit

- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

45 Deg. Elbow, B16.11, CL6000, SWE, A105

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. C , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. C , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 106 Gr. C, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPC
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPC
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPC, SMLS
	3-6	2.5-4	MATCH	Con. Swage, MSS SP-95, BBE, A 234 Gr. WPC
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPC , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPC
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	^ - ^			4- B - EU - B4044 - OL0000 - OLME - 440-

0.5.0.5 1.49W	PIPE SPEC:	1GAC1	Date:	: 8/4/2016 6:07:54	PM Wiewit	
0.5-2		0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2			90 Deg. Elbow , B16.11 , CL3000 , SWE , A105 90 Deg. Elbow , B16.11 , CL6000 , SWE , A105 90 Deg. Elbow , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL3000 , FTE , A105 Cap , B16.11 , CL3000 , SWE , A105 Cap , B16.11 , CL6000 , FTE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cplg. , B16.11 , CL3000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Cplg. , B16.11 , CL9000 , SWE , A105 Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL5000 , SWE , A105 Equal Tee , B16.11 , CL5000 , SWE , A105 Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-8W	
Side Bit & 2HryHerk Mt, ASME Bit 8.312 / Bit 8.22 / A 193 Bit 7.4 194 2H	Date	0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-0.75 0.75-2 1-1 1-2 1-2	0.5-1.5 - - 0.5-1.5 0.5-1.5		Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL6000 , FTE , A105 Union , MSS SP-83 , CL6000 , SWE , A105 Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPC Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPC Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A105 Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W Red. Tee , B16.11 , CL3000 , SWE , A105 Red. Tee , B16.11 , CL6000 , SWE , A105	
Sp. World Gstr., B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR (-0.175' non compressed thickness		0.5-24	1	<u> </u>	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H	
0.5-2		0.5-24			Sp. Wound Gskt , B16.20 , CL1500 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness	
Gate Valve, App. Mig., CL1500, SWE xFTE, Welded Bonnet, Handwheel Operator, A 105		2.5-24	- - -		WN Flg. , B16.5 , CL1500 , RF , A105	
Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL1500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL1500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL1500, SWE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCC Globe Valve LP, B16.10 App. Mfg., CL1500, RF, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, A 105 Check Valve Pistn Lft, App. Mfg., CL1500, BE, Pressure Seal Bonnet, A 216 Gr. WCC Globe Valve Sp, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, A 216 Gr. WCC		0.5-2 0.5-2 2.5-4 2.5-4 6-24	- - - - -		Operator , A 105 Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL1500 , RF , Welded Bonnet , Handwheel Operator , A 105 Gate Valve , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Gate Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Gate Valve , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCC Gate Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , Gear	
Check Valves 0.5-2 - Check Valve Pistn Lft , App. Mfg. , CL1500 , RF , Welded Bonnet , A 105 0.5-2 - Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 105 Check Valve Swing SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , A 2.5-24 - MATCH 216 Gr. WCC Ball Valves	Globe Valves	0.5-2 0.5-2 2.5-4 2.5-4 6-24	- - - - -		Operator , A 105 Globe Valve , Manf. Std. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 105 Globe Valve , Manf. Std. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Globe Valve LP , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Globe Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Globe Valve LP , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCC Globe Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCC	
Ball Valves	Check Valves	0.5-2 0.5-2	- - -		Check Valve Pistn Lft , App. Mfg. , CL1500 , RF , Welded Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 105 Check Valve Swing SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , A	
Butterfly Valves	Ball Valves	2.5-24	-	MATCH	216 Gr. WCC	
	Butterfly Valves					

PIPE SPEC: 1GBA1

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DESCRIPTION:

MATERIAL: 1.25Cr-0.5Mo

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 1500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ECT TO CHAINGE IF S	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	3750
100	3750
200	3750
300	3610
400	3465
500	3325
600	3025
650	2940
700	2840
750	2660
800	2440
850	2435
900	2245
950	1595
1000	1080
1050	720
1100	480

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P11 , SMLS
	2.5-30	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P11 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P11 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P11 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 335 Gr. P11 , 12" Long, SMLS
Large Bore Fittings				
	1-24	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		45 Deg Latrolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F11 Cl. 2
	1-24	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F11 Cl. 2
	2.5-30	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-30	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-30	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-30	-	MATCH	Cap , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A234 Grade WP11 Cl. 1, SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A234 Grade WP11 Cl. 1, SMLS

PIPE SPEC: 1GBA1 **Date:** 8/4/2016 6:09:13 PM

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1 II L 01 L0.	Date: 0/4/2010 0.09		. 0/4/2010 0.00.10	. IS FIVE		
	2.5.20		MATCH	Eg Too B16.0 BE A224 Crodo WB11.CL 1 SMIS		
	2.5-30	-	MATCH	Eq. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS		
	3-30	2.5-24	MATCH	Con. Reducer , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS		
	3-30	2.5-24	MATCH	Ecc. Reducer , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS		
	3-30	2.5-24	MATCH	Red. Tee , B16.9 , BE , A234 Grade WP11 Cl. 1 , SMLS		
	6-30	2.5-24	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F11 Cl. 2		
Small Bore Fittings				45 D		
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	_		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	_		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2			Cplg., B16.11, CL6000, SWE, A 182 Gr. F11 Cl. 2		
	0.5-2	-		Cplg. , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
		-				
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2		
	0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
				Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-		
	0.75-0.75	-		810-1-12W		
	1-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A234 Grade WP11 Cl. 1 , SMLS		
	1-2	0.5-1.5	MATCH	Ecc. Swage, MSS SP-95, PBE, A234 Grade WP11 Cl. 1, SMLS		
				Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-		
	1-1	-		16W		
	1-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F11 Cl. 2		
	1-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F11 Cl. 2		
	1-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F11 Cl. 2		
Bolts	1 2	0.5 1.5		Ned. 166 ; B16.11 ; GE3000 ; GWE ; A 162 G1.1 11 Gl. 2		
	0.5-30			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3		
Gaskets						
		•	*	Sp. Wound Gskt, B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,		
	0.5-30			0.175" Thick, 0.175" non compressed thickness		
				Sp. Wound Gskt, B16.20, CL2500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,		
	0.5-30			0.175" Thick , 0.175" non compressed thickness		
	0.0 00			Sp. Wound Gskt, B16.20, CL600, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,		
	0.75-30			0.175" Thick, 0.175" non compressed thickness		
	0.75-30			Sp. Wound Gskt, B16.20, CL900, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,		
	0.75-30			0.175" Thick, 0.175" non compressed thickness		
Flanges	0.73-30			0.175 Triick ; 0.175 Horr compressed triickness		
i langes	0.5-2	<u>.</u>	MATCH	SW Flg. , B16.5 , CL2500 , RF , A 182 Gr. F11 Cl. 2		
	0.5-30	_	MATCH	WN Flg. , B16.5 , CL1500 , RF , A 182 Gr. F11 Cl. 2		
	0.5-30	_	1717 (1 01 1	Blind Flg. , B16.5 , CL1500 , RF , A 182 Gr. F11 Cl. 2		
	0.5-2	_	MATCH			
		-	MATCH	SW Flg. , B16.5 , CL1500 , RF , A 182 Gr. F11 Cl. 2		
Gate Valves	0.5-30	-	IVIATOR	WN Flg. , B16.5 , CL2500 , RF , A 182 Gr. F11 Cl. 2		
Cate valves	l			Gate Valve , App. Mfg. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel		
	0.5-2			Operator, A 182 Gr. F11 Cl. 2		
	0.5-2	-		·		
	050			Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A		
	0.5-2	-		182 Gr. F11 Cl. 2		
	275 2			Gate Valve LP , B16.10 App. Mfg. , CL1500 , RF , Welded Bonnet , Handwheel		
	0.75-2	-		Operator , A 182 Gr. F11 Cl. 2		
	/			Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet,		
	2.5-4	-	MATCH	Handwheel Operator , A 217 Gr. WC6		
				Gate Valve , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Handwheel		
	2.5-4	-		Operator , A 217 Gr. WC6		
				Gate Valve , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Gear		
	6-24	-		Operator , A 217 Gr. WC6		
				Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear		
	6-24	-	MATCH	Operator , A 217 Gr. WC6		
Globe Valves						
				Globe Valve , Manf. Std. , CL1500 , SWE x FTE , Welded Bonnet , Handwheel		
	0.5-2	-		Operator , A 182 Gr. F11 Cl. 2		
				Globe Valve, Manf. Std., CL1500, SWE, Welded Bonnet, Handwheel Operator, A		
	0.5-2	-		182 Gr. F11 Cl. 2		
				Globe Valve LP , B16.10 App. Mfg. , CL1500 , RF , Welded Bonnet , Handwheel		
	0.75-2	-		Operator , A 182 Gr. F11 Cl. 2		
	5.70 2			Globe Valve LP , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet ,		
	2.5-4	-		Handwheel Operator, A 217 Gr. WC6		
	2.0-4	-		Globe Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet ,		
	2 = 1		NAATOLI	· · · · · · · · · · · · · · · · · · ·		
	2.5-4	-	MATCH	Handwheel Operator , A 217 Gr. WC6		
				Globe Valve LP , B16.10 App. Mfg. , CL1500 , RF , Pressure Seal Bonnet , Gear		
	6-14	-		Operator , A 217 Gr. WC6		
	_			Globe Valve SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , Gear		
	6-24	-	MATCH	Operator , A 217 Gr. WC6		
Check Valves						

® Kiewit 1GBA1 **PIPE SPEC: Date:** 8/4/2016 6:09:13 PM Check Valve Pistn Lft , App. Mfg. , CL1500 , RF , Welded Bonnet , A 182 Gr. F11 Cl. 0.5-2 Check Valve Pistn Lft , App. Mfg. , CL1500 , SWE , Welded Bonnet , A 182 Gr. F11 0.5-2 Check Valve Swing SP , B16.10 App. Mfg. , CL1500 , BE , Pressure Seal Bonnet , A 2.5-24 MATCH 217 Gr. WC6 **Ball Valves** Ball Valve LP FB, App. Mfg., CL1500, SWE, Two or Three Piece Metal Seated, 0.5-2 Gear Operator , A 182 Gr. F11 Cl. 2 Ball Valve LP FB , App. Mfg. , CL1500 , SWE , Two or Three Piece Metal Seated , 0.5-2 Lever Operator , A 182 Gr. F11 Cl. 2 Ball Valve LP FB , App. Mfg. , CL1500 , BE , Two or Three Piece Metal Seated , MATCH 2.5-6 Gear Operator , A 217 Gr. WC6 Ball Valve LP FB , App. Mfg. , CL1500 , BE , Two or Three Piece Metal Seated , 2.5-6 MATCH Lever Operator , A 217 Gr. WC6 Ball Valve LP FB , App. Mfg. , CL1500 , RF , Two or Three Piece Metal Seated , 2.5-6 Gear Operator , A 217 Gr. WC6 Ball Valve LP FB , App. Mfg. , CL1500 , RF , Two or Three Piece Metal Seated , 2.5-6 Lever Operator , A 217 Gr. WC6 **Butterfly Valves**

PIPE SPEC: 1GBB1

Date: 8/4/2016 6:10:45 PM



DESCRIPTION: HIGH PRESSURE & TEMPERATURE STEAM

MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 1500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OF TO CHANGE II	OI LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
-20	3750
100	3750
200	3750
300	3640
400	3530
500	3325
600	3025
650	2940
700	2840
750	2660
800	2540
850	2435
900	2245
950	1930
1000	1335
1050	875
1100	550

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 7 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P22 , SMLS
	0.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P22, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P22, 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P22, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 12" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
Large Bore Fittings				
	2.5-36	0.5-2		45 Deg Latrolet , Bonney Forge , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-36	0.5-2		45 Deg Latrolet , Bonney Forge , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-48	1-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP22 Cl. 1 , SMLS

PIPE SPEC:	1GBB1	Date	: 8/4/2016 6:10:45 P	M Kiewit
Small Bore Fittings	2.5-48 2.5-6 2.5-48 2.5-48 2.5-48 2.5-48 2.5-48 3-3 6-48 6-24	1-42 0.5-2 - 1-42 0.5-2 0.5-2 0.5-2 1.5-2 2.5-24 3-3	MATCH MATCH MATCH MATCH MATCH S-XXS MATCH MATCH MATCH X S-XXS	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WP22 Cl. 1 , SMLS Eq. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS Red. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F22 Cl. 1 Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1 Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1
Sman Bore Fittings	0.5-2			45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2 0.75-2 0.75-2 0.75-2		MATCH MATCH	45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1 90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , FTE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL6000 , FTE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 Cap , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1 Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Flatolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F22 Flatolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F22 Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P Plug Square Head , B16.11 , MTE , A 182 Gr. F22 Con. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F22 , SS-810-1-12W Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F22 Cl. 1 Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	1-1	<u>-</u>		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F22 , SS-810-1-16W
Bolts	0.5-42			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
Gaskets	0.5-42			Sp. Wound Gskt, B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" Thick, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL2500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
Flanges	0.5-42	1	<u> </u>	0.175" Thick , 0.175" non compressed thickness
Tranges	0.5-2 0.5-2 2.5-42 0.5-42 2.5-42	- - - -	MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL1500 , RF , A 182 Gr. F22 Cl. 3 SW Flg. , B16.5 , CL2500 , RF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL2500 , RF , A 182 Gr. F22 Cl. 3 Blind Flg. , B16.5 , CL1500 , RF , A 182 Gr. F22 Cl. 3 WN Flg. , B16.5 , CL1500 , RF , A 182 Gr. F22 Cl. 3
Gate Valves	2.0 12		1,011	
	0.5-2 0.5-2 2.5-4	- -	MATCH	Gate Valve, App. Mfg., CL1500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Gate Valve, App. Mfg., CL1500, SWE, Welded Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Gate Valve, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Handwheel Operator, A 217 Gr. WC9 Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear
Globe Valves	6-48	<u>-</u>	MATCH	Operator , A 217 Gr. WC9
	0.5-2 0.5-2 2.5-4 6-48	- - -	MATCH MATCH	Globe Valve, Manf. Std., CL1500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Globe Valve, Manf. Std., CL1500, SWE, Welded Bonnet, Handwheel Operator, A 182 Gr. F22 Cl. 3 Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Handwheel Operator, A 217 Gr. WC9 Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear Operator, A 217 Gr. WC9
Check Valves				Check Valve Swing, App. Mfg., CL1500, SWE, Welded Bonnet, A 182 Gr. F22 Cl.
	0.5-2 2.5-24	-	MATCH	Check Valve Swing, App. Mig., CL1500, SWE, Welded Borliet, A 162 Gr. F22 Gr. 3 Check Valve Swing LP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, A 217 Gr. WC9
Ball Valves				
	0.5-2	_		Ball Valve LP FB , App. Mfg. , CL1500 , SWE , Two or Three Piece Metal Seated ,

Ball Valve LP FB , App. Mfg. , CL1500 , SWE , Two or Three Piece Metal Seated Lever Operator , A 182 Gr. F22 Cl. 3

®Kiewit PIPE SPEC: 1GBB1 **Date:** 8/4/2016 6:10:45 PM Ball Valve LP FB , App. Mfg. , CL1500 , SWE , Two or Three Piece Metal Seated , Gear Operator, A 182 Gr. F22 Cl. 3 0.5-2 Ball Valve LP FB , App. Mfg. , CL1500 , BE , Two or Three Piece Metal Seated , MATCH 2.5-6 Gear Operator , A 217 Gr. WC9 Ball Valve LP FB , App. Mfg. , CL1500 , BE , Two or Three Piece Metal Seated , 2.5-6 MATCH Lever Operator , A 217 Gr. WC9 **Butterfly Valves**

PIPE SPEC: 1GCA1

Date: 8/4/2016 6:12:19 PM



DESCRIPTION: HYDRAULIC OIL, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel
EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F

RATING CLASS: 1500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OF LOW ILD IN NOTES
PRESS. PSIG
3600
3600
3000
2690
2485
2330
2210
2160
2110
2065
2030
1980
1945
1910
1770

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	2.5-48	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
Large Bore Fittings				
	0.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Red. Tee, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	1-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304/304L Dual Cert.
	2.5-24	0.5-18	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F304/304L Dual Cert.

PIPE SPEC: 1GCA1

Date: 8/4/2016 6:12:19 PM



Small Bore Fittings				
	0.5-2	-	MATCH	Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert.
	0.5-2	-	MATCH	Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.
				Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
	0.75-0.75	-		810-1-12W
	1-1	-		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1 16W
Bolts				
	0.5-48	•	•	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	0.5-48			Sp. Wound Gskt, B16.20, CL1500, FF, 304 SS, Graphite Fill, CS CR, 304 SS IR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL1500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
[0.5-48		<u></u>	0.175" non compressed thickness
Flanges	0.5.12			Direct Flag D40 F 014500 DF A400 Ca F204/2041 Dural Cont
	0.5-12 0.5-12	- -	MATCH	Blind Flg., B16.5, CL1500, RF, A 182 Gr. F304/304L Dual Cert. WN Flg., B16.5, CL1500, FF, A 182 Gr. F304/304L Dual Cert. WN Ori Flg 0.75" Thd, B16.36, CL1500, RF, A 182 Gr. F304/304L Dual Cert., 2
	10-12	-	MATCH	Taps, 180deg apart
	0.5-12	-	MATCH	WN Flg. , B16.5 , CL1500 , RF , A 182 Gr. F304/304L Dual Cert.
Gate Valves				
	0.5-2	-	MATCH	Gate Valve, App. Mfg., CL1500, BE, Welded Bonnet, Handwheel Operator, A 351 Gr. CF3
	2.5-4	-	MATCH	Gate Valve, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Handwheel Operator, A 351 Gr. CF3 Gate Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear
	6-18	-	MATCH	Operator, A 351 Gr. CF3
Globe Valves				
	0.5-2	-	MATCH	Globe Valve, Manf. Std., CL1500, BE, Welded Bonnet, Handwheel Operator, A 351 Gr. CF3
	2.5-4	-	MATCH	Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Handwheel Operator, A 351 Gr. CF3 Globe Valve SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, Gear
	6-12	-	MATCH	Operator, A 351 Gr. CF3
Check Valves	•			
	0.5-2	-	MATCH	Check Valve Pistn Lft , App. Mfg. , CL1500 , BE , Welded Bonnet , A 351 Gr. CF3
	2.5-12	-	MATCH	Check Valve Swing SP, B16.10 App. Mfg., CL1500, BE, Pressure Seal Bonnet, A 351 Gr. CF3
Ball Valves				
	2.5-6	-		Ball Valve LP FB , App. Mfg. , CL1500 , RF , Two or Three Piece Metal Seated , Lever Operator , A 351 Gr. CF8
Butterfly Valves				

PIPE SPEC: 1HAA1

GENERAL AG SERVICE

MATERIAL: Carbon Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 800F
RATING CLASS: 2500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESCRIPTION:

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

I TO CHANGE IF SI	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	6170
100	6170
200	5655
300	5450
400	5280
500	5025
600	4730
650	4575
700	4425
750	4230
800	3430

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-		Nipple, B36.10M, PBE, A 106 Gr. B, 9" Long, SMLS
	0.5-2	-		Nipple , B36.10M , PBE , A 106 Gr. B , 12" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				-
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet, MSS SP-97, CL6000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WPB, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL9000, SWE, A105
	3-24	2.5-22	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPB
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-24	2.5-18	MATCH	Weldolet, MSS SP-97, BE, A105, SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105

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PIPE SPEC:	1HAA1	Date:	: 8/4/2016 6:13:47	PM Wiewit		
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2	- - - - - - 0.25-1.5 - - - - - 0.5-1.5	MATCH MATCH	90 Deg. Elbow , B16.11 , CL6000 , SWE , A105 90 Deg. Elbow , B16.11 , CL9000 , SWE , A105 Cplg. , B16.11 , CL3000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL9000 , SWE , A105 Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105 Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL6000 , SWE , A105 Union , MSS SP-83 , CL9000 , SWE , A105 Cap , B16.11 , CL3000 , FTE , A105 Cap , B16.11 , CL6000 , FTE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105 Con. Swage , MSS SP-95 , PBE , A 234 Gr. WPB Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WPB		
Bolts	0.75-0.75 0.75-2 1-2 1-2 1-2	0.5-1.5 0.5-1.5 0.5-1.5	I	Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A105 Red. Tee , B16.11 , CL3000 , SWE , A105 Red. Tee , B16.11 , CL6000 , SWE , A105 Red. Tee , B16.11 , CL9000 , SWE , A105		
	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H		
Gaskets	0.5-24			Sp. Wound Gskt , B16.20 , CL2500 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness		
Flanges	0.5-24 0.5-2 2.5-24	- - -	MATCH MATCH	Blind Flg. , B16.5 , CL2500 , RF , A105 SW Flg. , B16.5 , CL2500 , RF , A105 WN Flg. , B16.5 , CL2500 , RF , A105		
Gate Valves	0.5-2 0.5-2 0.5-2 2.5-4 2.5-4 6-24	- - - - -	MATCH MATCH	Gate Valve , App. Mfg. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve , App. Mfg. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL2500 , RF , Welded Bonnet , Handwheel Operator , A 105 Gate Valve SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve , B16.10 App. Mfg. , CL2500 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCB Gate Valve , B16.10 App. Mfg. , CL2500 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB Gate Valve , B16.10 App. Mfg. , CL2500 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCB		
Chask Volves	0.5-2 0.5-2 0.5-2 2.5-4 2.5-4 6-24 6-24	- - - - -	MATCH	Globe Valve LP, B16.10 App. Mfg., CL2500, RF, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL2500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL2500, SWE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve, B16.10 App. Mfg., CL2500, RF, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCB Globe Valve LP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCB Globe Valve, B16.10 App. Mfg., CL2500, RF, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCB		
Check Valves	0.5-2 0.5-2 2.5-24	- - -	MATCH	Check Valve Pistn Lft , App. Mfg. , CL2500 , RF , Welded Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL2500 , SWE , Welded Bonnet , A 105 Check Valve Swing SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , A 216 Gr. WCB		
Ball Valves	0.5-2 0.5-2 2.5-6 2.5-6 2.5-6	- - - -	MATCH MATCH	Ball Valve LP FB, App. Mfg., CL2500, SWE, Two or Three Piece Metal Seated, Gear Operator, A 105 Ball Valve LP FB, App. Mfg., CL2500, SWE, Two or Three Piece Metal Seated, Lever Operator, A 105 Ball Valve LP FB, App. Mfg., CL2500, BE, Two or Three Piece Metal Seated, Gear Operator, A 216 Gr. WCB Ball Valve LP FB, App. Mfg., CL2500, BE, Two or Three Piece Metal Seated, Lever Operator, A 216 Gr. WCB Ball Valve LP FB, App. Mfg., CL2500, RF, Two or Three Piece Metal Seated, Gear Operator, A 216 Gr. WCB		

PIPE SPEC: 1HAA1

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Ball Valve LP FB , App. Mfg. , CL2500 , RF , Two or Three Piece Metal Seated ,
Lever Operator , A 216 Gr. WCB

Butterfly Valves

1HAC1 **PIPE SPEC:**

DESCRIPTION:

MATERIAL:

GENERAL AG SERVICE

Carbon Steel

0.5-2

EXAMINATION: Per ASME B31.1 - 2014

-20F to 800F TEMPERATURE LIMIT:

RATING CLASS: 2500, ASME B16.5 - 2013 CORROSION ALLOWANCE:

0.0630 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

PRESS. PSIG
6170
6170
5655
5450
5280
5025
4730
4575
4425
4230
3430

GENERAL NOTES

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1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST); FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION

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- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

45 Deg. Elbow, B16.11, CL9000, SWE, A105

5 INSULATING GASKET SETS SHALL BE LIMITED TO 250 DEG-F MAXIMUM DESIGN TEMPERATURE INSTALLATIONS.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. C , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 106 Gr. C , SMLS
	0.5-2	-	Calc	Nipple, B36.10M, TBE, A 106 Gr. C, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 106 Gr. C, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. C , 3" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A105
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPC
	2.5-6	0.5-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPC
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A105
	3-24	2.5-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPC , SMLS
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 234 Gr. WPC
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WPC , SMLS
	3-6	2.5-4	MATCH	Ecc. Swage , MSS SP-95 , BBE , A 234 Gr. WPC
	3-24	2.5-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPC , SMLS
	6-24	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5.0			45 Day 515 and 544 OLOGOO OME A405

PIPE SPEC:	1HAC1	- Date:	8/4/2016 6:15:18	PM Wiewit
	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2 0.75-2	- - - - - - - - 0.25-1.5 - - - - - - - - - - - - - - - -	MATCH MATCH	90 Deg. Elbow , B16.11 , CL3000 , SWE , A105 90 Deg. Elbow , B16.11 , CL6000 , SWE , A105 90 Deg. Elbow , B16.11 , CL9000 , SWE , A105 Cplg. , B16.11 , CL3000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL3000 , SWE , A105 Equal Tee , B16.11 , CL6000 , SWE , A105 Equal Tee , B16.11 , CL9000 , SWE , A105 Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A105 Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL6000 , SWE , A105 Union , MSS SP-83 , CL9000 , SWE , A105 Cap , B16.11 , CL3000 , FTE , A105 Cap , B16.11 , CL3000 , FTE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL6000 , SWE , A105 Cap , B16.11 , CL9000 , SWE , A105
	0.75-0.75 0.75-2 1-1 1-2 1-2 1-2	0.5-0.5 - - 0.5-1.5 0.5-1.5 0.5-1.5		Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Plug Hex Head , B16.11 , MTE , A105 Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W Red. Tee , B16.11 , CL3000 , SWE , A105 Red. Tee , B16.11 , CL6000 , SWE , A105 Red. Tee , B16.11 , CL9000 , SWE , A105
Bolts	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets	0.5-24			Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, CS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL2500, RF, 304 SS, Graphite Fill, CS CR, 0.175" non compressed thickness Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, CS CR, 0.175" non compressed thickness
Flanges	0.75-24			compressed thickness
	2.5-2.5 10-24 0.5-24 0.5-2 1-8 2.5-24	- - - - - -	MATCH MATCH MATCH MATCH MATCH	WN OriFlg0.75"SW tap , B16.36 , CL2500 , RF , A105 , 2 Taps , 180deg apart WN Ori Flg 0.75" Thd , B16.36 , CL2500 , RF , A105 , 2 Taps , 180deg apart Blind Flg. , B16.5 , CL2500 , RF , A105 SW Flg. , B16.5 , CL2500 , RF , A105 WN Ori Flg 0.5" Thd , B16.36 , CL2500 , RF , A105 , 2 Taps , 180deg apart WN Flg. , B16.5 , CL2500 , RF , A105
Gate Valves				Gate Valve , App. Mfg. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2 0.5-2 0.5-2 2.5-4 2.5-12 2.5-4 6-12	- - - - -	MATCH MATCH	Operator , App. Mig. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve , App. Mfg. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A 105 Gate Valve LP , B16.10 App. Mfg. , CL2500 , RF , Welded Bonnet , Handwheel Operator , A 105 Gate Valve , B16.10 App. Mfg. , CL2500 , RF , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Gate Valve SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCC Gate Valve SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , Handwheel Operator , A 216 Gr. WCC Gate Valve , B16.10 App. Mfg. , CL2500 , RF , Pressure Seal Bonnet , Gear Operator , A 216 Gr. WCC
Globe Valves				
	0.5-2 0.5-2 0.5-2 2.5-4 2.5-12 2.5-4	- - - -	MATCH MATCH	Globe Valve LP, B16.10 App. Mfg., CL2500, RF, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL2500, SWE x FTE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve, Manf. Std., CL2500, SWE, Welded Bonnet, Handwheel Operator, A 105 Globe Valve LP, B16.10 App. Mfg., CL2500, RF, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Handwheel Operator, A 216 Gr. WCC Globe Valve LP, B16.10 App. Mfg., CL2500, RF, Pressure Seal Bonnet, Gear Operator, A 216 Gr. WCC
Check Valves	6-12	-		Operator , A 216 Gr. WCC
3.100K THITOU	0.5-2 0.5-2 2.5-24	- - -	MATCH	Check Valve Pistn Lft , App. Mfg. , CL2500 , RF , Welded Bonnet , A 105 Check Valve Pistn Lft , App. Mfg. , CL2500 , SWE , Welded Bonnet , A 105 Check Valve Swing SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , A 216 Gr. WCC

PIPE SPEC: 1HAC1

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	2.5-12	-		Check Valve Tilting Disc , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , A 216 Gr. WCC
Ball Valves				
				Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,
	0.5-2	-		Gear Operator , A 105
				Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,
	0.5-2	-		Lever Operator, A 105
				Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,
	2.5-6	-	MATCH	Gear Operator , A 216 Gr. WCC
				Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,
	2.5-6	-	MATCH	Lever Operator , A 216 Gr. WCC
				Ball Valve LP FB , App. Mfg. , CL2500 , RF , Two or Three Piece Metal Seated ,
	2.5-6	-		Gear Operator , A 216 Gr. WCC
				Ball Valve LP FB , App. Mfg. , CL2500 , RF , Two or Three Piece Metal Seated ,
	2.5-6	-		Lever Operator , A 216 Gr. WCC
Butterfly Valves				

PIPE SPEC: 1HBB1

DESCRIPTION:

HIGH PRESSURE STEAM

0.5-2

MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F RATING CLASS: 2500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ST TO CHANGE IF 3	PECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	6250
100	6250
200	6250
300	6070
400	5880
500	5540
600	5040
650	4905
700	4730
750	4430
800	4230
850	4060
900	3745
950	3220
1000	2230
1050	1455
1100	915

GENERAL NOTES

1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.

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- 2 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER

45 Deg. Elbow, B16.11, CL9000, SWE, A 182 Gr. F22 Cl. 1

5 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P22 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P22, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P22 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 335 Gr. P22 , 3" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P22 , 6" Long, SMLS
Large Bore Fittings				
	2.5-12	0.5-2		45 Deg Latrolet , Bonney Forge , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	2-22	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP22 Cl. 1, SMLS
	2.5-24	2-22	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP22 Cl. 1, SMLS
	2.5-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	2-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	2.5-24	0.5-2		Threadolet , MSS SP-97 , CL6000 , FTE , A 182 Gr. F22 Cl. 1
	3-3	1.5-2	S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WP22 Cl. 1 , SMLS
	6-24	2.5-20	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1
	6-24	3-3	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A 182 Gr. F22 Cl. 1
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow, B16.11, CL6000, SWE, A 182 Gr. F22 Cl. 1

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PIPE SPEC:	1HBB1	Date:	8/4/2016 6:16:51	PM Kiewit
	0.5-2	_		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	_		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	_		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg., B16.11, CL9000, SWE, A 182 Gr. F22 Cl. 1
		-		10.
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1 Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-
	0.5-0.5	-		1-8W
	0.5-0.5	-		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS
	0.75-2	0.5-1.5	IVIATOR	
	0.75.0.75			Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Hex Head , B16.11 , MTE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
				Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-
Bolts	1-1	<u>-</u>		16W
Boils	0.5-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B16 / A 194 3
Gaskets				
	0.5.04			Sp. Wound Gskt , B16.20 , CL2500 , RF , 304 SS, Graphite Fill, CS CR, 304 SS IR ,
Flanges	0.5-24	1	Ī	0.175" Thick , 0.175" non compressed thickness
i laliges	0.5-2	<u>-</u>	MATCH	SW Flg. , B16.5 , CL2500 , RF , A 182 Gr. F22 Cl. 3
	0.5-24	_	100 (1 01 1	Blind Flg. , B16.5 , CL2500 , RF , A 182 Gr. F22 Cl. 3
	0.5-24	- -	MATCH	WN Flg., B16.5, CL2500, RF, A 182 Gr. F22 Cl. 3
Gate Valves	0.0 2 .		111111111111111111111111111111111111111	VIVING. ; 510.0 ; 612000 ; 101 ; 70 102 61.1 22 61. 0
				Gate Valve , App. Mfg. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
	0.0 =			Gate Valve , App. Mfg. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F22 Cl. 3
	5.5 2			Gate Valve, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Handwheel
	2.5-4	_	MATCH	Operator , A 217 Gr. WC9
	2.0		100 (1 01 1	Gate Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear
	3-24	-	MATCH	Operator , A 217 Gr. WC9
Globe Valves	Ţ			
				Globe Valve , Manf. Std. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel
	0.5-2	-		Operator , A 182 Gr. F22 Cl. 3
				Globe Valve , Manf. Std. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-		182 Gr. F22 Cl. 3
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet,
	2.5-4	-	MATCH	Handwheel Operator , A 217 Gr. WC9
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear
Ob a all Walking	6-24	<u>-</u>	MATCH	Operator , A 217 Gr. WC9
Check Valves				Check Valve Swing , App. Mfg. , CL2500 , SWE , Welded Bonnet , A 182 Gr. F22 Cl.
	0.5.2			3
	0.5-2	-		
	2.5-24	_	MATCH	Check Valve Swing LP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , A 217 Gr. WC9
Ball Valves	2:5-24	<u>-</u>	IVIATOR	217 GI. WC9
Bull Tultus	l	<u>I</u>	I	Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,
	0.5-2			
	0.5-2	-		Gear Operator , A 182 Gr. F22 Cl. 3
				Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,
	0.5.0			Lever Operator , A 182 Gr. F22 Cl. 3
	0.5-2	-		·
		-		Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,
	0.5-2 2.5-6	-	MATCH	Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated , Gear Operator , A 217 Gr. WC9
		-	MATCH MATCH	Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,

PIPE SPEC: 1HBD1

DESCRIPTION: HIGH PRESSURE STEAM

MATERIAL: 9Cr-1Mo-V

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1100F

RATING CLASS: 2500, ASME B16.5 - 2013 CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

CT TO CHANGE IF SE	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	6250
100	6250
200	6250
300	6070
400	5880
500	5540
600	5040
650	4905
700	4730
750	4430
800	4230
850	4060
900	3745
950	3220
1000	3030
1050	3000
1100	2515

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 2 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 3 TRANSITIONS FROM P91 LARGE BORE PIPE TO P22 ARE SHOWN ON MECHANICAL DETAILS AND THE ISOMETRIC. THE CONTRACTOR/MANUFACTURER SHALL FOLLOW THOSE DESIGN DOCUMENTS.
- ${\bf 4}$ PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P91 , SMLS
	2.5-28	-	Calc	Pipe , B36.10M , BE , A 335 Gr. P91 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P91 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , BE x PE , A 335 Gr. P91 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 335 Gr. P91, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, BE x PE, A 335 Gr. P91, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PBE, A 335 Gr. P91, 12" Long, SMLS
	1.5-2	-	S-XXS	Nipple , B36.10M , BE x PE , A 335 Gr. P91 , 6" Long, SMLS
Large Bore Fittings				
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91
	1-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F91
	2.5-28	-	MATCH	45 Deg. Elbow 3D , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	-	MATCH	90 Deg. Elbow 3D , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	2-24	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-6	0.5-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP91, SMLS
	2.5-28	2-24	MATCH	Ecc. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-6	0.5-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 234 Gr. WP91, SMLS
	2.5-28	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-48	2-46	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WP91 , SMLS
	2.5-28	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F91
	2.5-28	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A 182 Gr. F91
	2.5-28	0.5-2		Sockolet , MSS SP-97 , CL9000 , SWE , A 182 Gr. F91

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PIPE SPEC: 1HBD1 Date:

Date: 8/4/2016 6:18:15 PM



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	3-3	1.5-2	S-XXS	Con. Reducer , B16.9 , BE , A 234 Gr. WP91 , SMLS	
	4-28	0.5-24	MATCH	Weldolet , MSS SP-97 , BE , A 182 Gr. F91	
	6-24	0.5-24	MATCH X S-XXS	Weldolet , MSS SP-97 , BE , A 182 Gr. F91	
	16-20	12-12	MATCH	45Deg Red Lat Custom , Manuf. Std , BE , A 234 Gr. WP91 , SMLS	
	16-16	14-14	MATCH	45Deg Red Lat Custom , Manuf. Std , BE , A 234 Gr. WP91 , SMLS	
Small Bore Fittings					
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2	-		Cplg. , B16.11 , CL9000 , SWE , A 182 Gr. F91	
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.5-2 0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F91 Flatolet , MSS SP-97 , BE , A 182 Gr. F91	
	0.5-2	-		Male Connector , 0.5 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-	
	0505			1-8W	
	0.5-0.5 0.5-0.5	- -		Plug Round Head , Swagelok or Eq , SWGLK , A 182 Gr. F316 , SS-810-1-P	
	0.5-0.5 0.75-2	- 0.5-1.5	MATCH	Con. Swage, MSS SP-95, PBE, A 234 Gr. WP91, SMLS	
	0.75-2 0.75-2	0.5-1.5 0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP91 , SMLS	
	0.73-2	0.5-1.5	WATOH	Ecc. Swage , Mos Si -95 , FBE , A 254 Gr. WI 91 , SIMES	
	0.75-0.75	_		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W	
	0.75-2	_		Plug Square Head, B16.11, MTE, A 105	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F91	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F91	
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F91	
Bolts					
Contrate		T			
Gaskets					
Flanges					
Gate Valves				O C V V A MY OLOFOO OWE FTE WALLED	
	0.5.0			Gate Valve , App. Mfg. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel	
	0.5-2	-		Operator , A 182 Gr. F91	
	0.5.0			Gate Valve , App. Mfg. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A	
	0.5-2	-		182 Gr. F91	
	2.5-4		MATCH	Gate Valve, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Handwheel	
	2.5-4	-	WATCH	Operator , A 217-C12A Gate Valve SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , Gear	
	6-28	-	MATCH	Operator, A 217-C12A	
Globe Valves			10.2 (1 01 1	Operator, 77217 O127	
	·			Globe Valve , Manf. Std. , CL2500 , SWE x FTE , Welded Bonnet , Handwheel	
	0.5-2	-		Operator , A 182 Gr. F91	
				Globe Valve , Manf. Std. , CL2500 , SWE , Welded Bonnet , Handwheel Operator , A	
	0.5-2	-		182 Gr. F91	
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet,	
	2.5-4	-	MATCH	Handwheel Operator , A 217-C12A	
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear	
Chack Values	6-28	<u>-</u>	MATCH T	Operator , A 217-C12A	
Check Valves		l			
	0.5-2	<u>-</u>		Check Valve Swing , App. Mfg. , CL2500 , SWE , Welded Bonnet , A 182 Gr. F91	
	0.5-2	-		Check Valve Swing LP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, A	
	2.5-48	-	MATCH	217-C12A	
Ball Valves					
	•			Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,	
	0.5-2	-		Gear Operator , A 182 Gr. F91	
				Ball Valve LP FB , App. Mfg. , CL2500 , SWE , Two or Three Piece Metal Seated ,	
	0.5-2	-		Lever Operator , A 182 Gr. F91	
				Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,	
	2.5-6	-	MATCH	Gear Operator , A 217-C12A	
				Ball Valve LP FB , App. Mfg. , CL2500 , BE , Two or Three Piece Metal Seated ,	
Dette die Velee	2.5-6	<u>-</u>	MATCH	Lever Operator , A 217-C12A	
Butterfly Valves					

PIPE SPEC: 1HCA1

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DESCRIPTION: LIFT OIL, LOW AND INTERMEDIATE TEMP

MATERIAL: Stainless Steel

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1000F
RATING CLASS: 2500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

1 10 011/11102 11	OI LOII ILD IN NOTLO
TEMP. F	PRESS. PSIG
-20	6000
100	6000
200	5000
300	4480
400	4140
500	3880
600	3680
650	3600
700	3520
750	3440
800	3380
850	3300
900	3240
950	3180
1000	2950

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.19M , BE , A 312 Gr. TP304/304L Dual Cert. , SMLS
	2.5-48	-	Calc	Pipe, B36.19M, BE, A 312 Gr. TP304/304L Dual Cert., SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304/304L Dual Cert., 12" Long, SMLS
Large Bore Fittings				
	0.5-48	-	MATCH	45 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	90 Deg. LR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.5-48	-	MATCH	Eq. Tee, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304/304L Dual Cert.
	0.75-48	0.5-42	MATCH	Red. Tee, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	1-24	-	MATCH	90 Deg. SR Elbow, B16.9, BE, A 403 Gr. WP304/304L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304/304L Dual Cert.
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A 182 Gr. F304/304L Dual Cert.
	2.5-24	0.5-18	MATCH	Weldolet, MSS SP-97, BE, A 182 Gr. F304/304L Dual Cert.

PIPE SPEC: 1HCA1

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Small Bore Fittings				
	0.5-2	-	MATCH	Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304/304L Dual Cert.
	0.5-2	-	MATCH	Cap , B16.11 , CL6000 , FTE , A 182 Gr. F304/304L Dual Cert.
				Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-		810-1-12W
				Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-
	1-1	-		16W
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-48			Cad Plated
Gaskets				
				Sp. Wound Gskt, B16.20, CL2500, RF, 304 SS, Graphite Fill, CS CR, 304 SS IR,
	0.5-48			0.175" non compressed thickness
Flanges				
	0.5-12	-		Blind Flg., B16.5, CL2500, RF, A 182 Gr. F304/304L Dual Cert.
	0.5-12	-	MATCH	WN Flg., B16.5, CL2500, FF, A 182 Gr. F304/304L Dual Cert.
	0.5-12	-	MATCH	WN Flg., B16.5, CL2500, RF, A 182 Gr. F304/304L Dual Cert.
				WN Ori Flg 0.75" Thd , B16.36 , CL2500 , RF , A 182 Gr. F304/304L Dual Cert. , 2
	10-12	-	MATCH	Taps, 180deg apart
Gate Valves				
				Gate Valve , App. Mfg. , CL2500 , BE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-	MATCH	351 Gr. CF3
				Gate Valve, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Handwheel
	2.5-4	-	MATCH	Operator , A 351 Gr. CF3
				Gate Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear
	6-18	-	MATCH	Operator , A 351 Gr. CF3
Globe Valves				
				Globe Valve , Manf. Std. , CL2500 , BE , Welded Bonnet , Handwheel Operator , A
	0.5-2	-	MATCH	351 Gr. CF3
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet,
	2.5-4	-	MATCH	Handwheel Operator , A 351 Gr. CF3
				Globe Valve SP, B16.10 App. Mfg., CL2500, BE, Pressure Seal Bonnet, Gear
	6-12	-	MATCH	Operator , A 351 Gr. CF3
Check Valves				
	0 = 0			OL 1771 BY 16 A 16 OLOGOO BE WILLIAM A 16-10 CE-
	0.5-2	-	MATCH	Check Valve Pistn Lft , App. Mfg. , CL2500 , BE , Welded Bonnet , A 351 Gr. CF3
	2 - 12			Check Valve Swing SP , B16.10 App. Mfg. , CL2500 , BE , Pressure Seal Bonnet , A
D 111/1	2.5-12	<u>-</u>	MATCH	351 Gr. CF3
Ball Valves			1	D HV I I D ED A MY OLOGOO DE TI DI EN D II I O
	252		MATOU	Ball Valve LP FB , App. Mfg. , CL2500 , BE , Three Piece Fltg. Ball , Lever Operator
	0.5-2	-	MATCH	, A 351 Gr. CF3
	0.5.0			Ball Valve LP FB , App. Mfg. , CL2500 , RF , Two or Three Piece Metal Seated ,
Duttenthy Velves	2.5-6	<u>-</u>	<u> </u>	Lever Operator , A 351 Gr. CF8
Butterfly Valves		1	1	

PIPE SPEC: 1JBB1

Date: 8/4/2016 6:21:16 PM



DESCRIPTION: HIGH PRESSURE AND HIGH TEMPERATURE STEAM

MATERIAL: 2.25Cr-1Mo

EXAMINATION: Per ASME B31.1 - 2014
TEMPERATURE LIMIT: -20F to 1100F
RATING CLASS: 4500, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0313 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

ST TO CHANGE IF	SPECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	11250
100	11250
200	11250
300	10925
400	10585
500	9965
600	9070
650	8825
700	8515
750	7970
800	7610
850	7305
900	6740
950	5795
1000	4010
1050	2625
1100	1645

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 4 PIPE BENDING PROCEDURES SHALL BE SUBMITTED FOR APPROVAL.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 335 Gr. P22 , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P22 , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 335 Gr. P91 , 6" Long, SMLS
Large Bore Fittings				
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		45 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		90 Deg. Elbow , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cap , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Cplg., B16.11, CL9000, SWE, A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.5-2	-		Equal Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5	MATCH	Con. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 234 Gr. WP22 Cl. 1 , SMLS
				Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-		810-1-12W
	0.75-2	-		Plug Hex Head, B16.11, MTE, A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A 182 Gr. F22 Cl. 1
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL9000 , SWE , A 182 Gr. F22 Cl. 1
				Male Connector, 1 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1
	1-1	-		16W
Bolts				
Gaskets				
Flanges		T	T	

PIPE SPEC: 1JBB1 **Date:** 8/4/2016 6:21:16 PM



Gate Valves		1	
	0.5-2	-	Gate Valve , App. Mfg. , CL4500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 182 Gr. F22 Cl. 3
	0.5-2	-	Gate Valve , App. Mfg. , CL4500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F22 Cl. 3
Globe Valves			
	0.5-2 0.5-2	-	Globe Valve , Manf. Std. , CL4500 , SWE x FTE , Welded Bonnet , Handwheel Operator , A 182 Gr. F22 Cl. 3 Globe Valve , Manf. Std. , CL4500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F22 Cl. 3
Check Valves	0.0 2		102 01.1 22 01.0
	0.5-2	<u>-</u>	Check Valve Pistn Lft , App. Mfg. , CL4500 , SWE , Welded Bonnet , A 182 Gr. F22 Cl. 3
Ball Valves			
	0.5-2	-	Ball Valve LP FB , App. Mfg. , CL4500 , SWE , Two or Three Piece Metal Seated , Lever Operator , A 182 Gr. F22 Cl. 3
Butterfly Valves			

PIPE SPEC: 1KFB0

Date: 8/4/2016 6:22:44 PM



DESCRIPTION: ABOVE GROUND POTABLE WATER

MATERIAL: Copper

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES **TEMP. F PRESS. PSIG**

-20 275 100 275 200 230

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 POTABLE WATER PIPING SHALL BE CERTIFIED ACCORDING TO NSF 14 AND NSF 61.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
	0.5-8	-	Type K	Pipe , Copper Tubing , Male Solder End , B 88 Cl.C10200, drwn
Large Bore Fittings				
	0.5-8	-	Type K	45 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 606
	0.5-4	-	Type K	45 Deg Street Elbow, Nibco, FSC x MSC, Wrought Copper Alloy, 606-2
	0.5-8	-	Type K	90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607
	0.5-4	-	Type K	90 Deg Street Elbow, Nibco, FSC x MSC, Wrought Copper Alloy, 607-2
	0.5-8	-	Type K	Cap , Nibco , FSC , Wrought Copper Alloy , 617
	0.5-8	-	Type K	Coupling, Nibco, FSC, Wrought Copper Alloy, 600-DS
	0.5-3	-	Type K	Female Adapter, Nibco, FTE x FSC, Wrought Copper Alloy, 603
	0.5-3	-	Type K	Male Adapter, Nibco, MTE x FSC, Wrought Copper Alloy, 604
	0.5-8	-	Type K	Tee , Nibco , FSC , Wrought Copper Alloy , 611
	0.75-8	0.5-6	Type K	Red. Coupling, Nibco, FSC, Wrought Copper Alloy, 600
	0.75-8	0.5-6	Type K	Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
	1.25-3	-		Union, Nibco, FSC, Brass / Bronze B62, 733
	2-3	1.5-2	Type K	Concentric Reducer, Nibco, FSC x MSC, Wrought Copper Alloy, 600-2
	3-3	-	Type K	Male Adapter , Nibco , MTE x FSC , Brass / Bronze B62 , 704
Small Bore Fittings				
	0.5-1	_		Union , Nibco , FSC , Brass / Bronze B62 , 733
	0.5-1	-		Union, Nibco, FSC, Wrought Copper Alloy, 633-W
	0.75-2	0.5-1.5	Type K	90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607
	1-2	0.75-1.5	Type K	90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607
Bolts				
				Machine Bolt, B18.2.1, B98 Alloy 651, Nuts Silicon Bronze ASME 18.2.2 Std,
	0.5-8			Integral thread UN, B98 Alloy 651
Gaskets				
				Non Metal Flat Gskt, B16.21, CL125, FF, Neoprene Rubber, 0.125" non
	0.5-8			compressed thickness
Flanges				
_	0.5-8	-	Type K	SW Flg. , Nibco , CL125 , FF , BRASS / BRONZE B584
Gate Valves				
				Gate Valve , App. Mfg. , CL125 , FSC , Thd. Bonnet , Handwheel Operator , BRASS
	0.5-3	-	ı	/ BRONZE B62
Globe Valves				
	0 - 0			Globe Valve, Manf. Std., CL125, FSC, Thd. Bonnet, Handwheel Operator,
	0.5-3	<u>-</u>	T	BRASS / BRONZE B62
Check Valves				
	0 = 4			Check Valve Swing LP , App. Mfg. , CL125 , FSC , Thd. Bonnet , BRASS / BRONZE
Dall Value	0.5-4	-	1	B62
Ball Valves				Dell'Alexa I D. ED. Ann. Mar. OL 000 E00 O' In Entre Ette Dell' I e o
	0.5.0			Ball Valve LP FB , App. Mfg. , CL600 , FSC , Side Entry Fltg. Ball , Lever Operator ,
	0.5-3	-		BRASS / BRONZE B62
	0.5-2	-		Ball Valve, App. Mfg., CL400, FTE, Lever Operator, Bronze
Dutterfly Values	0.5-2	<u>-</u>	1	Ball Valve , App. Mfg. , CL400 , FSC , Lever Operator , Bronze
Butterfly Valves			1	

PIPE SPEC: 1KFB1

Date: 8/4/2016 6:23:36 PM



DESCRIPTION: ABOVE GROUND COMPRESSED AIR

MATERIAL: Copper

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

200

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSIG

-20 275

100 275

230

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples		0=	90	
	0.25-8	=	Type K	Pipe , Copper Tubing , Male Solder End , B 88 Cl.C10200, drwn
Large Bore Fittings				
	0.25-3	-	Type K	Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603
	0.5-8	-	Type K	45 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 606
	0.5-4	-	Type K	45 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 606-2
	0.5-8	-	Type K	90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607
	0.5-4	-	Type K	90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2
	0.5-8	-	Type K	Cap , Nibco , FSC , Wrought Copper Alloy , 617
	0.5-8	-	Type K	Coupling, Nibco, FSC, Wrought Copper Alloy, 600-DS
	0.5-3	-	Type K	Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604
	0.5-8	-	Type K	Tee , Nibco , FSC , Wrought Copper Alloy , 611
	0.75-8	0.5-6	Type K	Red. Coupling, Nibco, FSC, Wrought Copper Alloy, 600
	0.75-8	0.5-6	Type K	Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
	1.25-3	-		Union , Nibco , FSC , Brass / Bronze B62 , 733
	3-3	-	Type K	Male Adapter , Nibco , MTE x FSC , Brass / Bronze B62 , 704
Small Bore Fittings				
	0.5-2	-		Dieletric Union , Wilkins , FTE x FSC , Brass
	0.5-1	-		Union , Nibco , FSC , Brass / Bronze B62 , 733
	0.5-1	-		Union , Nibco , FSC , Wrought Copper Alloy , 633-W
	0.75-2	0.5-1.5	Type K	90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607
	0.75-2	-	Type K	Male Adapter, Nibco, MSC x FTE, Wrought Copper Alloy, 603
	0.75-0.75	-		Plug Hex Head , B16.11 , MTE , Brass
	1-2	0.75-1.5	Type K	90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607
Bolts				
				Machine Bolt , B18.2.1 , B98 Alloy 651 , Nuts Silicon Bronze ASME 18.2.2 Std,
	0.5-8	•		Integral thread UN, B98 Alloy 651
Gaskets				N. M. J. F. J. O. J. B. D. O. J. C. J. C. D. J. J.
	0 = 0			Non Metal Flat Gskt , B16.21 , CL125 , FF , Neoprene Rubber , 0.125" non
(e)	0.5-8	1		compressed thickness
Flanges	0.5.0		<u> </u>	
Osta Valera	0.5-8	-	Type K	SW Flg. , Nibco , CL125 , FF , BRASS / BRONZE B584
Gate Valves				0.44.7/d - A M/- 01405 F00 T1 B 1 I I DDA00
	0.5.0			Gate Valve, App. Mfg., CL125, FSC, Thd. Bonnet, Handwheel Operator, BRASS
Claha Valvas	0.5-3	<u>-</u>		/ BRONZE B62
Globe Valves				Globe Valve , Manf. Std. , CL125 , FSC , Thd. Bonnet , Handwheel Operator ,
	0.5.2			
Check Valves	0.5-3	<u> </u>		BRASS / BRONZE B62
Check valves				L Check Valve Swing LP , App. Mfg. , CL125 , FSC , Thd. Bonnet , BRASS / BRONZE
	0.5.4			
Rall Valvas	0.5-4	<u> </u>		B62
Ball Valves				Poll Volvo I D.ED. Ann. Mfg. Cl 600, ESC. Sido Fotos Fito Doll Lossos Operator
	0.5-4			Ball Valve LP FB, App. Mfg., CL600, FSC, Side Entry Fltg. Ball, Lever Operator,
		-		BRASS / BRONZE B62
	0.5-2	-		Ball Valve, App. Mfg., CL400, FTE, Lever Operator, Bronze
Duttorfly Volves	0.5-2	<u>-</u>		Ball Valve , App. Mfg. , CL400 , FSC , Lever Operator , Bronze
Butterfly Valves				

PIPE SPEC: 1KFB6

Date: 8/4/2016 6:24:30 PM



DESCRIPTION: UNDERGROUND COMPRESSED AIR

MATERIAL: Copper

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

 TEMP. F
 PRESS. PSIG

 -20
 275

 100
 275

 200
 230

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 3 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

Pipes & Nipples 2-6 Large Bore Fittings 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 3-6 3-6 3-6 Small Bore Fittings 2-6 Gaskets 2-6 Flanges 2-6	- - - - - - - - - - 2-4 2-4	Type K	Pipe , Copper Tubing , Male Solder End , B 88 Cl.C10200, drwn 45 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 606 45 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 606-2 90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607 90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611 Machine Bolt , B18.2.1 , B98 Alloy 651 , Nuts Silicon Bronze ASME 18.2.2 Std,
Large Bore Fittings	- - - - - - - - 2-4	Type K	45 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 606 45 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 606-2 90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607 90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6		Type K Type K Type K Type K Type K Type K Type K Type K	45 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 606-2 90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607 90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6		Type K Type K Type K Type K Type K Type K Type K Type K	45 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 606-2 90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607 90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 3-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2		Type K Type K Type K Type K Type K Type K Type K	90 Deg Elbow , Nibco , FSC , Wrought Copper Alloy , 607 90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6 2-6		Type K Type K Type K Type K Type K Type K	90 Deg Street Elbow , Nibco , FSC x MSC , Wrought Copper Alloy , 607-2 Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 2-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 4-6 4-7 4-7 5-7 5-7 5-7 5-7 5-7 5-7 5-7 5-7 5-7 5		Type K Type K Type K Type K Type K Type K	Cap , Nibco , FSC , Wrought Copper Alloy , 617 Coupling , Nibco , FSC , Wrought Copper Alloy , 600-DS Female Adapter , Nibco , FTE x FSC , Wrought Copper Alloy , 603 Male Adapter , Nibco , MTE x FSC , Wrought Copper Alloy , 604 Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 2-6 2-6 2-6 2-6 2-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges		Type K Type K Type K Type K Type K	Coupling, Nibco, FSC, Wrought Copper Alloy, 600-DS Female Adapter, Nibco, FTE x FSC, Wrought Copper Alloy, 603 Male Adapter, Nibco, MTE x FSC, Wrought Copper Alloy, 604 Tee, Nibco, FSC, Wrought Copper Alloy, 611 Union, Nibco, FSC, Wrought Copper Alloy, 633-W 90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607 Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
2-6 2-6 2-6 2-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges		Type K Type K Type K Type K	Female Adapter, Nibco, FTE x FSC, Wrought Copper Alloy, 603 Male Adapter, Nibco, MTE x FSC, Wrought Copper Alloy, 604 Tee, Nibco, FSC, Wrought Copper Alloy, 611 Union, Nibco, FSC, Wrought Copper Alloy, 633-W 90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607 Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
2-6 2-6 3-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges		Type K Type K Type K	Male Adapter, Nibco, MTE x FSC, Wrought Copper Alloy, 604 Tee, Nibco, FSC, Wrought Copper Alloy, 611 Union, Nibco, FSC, Wrought Copper Alloy, 633-W 90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607 Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
2-6 2-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges		Type K Type K	Tee , Nibco , FSC , Wrought Copper Alloy , 611 Union , Nibco , FSC , Wrought Copper Alloy , 633-W 90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
2-6 3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges		Type K	Union, Nibco, FSC, Wrought Copper Alloy, 633-W 90 Deg. Red. Elbow, Nibco, FSC, Wrought Copper Alloy, 607 Reducing Tee, Nibco, FSC, Wrought Copper Alloy, 611
3-6 3-6 Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges			90 Deg. Red. Elbow , Nibco , FSC , Wrought Copper Alloy , 607 Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
Small Bore Fittings Bolts 2-6 Gaskets 2-6 Flanges			Reducing Tee , Nibco , FSC , Wrought Copper Alloy , 611
Bolts 2-6 Gaskets 2-6 Flanges	2-4	Type K	
Bolts 2-6 Gaskets 2-6 Flanges			Machine Bolt B18.2.1 B98 Alloy 651 Nuts Silicon Bronze ASMF 18.2.2 Std
Gaskets 2-6 2-6 Flanges			Machine Rolt B18 2.1 B98 Alloy 651 Nuts Silicon Bronze ASME 18 2.2 Std
Gaskets 2-6 2-6 Flanges			Machine Rolt B18.2.1 B98 Alloy 651 Nuts Silicon Bronze ASME 18.2.2 Std
Gaskets 2-6 Flanges			Machine Bolt B18 2.1 B98 Alloy 651 Nuts Silicon Bronze ASMF 18 2.2 Std
Gaskets 2-6 Flanges			· · · · · · · · · · · · · · · · · · ·
2-6 Flanges			Integral thread UN, B98 Alloy 651
2-6 Flanges			
Flanges			Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig
			or better, 0.125" non compressed thickness
2-6			
	-		SW Flg., Nibco, CL125, FF, BRASS / BRONZE B584
Gate Valves			
Globe Valves			
Check Valves			
			<u> </u>
Ball Valves			
Butterfly Valves			

PIPE SPEC: 1KFD0

DESCRIPTION: POTABLE WATER

MATERIAL: Copper

EXAMINATION: Per ASME B31.1 - 2012

TEMPERATURE LIMIT: 32F to 200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2012 STRESS RELIEF: Per ASME B31.1 - 2012

PRESSURE - TEMPERATURE RATINGS
SUBJECT TO CHANGE IF SPECIFIED IN NOTES
TEMP. F PRESS. PSIG
32 200
200 200

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GENERAL NOTES

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- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 COMPONENT RATINGS (FLANGES, FITTINGS, ETC.) SHALL, AT A MINIMUM, MEET THE PRESSURE AND TEMPERATURE LIMITS SHOWN ON THIS PIPE CODE. COMPONENTS (FITTINGS, FLANGES, ETC.) SELECTED SHALL CORRESPOND TO THE PIPING SCHEDULE SHOWN.
- 3 SEALING ELEMENTS AND FLANGE GASKET MATERIAL, AS SHOWN, ARE TO MATCH
- 4 POTABLE WATER PIPING SHALL BE CERTIFIED ACCORDING TO NSF 61.
- 5 GASKETS FOR MECHANICAL COUPLINGS SHALL BE VIEGA GRADE EPDM
- 6 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 7 NON-METALLIC GASKETS SHALL NOT BE UTILIZED FOR STEAM AND GAS APPLICATIONS

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
				Pipe , Copper Tubing , Male Solder End , B 88 Cl.C10200, drwn , NSF 61 Certified
	0.5-4	-	Type K	
Large Bore Fittings				
				45 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0926XL,
	2.5-4	-	Type K	NSF 61 Certified
				Coupling , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0915XL, CPLG
	2.5-4	-		W/O STOP, NSF 61 Certified
				Red. Coupling, Viega ProPress, FMJE, Wrought Copper Alloy, Model 0915.2XL,
	2.5-4	0.75-3	Type K	NSF 61 Certified
				Reducing Tee, Viega ProPress, FMJE, Wrought Copper Alloy, Model 0918XL,
	2.5-4	0.75-3	Type K	NSF 61 Certified
				Tee , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0918XL, NSF 61
	2.5-4	-	Type K	Certified
Small Bore Fittings				
	0.5-2	-	Type K	45 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2926
	0.5-2	-	Type K	90 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2916
	0.5-2	-	Type K	Cap , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2956
				Coupling , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2915, CPLG W/O
	0.5-2	-		STOP
				Dielectric Union, Viega ProPress, MTE x FMJE, Wrought Copper Alloy, Model
	0.5-2	-		4067
	0.5-2	-	Type K	Tee, Viega ProPress, FMJE, Wrought Copper Alloy, Model 2918
	0.5-2	-		Union, Viega ProPress, FMJE, Wrought Copper Alloy, Model 2960ZL
				Female Adapter , Viega ProPress , FTE x FMJE , Wrought Copper Alloy , Model
	0.75-2	-	Type K	2912ZL
				Male Adapter, Viega ProPress, MTE x FMJE, Wrought Copper Alloy, Model
	0.75-2	-	Type K	2911ZL
	0.75-2	0.5-1.5	Type K	Red. Coupling, Viega ProPress, FMJE, Wrought Copper Alloy, Model 2915.2
	0.75-2	0.5-1.5	Type K	Reducing Tee , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2918
Bolts				
				Machine Bolt, B18.2.1, B98 Alloy 651, Nuts Silicon Bronze ASME 18.2.2 Std,
	0.5-4			Integral thread UN, B98 Alloy 651
Gaskets				

Insulating Gskt Set, B16.21, CL150, FF, G10 Retainer with PTFE Seal Rings, G10 Full Length Sleeves, Steel ZP and G10 Washers, Double Washer Configuration, LineBacker or equal, 300 deg F or better, NSF 61 Certified, 0.125" non compressed thickness

PIPE SPEC: 1KFD0

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	0.5-4	Non Metal Flat Gskt, B16.21, CL150, FF, Aramid Fiber/ NBR Binder (Blue-Gard 3000 or equal), Max Continous Temp- 400 deg F or better, PT- 250,000 deg FxPsig or better, NSF 61 Certified, 0.125" non compressed thickness
Flanges		
	2.5-4 -	Flg. Adapter , Viega ProPress , CL150 , FFFE x FMJE , Bronze , Model 0959.5XL
	1-2 -	Flg. Adapter, Viega ProPress, CL150, FFFE x FMJE, Bronze, Model 2959.5ZL, NSF 61 Certified
Gate Valves		
Olaha Wahaa		
Globe Valves		
Check Valves		
	0.5-2	Pistn Lft Chk VIv LP , Viega ProPress or eq. , FMJE , BRONZE , Model 2974ZL, NSF 61 Certified
Ball Valves		
	0.5-2 -	Ball VIv LP FB, Viega ProPress or eq., FMJE, Two piece Fltg. Ball, Lever Operator, BRONZE, SS Ball and Stem, Model 2970.3, NSF 61 Certified
Butterfly Valves		
	2.5-4 -	Bfly VIv Lug Type, Viega ProPress, FFTBE, Lever Operator, Ductile iron, SS Disc and Stem, Model 2873.81, NSF 61 Certified

PIPE SPEC: 1KFD1

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DESCRIPTION: ABOVE GROUND COMPRESSED AIR

MATERIAL: Copper

EXAMINATION: Per ASME B31.1 - 2012

TEMPERATURE LIMIT: 0F to 200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2012 STRESS RELIEF: Per ASME B31.1 - 2012

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 0 200 200 200

GENERAL NOTES

- 1 PRESSURE RATINGS FOR BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 2 COMPONENT RATINGS (FLANGES, FITTINGS, ETC.) SHALL, AT A MINIMUM, MEET THE PRESSURE AND TEMPERATURE LIMITS SHOWN ON THIS PIPE CODE. COMPONENTS (FITTINGS, FLANGES, ETC.) SELECTED SHALL CORRESPOND TO THE PIPING SCHEDULE SHOWN.
- 3 SEALING ELEMENTS AND FLANGE GASKET MATERIAL, AS SHOWN, ARE TO MATCH.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE VIEGA GRADE EPDM

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-4	-	Type K	Pipe , Copper Tubing , Male Solder End , B 88 Cl.C10200, drwn
Large Bore Fittings	1 25.4		T. ma I/	45 Day Elbayy Viago DroDroco EM IE Wysyysht Common Alloy Model 0020VI
	2.5-4	-	Type K	45 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0926XL
	2.5-4	-	Type K	90 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0916XL
	2.5-4	-	Type K	Cap , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0956XL
	2.5-4	-		Coupling , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0915XL, CPLG
	2.5-4	0.75-3	Type K	Red. Coupling, Viega ProPress, FMJE, Wrought Copper Alloy, Model 0915.2XL
	2.5-4	-	Type K	Reducing Tee, Viega ProPress, FMJE, Wrought Copper Alloy, Model 0918XL
	2.5-4	-	Type K	Tee , Viega ProPress , FMJE , Wrought Copper Alloy , Model 0918XL
Small Bore Fittings				
	0.5-2	-	Type K	45 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2926
	0.5-2	-	Type K	90 Deg Elbow , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2916
	0.5-2	-	Type K	Cap , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2956
	0.5-2	-		Coupling , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2915, CPLG
				Dielectric Union, Viega ProPress, MTE x FMJE, Wrought Copper Alloy, Model
	0.5-2	-		4067
	0.5-2	-	Type K	Tee , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2918
	0.5-2	-		Union, Viega ProPress, FMJE, Wrought Copper Alloy, Model 2960ZL
				Female Adapter, Viega ProPress, FTE x FMJE, Wrought Copper Alloy, Model
	0.75-2	-	Type K	2912ZL
				Male Adapter, Viega ProPress, MTE x FMJE, Wrought Copper Alloy, Model
	0.75-2	-	Type K	2911ZL
	0.75-2	0.5-1.5	Type K	Red. Coupling, Viega ProPress, FMJE, Wrought Copper Alloy, Model 2915.2
	0.75-2	0.5-1.5	Type K	Reducing Tee , Viega ProPress , FMJE , Wrought Copper Alloy , Model 2918
Bolts				
Gaskets	<u> </u>	1		
Cuonoto				
Flanges				
				Flg. Adapter, Viega ProPress, CL150, FFFE x FMJE, Bronze, Model 2959.5ZL
	1-2	-		
				Flg. Adapter , Viega ProPress , CL150 , FFFE x FMJE , Bronze , Model 0959.5XL
	2.5-4	-	_	
Gate Valves				
Globe Valves				
	•		•	
Check Valves				
	0.5-2	-	T	Pistn Lft Chk Vlv LP , Viega ProPress or eq. , FMJE , BRONZE , Model 2974ZL
Ball Valves				
				Ball VIv LP FB , Viega ProPress or eq. , FMJE , Two piece Fltg. Ball , Lever
	0.5-2	-	_	Operator , BRONZE , SS Ball and Stem , Model 2970.3
Butterfly Valves				
				Bfly VIv Lug Type, Viega ProPress, FFTBE, Lever Operator, Ductile iron, SS Disc

Bfly VIv Lug Type , Viega ProPress , FFTBE , Lever Operator , Ductile iron , SS Disc and Stem , Model 2873.81

PIPE SPEC: 1LCG1

Date: 8/4/2016 6:27:06 PM



DESCRIPTION: ABOVE GROUND COMPRESSED AIR

MATERIAL: Stainless Steel
EXAMINATION: Per ASME B31.1 - 2012

TEMPERATURE LIMIT: 0F to 140F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2012 STRESS RELIEF: Per ASME B31.1 - 2012

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 0 200 140 200

- 1 PRESSURE RATINGS FOR BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 2 COMPONENT RATINGS (FLANGES, FITTINGS, ETC.) SHALL, AT A MINIMUM, MEET THE PRESSURE AND TEMPERATURE LIMITS SHOWN ON THIS PIPE CODE. COMPONENTS (FITTINGS, FLANGES, ETC.) SELECTED SHALL CORRESPOND TO THE PIPING SCHEDULE SHOWN.
- 3 SEALING ELEMENTS AND FLANGE GASKET MATERIAL, AS SHOWN, ARE TO MATCH.
- 4 GASKETS FOR MECHANICAL COUPLINGS SHALL BE: VIEGA GRADE FKM

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	S-5S	Pipe , Annealed Stainless Tubing , PE , A 312 Gr. TP304 , Model 0103
	2.5-4	-	S-5S	Pipe , Annealed Stainless Tubing , PE , A554 , Model 0107XL
Large Bore Fittings				
	2.5-4	-	S-5S	45 Deg Elbow , Viega ProPress , VPS , A 182 Gr. F304 , Model 6026XL
	2.5-4	-	S-5S	90 Deg Elbow, Viega ProPress, VPS, A 182 Gr. F304, Model 6016XL
	2.5-4	-	S-5S	Cap, Viega ProPress, VPS, A 182 Gr. F304, Model 6056.1XL
	2.5-4	2-3		Concentric Reducer, Viega ProPress, VPS, A 182 Gr. F304, Model 6015.1XL
	2.5-4	-		Coupling, Viega ProPress, VPS, A 182 Gr. F304, Model 6015XL
	2.5-4	-		Male Adapter, Viega ProPress, MTE x VPS, A 182 Gr. F304, Model 6011XL
	2.5-4	0.75-1	S-5S	Reducing Tee, Viega ProPress, FTE x VPS, A 182 Grade F304, Model 6017.2XL
	2.5-4	1.5-3	S-5S	Reducing Tee, Viega ProPress, VPS, A 182 Gr. F304, Model 6018XL
	2.5-4	-	S-5S	Tee , Viega ProPress , VPS , A 182 Gr. F304 , Model 6018XL
Small Bore Fittings				
	0.5-2	-	S-5S	45 Deg Elbow , Viega ProPress , VPS , A 182 Gr. F304 , Model 6026
	0.5-2	-	S-5S	90 Deg Elbow , Viega ProPress , VPS , A 182 Gr. F304 , Model 6016
	0.5-2	-	S-5S	Cap, Viega ProPress, VPS, A 182 Gr. F304, Model 6056
	0.5-2	-		Coupling, Viega ProPress, VPS, A 182 Gr. F304, Model 6015
	0.5-2	-	S-5S	Female Adapter, Viega ProPress, FTE x VPS, A 182 Grade F304, Model 6012
	0.5-2	-	S-5S	Male Adapter, Viega ProPress, MTE x VPS, A 182 Gr. F304, Model 6011
				Male Connector, Swagelok or Eq, MNPT x CTBE, A 182 Gr. F316, 2 Ferrule, Grip
	0.5-0.75	0.125-0.5	S-5S	Type Compression , NPT
	0.5-2	-	S-5S	Tee , Viega ProPress , VPS , A 182 Gr. F304 , Model 6018
	0.5-2	_		Union , Viega ProPress , VPS , A 182 Gr. F304 , Model 6060
	0.75-2	0.5-1.5	S-5S	Concentric Reducer , Viega ProPress , VPS , A 182 Gr. F304 , Model 6015.1
	0.75-2	0.5-1.5	S-5S	Reducing Tee, Viega ProPress, VPS, A 182 Gr. F304, Model 6018
Bolts				
	'	<u> </u>		Machine Bolt , B18.2.1 , B98 Alloy 651 , Nuts Silicon Bronze ASME 18.2.2 Std,
	0.5-4			Integral thread UN, B98 Alloy 651
Gaskets				
	<u> </u>	•		Non Metal Flat Gskt, B16.21, CL125, FF, EPDM, 0.125" non compressed
	0.5-4			thickness
				Non Metal Flat Gskt, B16.21, CL150, FF, EPDM, 0.125" non compressed
	0.5-4			thickness
				Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , furnish with CL150
	0.5-4			PTFE compensation ring , 0.125" non compressed thickness
Flanges				
	•			Flg. Adapter, Viega ProPress, CL150, FF x VPS, A 182 Gr. F304, Model 6059
	0.5-2	-		
				Flg. Adapter, Viega ProPress, CL150, FF x VPS, A 182 Gr. F304, Model 6059XL
	2.5-4	-		
Gate Valves				
Globe Valves				
				Globe VIv , Cameron or eq. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A
	1.5-2	<u> </u>		182 Gr. F304
Check Valves				

PIPE SPEC: 1LCG1

Date: 8/4/2016 6:27:06 PM



Ball Valves			
			Ball VIv LP FB, Viega ProPress or eq., VPS, Three Piece Fltg. Ball, Lever
	0.5-2	-	Operator, A 182 Gr. F304, SS Ball and Stem, Model 4370.8
			Ball VIv LP FB, Kuka B16.10 Full Port or eq., CL150, RF, Top Entry Trun. Mount.
	2.5-4	-	Ball , Lever Operator , A 351 Gr. CF8M
Butterfly Valves			

PIPE SPEC: 1LCR1 **Date:** 8/4/2016 6:27:57 PM

DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

MATERIAL: ASTM A213, TP316 TUBING EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1000F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSIG

-20 3700

200 3501

200 3501 400 2893 600 2549 800 2388 1000 2286

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 4 DO NOT MIX FITTING MANUFACTURERS.
- 5 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

Tube		NPS 1	NPS2	SCH	Description:
Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/TP316L Dual Cert.	Pines & Ninnles	141 3 1	141 52	3011	Description.
Small Bore Fittings	i ipod a imppido	I			Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/TP316L Dual Cert.
Small Bore Fittings		0.375-1	-	0.065" tubing	, , , , , , , , , , , , , , , , , , ,
45 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2	Large Bore Fittings				
45 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2			T	T	
1.375-1 -	Small Bore Fittings				AS Dec. Eller O control of En MALENDT A 400 Oc F040/040LD at Oct.
45 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., FEMALE NPT, A 182 Gr. F316/316L Dual Cert., 2 1 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE ISO/BSP TAPERED THREAD (RT), A 182 0.375-1		0.275.4			
0.375-1 - THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., FEMALE NPT., A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAI/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Bulkhead Union, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Cap, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Sulkhead Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Cross, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip		0.375-1	-		Ferrule, Grip Type Compression
0.375-1 - THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., FEMALE NPT., A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAI/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Bulkhead Union, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Cap, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Sulkhead Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Cross, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq., FEMALE BUNN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip					45 Deg. Elbow . Swagelok or Eg . MALE POSITIONABLE SAE/MS STRAIGHT
90 Deg. Elbow, Swagelok or Eq., FEMALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL 10.375-1 - THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT 10.375-1 - THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 10.375-1 - Ferrule, Grip Type Compression 10.37		0.375-1	-		
0.375-1 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT , A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE NPT , A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Sulfkhead Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Gross, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Gross, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Gross, Swagelok or Eq., Swagelok or Eq., FSMGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Gross, Swagelok or Eq., FSMALE RMANCH, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Gross, G					· · · · · · · · · · · · · · · · · · ·
0.375-1 - Gr. F316/316L Dual Čert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., MALE PIPE WELD., A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (RP), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., FEMALE BRANCH, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., FEMALE RUN, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., FEMALE RUN, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq., FEMALE RUN, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elibow, Swagelok or Eq.		0.375-1	-		
90 Deg. Elbow, Swagelok or Eq., MALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 10 System Syste					90 Deg. Elbow, Swagelok or Eq, MALE ISO/BSP TAPERED THREAD (RT), A 182
0.375-1		0.375-1	-		Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
90 Deg. Elbow, Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , F84ALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT					
0.375-1 - Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL. THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq., SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq., SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq., SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq., SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq., FSMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq., FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cap , Swagelok or Eq., FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cap , Swagelok or Eq., FEMALE RUN, NPT (TTF) , A 182 Gr. F316/316L Dual		0.375-1	-		
90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual					
O.375-1		0.375-1	-		Cert., 2 Ferrule, Grip Type Compression
O.375-1					90 Deg. Flhow: Swagelok or Eg. MALE POSITIONABLE ISO/BSP PARALLEI
90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Ter , Swagelok or Eq , FEMALE RUN, NPT (TTF) , A 182 Gr. F316/316L Dual		0.375-1	-		
0.375-1 - THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Bulkhead Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Cap., Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 0.375-1 - Type Compression 0.375-1 - Type Compression Cross, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee., Swagelok or Eq., FEMALE BRANCH, NPT (TTF), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee., Swagelok or Eq., FEMALE RUN, NPT (TTF), A 182 Gr. F316/316L Dual					(
90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 0.375-1 - Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 0.375-1 - Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TTF) , A 182 Gr. F316/316L Dual					
0.375-1		0.375-1	-		, ,
90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual					
0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 0.375-1 - Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.375-1	-		
Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 0.375-1 - Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual					
Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.375-1	-		
Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.075.4			
Type Compression Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Type Compression Type Compression Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.375-1	-		
Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.275.4			
0.375-1 - Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.375-1	-		· · · · · · · · · · · · · · · · · · ·
Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L 0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.275.1			
0.375-1 - Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		0.375-1	-		71 1
Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual		∩ 375 ₋ 1	_		
		0.070 1			
		0.375-1	-		Cert., 2 Ferrule, Grip Type Compression



Paper Text Support or Per AME BRANCH, NPT (TTR) A 100 OF PRIVATED	PIPE SPEC:	1LCR1	Date: 8/4/201	6 6:27:57 PM	®Kiewit
Equal Tex Suspens or Eq. MALE FORTIONNELE BRACK, BOSEP		0.075.4			, , ,
Compression		0.375-1	-	Equal Tee , Swagelok or Eq , MA	LE POSITIONABLE BRANCH, ISO/BSP
STRAGHT TREED, CITES, A 182 GF, FS1603ED, Dual Cent, 2 Ferrule, Grot Type		0.375-1	-	, , ,	82 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
0.375-1					·
1.0396-1 1.0396-1		0.375-1	-	Compression	
Equal Tee - Swagesko to Eq., NALE POSITIONABLE NUM. SAS-MS STRAIGHT HERDER OF THE CONTROL OF T				THREAD (TRT) , A 182 Gr. F316	
0.375-1 Compression Country Swagelick or Eq. (MALE RUN, NPT (TMT), A 182 Gr. 5316/316L Dual Cent. 2 Farrule, Girl Type Compression Cont. 2 Farrule, Gi		0.375-1	-	•	LE POSITIONABLE RUN, SAE/MS STRAIGHT
Equal Tes., Suagable or Eq., PALER RIN, PT (TMT), A 182 Gr. F316/316, Dual Cert., 2 Ferrials, Girp Type Compression		0.375-1	_		/316L Dual Cert. , 2 Ferrule, Grip Type
Equal Tel. Stargable or Eq., SWGLIK, A 182 GF, F316318L Dual Cent. 2 Ferrule, GPT-Type Compression				Equal Tee , Swagelok or Eq , MA	
Female Commondor, Swagelok or Eq., BULKEAD NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) Family Commondor, Swagelok or Eq., 1984 F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984) F316/316L Dual Cert., 2 Ferrula, Grip Type Compression (Swagelok or Eq., 1984)			-	Equal Tee , Swagelok or Eq , SW	
Formails Connector - Swagelick or Eq. FEMALE NPT. A 182 Gr. F310516L Dual Cort. Formails Cornector - Swagelick or Eq. SDSPSP Parallel Throad (RJ), A 182 Gr.		0.375-1	-		Eq , BULKEAD NPT , A 182 Gr. F316/316L Dual
0.376-1 Cert. 2 Ferrule, Gip Type Compression Ferrale Connector, Swagelok or Eq., 180/89 Parallel Thread (RJ), A 182 Gr. P316/318, Dual Cert., 2 Ferrule, Gip Type Compression Ferrale Connector, 2 Ferrule, Gip Type Compression State Connector, 3 Ferrul		0.375-1	-		
0.375-1		0.375-1	-	Cert., 2 Ferrule, Grip Type Comp	pression
0.375-1		0.375-1	-	F316/316L Dual Cert., 2 Ferrule,	Grip Type Compression
0.375-1 		0.375-1	-	-	• • • • • • • • • • • • • • • • • • • •
Male Connector, Swagelok or Eq., MALE ISSORSP TAPERED THREAD (RT), A 182 GF. F1810L Dual Cert., 2 Ferrule, Gift Type Compression Male Connector		0.375-1	_		•
Male Connector, Swagelok or Eq., MALE NPT, Ä 192 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Freedom (1) and Connector, Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq., MALE SACHS, STRAIGHT THREAD (ST), A 192 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq., O-Seal (SAEMS Straight Thread), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Pup Round (Freedom (1) and Cert.) and Cert., 2 Ferrule, Grip Type Compression Pup Round (Freedom (1) and Cert.) and Cert., 2 Ferrule, Grip Type Compression Pup Round (Freedom (1) and Cert.) and Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Bulkhead Red pull (Free Type) Compression Bulkhead Red pull (Free Type) Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., SwGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Red Tea., Swagelok or Eq., WGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type				Male Connector , Swagelok or Eq	, MALE ISO/BSP TAPERED THREAD (RT) , A
Male Connector , Swagelok or Eq., MALE POSITIONABLE ISO/BSP PARALLEL THEAD (PR). A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression Male Connector , Swagelok or Eq., AMEL SEAMS STRANGENT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression Male Connector , Swagelok or Eq., O-SE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., O-SE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., O-SE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression Weld Connector, Swagelok or Eq., TSE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE. A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE., A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE., A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., TSE., A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok or Eq., SWGLK, A, 182 Gr. F316/316L Dual Cert., 2 Ferrule, Girp Type Compression District Connector, Swagelok			-	Male Connector, Swagelok or Eq	, MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
0.375-1		0.375-1	-	Ferrule, Grip Type Compression	
Male Connector, Swagelok or Eq., MALE SAEMAS STRAIGHT THREAD (ST), A 182 GF, F316/316 LD ucl Cert., 2 Ferrule, Gir Dyse Compression 0.375-1 -		0.375-1	<u>-</u>		•
Male Connector , Swagelok or Eq., O-Seal (SAE/MS Straight Thread) , A 182 Gr. F316/316L Dual Cert. 2, Ferrule, Grip Type Compression Plug Round Head , Swagelok or Eq., CTBE , A 182 Gr. F316/316L Dual Cert. 2, 2 Ferrule, Grip Type Compression Union , Swagelok or Eq., SWELK , A 182 Gr. F316/316L Dual Cert. 2 Ferrule, Grip Type Compression Weld Connector , Swagelok or Eq., MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. 2 Ferrule, Grip Type Compression Weld Connector , Swagelok or Eq., Wale PIPE WELD , A 182 Gr. F316/316L Dual Cert. 2 Ferrule, Grip Type Compression Weld Connector , Swagelok or Eq., TUBE SOCKET WELD , A 182 Gr. F316/316L Dual Cert. 2 Ferrule, Grip Type Compression Bulkead Reding Union , Swagelok or Eq., TUBE SOCKET WELD , A 182 Gr. F316/316L Dual Cert. 2 Ferrule, Grip Type Compression Part (Socket Well of Part (Socket Part (Socket Well of Part (Socket			_	Male Connector, Swagelok or Eq	, MALE SAE/MS STRAIGHT THREAD (ST) , A
Plug Round Head, Swagelok or Eq., CTBE, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq., CTBE, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducer Connector, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducer Connector (Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducer Connector (Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducing Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducing Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducing Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducing Union, Swagelok or Eq., SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Reducing Union, Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 0.75 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0.5 in Swagelok Or Eq., PEx CTBE, A 182 Gr. F316, SS-810-112W Male Connector, 1 x 0				Male Connector, Swagelok or Eq	, O-Seal (SAE/MS Straight Thread), A 182 Gr.
Union			-	Plug Round Head , Swagelok or E	
Weld Connector , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Weld Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Bulkhead Rendg Union , Swagelok or Eq , TUBE , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Red Tep . Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Con		0.375-1	-		(, A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
Cert., 2 Ferrule, Grip Type Compression		0.375-1	-	·	a . MALE PIPE WELD . A 182 Gr. F316/316L Dual
0.375-1		0.375-1	-	Cert. , 2 Ferrule, Grip Type Comp	pression
0.5-1		0.375-1	-	Dual Cert., 2 Ferrule, Grip Type 0	Compression
0.5-1 0.375-0.75 Grip Type Compression Reducer Concentric , Swagelok or Eq , SWGLK X CTBE , A 182 Gr. F316/316L Dua Cert. , 2 Ferrule, Grip Type Compression Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 0.5-1 0.375-0.75 Ferrule, Grip Type Compression Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , 0.75 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 3 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5 in S		0.5-1	0.375-0.75	2 Ferrule, Grip Type Compression	n
Reducer Concentric , Swagelok or Eq , SWGLK X CTBE , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-		0.5-1	0.375-0.75	·	GLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2		0 5-1		Reducer Concentric , Swagelok o	•
Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W 0.75-1				Reducing Union , Swagelok or Eq	
0.75-1 0.5-0.5 Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A			0.373-0.73	Male Connector , 0.75 x 0.5in Swa	agelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-7 16W			<u>-</u>		
Gaskets			0.5-0.5	Male Connector , 1 x 0.5in Swage	•
Flanges Gate Valves Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 0.75-1 - 182 Gr. F316/316L Dual Cert. Globe Valves	Bolts	1-1	-	16W	
Flanges Gate Valves Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 0.75-1 - 182 Gr. F316/316L Dual Cert. Globe Valves	Gaskets				
Gate Valves Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F316/316L Dual Cert. Globe Valves			<u>'</u>	1	
Gate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A 182 Gr. F316/316L Dual Cert. Globe Valves			<u> </u>		
Globe Valves	Oale valves	0.75.4	1		, SWE , Welded Bonnet , Handwheel Operator , A
Check Valves	Globe Valves	0./5-1	<u>-</u>	182 Gr. F316/316L Dual Cert.	
	Check Valves				

Ball Valves

Butterfly Valves

PIPE SPEC: 1LCR2

Date: 8/4/2016 6:28:45 PM



DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

MATERIAL: ASTM A213, TP304L TUBING EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

 SUBJECT TO CHANGE IF SPECIFIED IN NOTES

 TEMP. F
 PRESS. PSIG

 -20
 3100

 100
 3100

 200
 3100

 400
 2883

 200
 3100

 400
 2883

 600
 2542

 800
 2356

 1000
 2139

 1200
 1184

- 1 ALL TUBING FITTINGS SHALL BE 316.
- 2 THREAD CONNCECTIONS SHALL BE STRAIGHT THREADED, O-RINGS.
- 3 MINIMUN RADI USED FOR TUBE BEND SHALL BE BE 1.5IN FOR 0.5" TUBING AND 4 X TUBE OD FOR 0.75" AND GREATER.
- 4 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 5 SEAMLESS SS304L TUBING SHALL BE USED; WELDED TUBING IS NOT PERMIT.
- 6 O-RINGS SHALL BE COMBATIBLE WITH PHOSPHATE ESTER HYDRUALIC FLUID.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				·
•	0.5-0.75	-	0.065" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1-1	-	0.083" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1.5-1.5	-	0.134" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	2-2	-	0.188" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
Large Bore Fittings				
Constit Days Fittings	T	1	ī	
Small Bore Fittings	0.375-1	-		45 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	_		90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-0.5	0.25-0.25		Bulkhead Redng Union , Swagelok or Eq , CTBE , A 182 Gr. F316
		0.25-0.25		· · · · · · · · · · · · · · · · · · ·
	0.375-1	-		Bulkhead Union, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316
	0.375-1	-		Cross, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316
	0.375-1	-		Equal Tee , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Female Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Male Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Plug Round Head , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Union , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Weld Connector, Swagelok or Eq, MALE PIPE WELD, A 182 Gr. F316
	0.375-1	-		Weld Connector, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F316
	0.5-1	0.375-0.75		Red. Tee , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.5-1	0.375-0.75		Reducer Concentric, Swagelok or Eq, SWE X CTBE, A 182 Gr. F316
	0.5-1	0.375-0.75		Reducing Union , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
Bolts				
Gaskets				
Florence	T			
Flanges				Flg. Adapter , Swagelok or eq. , CL150 , FFFE X TUBE SOCKET WELD , A 182 G
	0.375-1	-		F316 -
Gate Valves				
Globe Valves				
	T	T	ī	
Check Valves				
Ball Valves				

PIPE SPEC: 1LCR3

DESCRIPTION: HYDRAULIC OIL

MATERIAL: ASTM A213, TP304L TUBING EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

1200

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -20 3100 100 3100 200 3100 400 2883 600 2542 800 2356 1000 2139

1184

GENERAL NOTES

- 1 ALL TUBING FITTINGS SHALL BE 316.
- 2 THREAD CONNCECTIONS SHALL BE STRAIGHT THREADED, O-RINGS.
- 3 MINIMUN RADI USED FOR TUBE BEND SHALL BE BE 1.5IN FOR 0.5" TUBING AND 4 X TUBE OD FOR 0.75" AND GREATER.
- 4 VERIFY VALVE PRESSURE/TEMPERATURE RATING WITH VALVE MANUFACTURER
- 5 SEAMLESS SS304L TUBING SHALL BE USED; WELDED TUBING IS NOT PERMIT.
- ${\bf 6}$ O-RINGS SHALL BE COMBATIBLE WITH PHOSPHATE ESTER HYDRUALIC FLUID.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-0.75	-	0.065" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1-1	-	0.083" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1.5-1.5	-	0.134" tubing	Tube, Annealed Stainless Tubing, CTBE, ASTM A 213, TP304L
	2-2	-	0.188" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
arge Bore Fittings				
Small Bore Fittings			1	
man Bore Fittings	0.375-1			45 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
		-		e e e e e e e e e e e e e e e e e e e
	0.375-1	-		90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Bulkhead Union, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316
	0.375-1	-		Cross, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316
	0.375-1	-		Equal Tee , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Female Connector, Swagelok or Eq., TUBE SOCKET WELD, A 182 Gr. F316
	0.375-1	-		Male Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Plug Round Head , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-1	-		Union , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.375-2	-		Weld Connector , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316
	0.375-1	-		Weld Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.5-2	0.375-0.75		Bulkhead Redng Union , Swagelok or Eq , CTBE , A 182 Gr. F316
	0.5-2	0.375-1.5		Red. Tee , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316
	0.5-2	0.375-1.5		Reducer Concentric , Swagelok or Eq , SWE X CTBE , A 182 Gr. F316
	0.5-1	0.375-0.75		Reducer Concentric, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F31
	0.5-1	0.5-0.75		Reducer Eccentric, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F316
	0.5-1	0.375-0.75		Reducing Union, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F316
	0.5-0.5	-	0.065" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	0.5-0.5	-	0.065" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1-1	-	0.083" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1-1	-	0.083" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1.5-2	-	0.000 talon.g	45 Deg. Elbow , Swagelok or Eq , CTBE , A 182 Gr. F316
	1.5-2	-		90 Deg. Elbow , Swagelok or Eq , CTBE , A 182 Gr. F316
	1.5-2	-		Bulkhead Union , Swagelok or Eq , CTBE , A 182 Gr. F316
	1.5-2	_		Equal Tee , Swagelok or Eq , CTBE , A 182 Gr. F316
	1.5-2	-		Female Connector, Swagelok or Eq, CTBE, A 182 Gr. F316
	1.5-2	_		Male Connector, Swagelok or Eq, CTBE, A 182 Gr. F316
	1.5-2	_		Plug Round Head, Swagelok or Eq, CTBE, A 182 Gr. F316
	1.5-1.5	_	0.134" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L
	1.5-1.5	<u>-</u>	0.134 tubing 0.134" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TF304L Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TF304L
	1.5-1.5	<u>-</u>	U. 13+ tubing	Union, Swagelok or Eq., CTBE, A 182 Gr. F316
	1.5-2 1.5-2	-		Weld Connector, Swagelok or Eq, CTBE, A 182 Gr. F316
		-	0 100" tubing	· · · · · · · · · · · · · · · · · · ·
	2-2	-	0.188" tubing	Tube, Annealed Stainless Tubing, CTBE, ASTM A 213, TP304L
	2-2	-	0.188" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP304L

Date: 8/4/2016 6:29:33 PM



PIPE SPEC: 1LCR3 **Date:** 8/4/2016 6:29:33 PM



Bolts				
'				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.375-2			Cad Plated
Gaskets				
Flanges				
	0.375-2	_		Flg. Adapter , Swagelok or eq. , CL150 , FFFE X TUBE SOCKET WELD , A 182 Gr. F316 -
Gate Valves	0.373 2		I	T 310 -
Gate valves				
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				

1LCS1 **PIPE SPEC:** Date: 8/4/2016 6:30:21 PM

DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

MATERIAL: ASTM A213, TP316 TUBING **EXAMINATION:** Per ASME B31.1 - 2014

-20F to 1000F TEMPERATURE LIMIT: RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

Per ASME B31.1 - 2014 DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF:

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TE

I TO CHANGE IF SP	ECIFIED IN NOTES
TEMP. F	PRESS. PSIG
-20	2991
100	2991
200	2587
300	2333
400	2139
500	1989
600	1884
650	1839
700	1809
750	1780
800	1765
850	1735
900	1720
950	1705
1000	1690

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 3 DO NOT MIX FITTING MANUFACTURERS.
- 4 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples		141 02	3311	5 documents and the second sec
	+	•	•	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/TP316L Dual Cert.
	0.375-1	<u>-</u>	0.049" tubing	
Large Bore Fittings				
Small Bore Fittings				
<u> </u>		ı	I	45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-1	-		Ferrule, Grip Type Compression
				45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	_		90 Deg. Elbow, Swagelok or Eq, FEMALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.0.0			90 Deg. Elbow , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A 182
	0.375-1	-		Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-1	_		90 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.070			90 Deg. Elbow , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL
	0.375-1	-		THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1			90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2
	0.373-1	-		Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression
	0.075.4			Bulkhead Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-		Type Compression



PIPE SPEC:	1LCS1	Date: 8/4/201	6 6:30:21 PM Wiewit
	0.075.4		Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-	Type Compression Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L
	0.375-1	-	Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, FEMALE RUN, NPT (TFT), A 182 Gr. F316/316L Dua
	0.375-1	-	Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, MALE BRANCH, NPT (TTM), A 182 Gr. F316/316L
	0.375-1	-	Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE BRANCH, ISO/BSP
	0.375-1	-	PARALLEL THREAD (TTR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE BRANCH, SAE/MS
	0.375-1	-	STRAIGHT THREAD (TTS), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE RUN, ISO/BSP PARALLEL THREAD (TRT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
	0.375-1	-	Compression Equal Tee , Swagelok or Eq , MALE POSITIONABLE RUN, SAE/MS STRAIGHT THREAD (TST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.375-1	-	Compression Equal Tee, Swagelok or Eq, MALE RUN, NPT (TMT), A 182 Gr. F316/316L Dual
	0.375-1	-	Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, NALE RON, NPT (TMT), A 162 GI. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule,
	0.375-1	-	Grip Type Compression
	0.375-1	-	Female Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	-	Female Connector, Swagelok or Eq, FEMALE NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	-	Female Connector, Swagelok or Eq, ISO/BSP Parallel Thread (RJ), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	-	Female Connector, Swagelok or Eq, ISO/BSP Tapered Thread (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	-	Male Connector , Swagelok or Eq , BULKEAD NPT , A 182 Gr. F316/316L Dual Cer , 2 Ferrule, Grip Type Compression
	0.375-1	-	Male Connector , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-1	-	Male Connector , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-1	-	Male Connector, Swagelok or Eq, MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compressior Male Connector, Swagelok or Eq, MALE SAE/MS STRAIGHT THREAD (ST), A
	0.375-1	-	182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , O-Seal (SAE/MS Straight Thread) , A 182 Gr.
	0.375-1	-	F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Plug Round Head , Swagelok or Eq , CTBE , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-1	-	Ferrule, Grip Type Compression Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-	Type Compression Weld Connector, Swagelok or Eq, MALE PIPE WELD, A 182 Gr. F316/316L Dual
	0.375-1	-	Cert., 2 Ferrule, Grip Type Compression Weld Connector, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F316/316L
	0.375-1	-	Dual Cert., 2 Ferrule, Grip Type Compression Bulkhead Redng Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert
	0.5-1	0.375-0.75	, 2 Ferrule, Grip Type Compression Red. Tee , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
	0.5-1	0.375-0.75	Grip Type Compression Reducer Concentric , Swagelok or Eq , SWGLK X CTBE , A 182 Gr. F316/316L Dua
	0.5-1	0.375-0.75	Cert., 2 Ferrule, Grip Type Compression Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-	810-1-12W
	0.75-1	0.5-0.5	Male Connector, Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W Reducing Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.75-0.75	0.375-0.5	Ferrule, Grip Type Compression Male Connector, 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-
	1-1	-	16W Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2
Bolts	1-1	0.375-0.75	Ferrule, Grip Type Compression
Gaskets	1	, , 	
	1		
Flanges			
Gate Valves			
Globe Valves			
Check Valves			

PIPE SPEC: 1LCS1

Date: 8/4/2016 6:30:21 PM



Ball Valves		
Butterfly Valves		

PIPE SPEC: 1LCT1 **Date:** 8/4/2016 6:31:10 PM

DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

MATERIAL: ASTM A213, TP316 TUBING EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1200F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -20 3700 200 3501 400 2893 600 2549 800 2388 2286 1000 1200 1184

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 3 DO NOT MIX FITTING MANUFACTURERS.
- 4 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples	141 5 1	141 32	3011	Description.
· ·pec di · · · ·ppi de				Tube , Annealed Stainless Tubing , CTBE , ASTM A269, TP316/TP316L, Dual Cert
	0.375-1	-	0.065" tubing	
Large Bore Fittings				
		_		
Small Bore Fittings				
	0.375-1	-		45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
				45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1			90 Deg. Elbow , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.373-1	-		90 Deg. Elbow , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A 182
	0.375-1	_		Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.010			90 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-1	-		Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL
	0.375-1	-		THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.075.4			90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	_		90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.373-1	-		90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression
				Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-1	-		Ferrule, Grip Type Compression
				Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-		Type Compression
				Cross, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip
	0.375-1	-		Type Compression
	0.075.4			Equal Tee, Swagelok or Eq, FEMALE BRANCH, NPT (TTF), A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression Equal Top Swagglok or Eq. FEMALE PUN NET (TET), A 182 Gr. F316/316L Dual
	0.375-1	_		Equal Tee, Swagelok or Eq, FEMALE RUN, NPT (TFT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.070 1			Equal Tee , Swagelok or Eq , MALE BRANCH, NPT (TTM) , A 182 Gr. F316/316L
	0.375-0.75	-		Dual Cert., 2 Ferrule, Grip Type Compression



	0.275.4			Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, ISO/BSP PARALLEL THREAD (TTR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.375-1	-		Compression Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, SAE/MS STRAIGHT THREAD (TTS) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.375-1	-		Compression Equal Tee , Swagelok or Eq , MALE POSITIONABLE RUN, ISO/BSP PARALLEL
	0.375-1	-		THREAD (TRT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE RUN, SAE/MS STRAIGHT
	0.375-1	-		THREAD (TST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.75	-		Equal Tee, Swagelok or Eq, MALE RUN, NPT (TMT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-1	-		Equal Tee, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq., FEMALE NPT, A 182 Gr. F316/316L Dual
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq., ISO/BSP Parallel Thread (RJ), A 182 Gr.
	0.375-1	-		F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, ISO/BSP Tapered Thread (RT), A 182 Gr.
	0.375-1	-		F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq., BULKEAD NPT, A 182 Gr. F316/316L Dual Cert.
	0.375-1	-		, 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A
	0.375-1	-		182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq, MALE NPT, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression
	0.375-1	-		Male Connector , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , MALE SAE/MS STRAIGHT THREAD (ST) , A
	0.375-1	-		182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , O-Seal (SAE/MS Straight Thread) , A 182 Gr.
	0.375-1	-		F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Plug Round Head, Swagelok or Eq, CTBE, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-		Type Compression Weld Connector , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual
	0.375-1	-		Cert. , 2 Ferrule, Grip Type Compression Weld Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression Red. Tee, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule,
	0.5-1 0.5-1	0.375-0.75 0.375-0.75		Grip Type Compression Reducer Concentric, Swagelok or Eq, SWGLK X CTBE, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-1	0.375-0.75		Reducing Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.75-0.75	-		Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-810-1-12W
	0.75-1	0.5-0.5		Male Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W
	1-1	<u>-</u>		Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts				
Gaskets				
Gaskers			<u> </u>	
Flanges				
Gate Valves				
Cate Taires	l		1	
Globe Valves				

Date: 8/4/2016 6:31:10 PM

PIPE SPEC:

Check Valves

Ball Valves

Butterfly Valves

1LCT1

®Kiewit

1LCT2 **PIPE SPEC:**

Date: 8/4/2016 6:31:59 PM

MATERIAL: ASTM A213, TP316 TUBING Per ASME B31.1 - 2014

EXAMINATION: -20F to 1200F TEMPERATURE LIMIT:

RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESCRIPTION:

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TI

I TO CHANGE IF SI	ECIFIED IN NOTES
ΓEMP. F	PRESS. PSIG
-20	4550
100	4550
200	4550
300	4550
400	4321
500	4043
600	3829
650	3743
700	3678
750	3635
800	3592
850	3549
900	3527
950	3484
1000	3462
1050	3419
1100	2874
1150	2232
1200	1713

GENERAL NOTES

INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 3 DO NOT MIX FITTING MANUFACTURERS.
- 4 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-0.5	-	0.065" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/TP316L Dual Cert.
Large Bore Fittings				
Small Bore Fittings				
	0.5-0.5	-		45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	-		45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual Cert. ,
	0.5-0.5	-		2 Ferrule, Grip Type Compression
	0.5-0.5	-		90 Deg. Elbow, Swagelok or Eq, MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq, MALE NPT, A 182 Gr. F316/316L Dual Cert., 2
	0.5-0.5	-		Ferrule, Grip Type Compression
	0.5-0.5	-		90 Deg. Elbow , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	-		90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	-		90 Deg. Elbow, Swagelok or Eq, MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.5-0.5	-		Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.5-0.5	-		Dual Cert., 2 Ferrule, Grip Type Compression



PIPE SPEC:	1LCT2	Date: 8/4/2016 6	:31:59 PM
	0.5.0.5		Bulkhead Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2
	0.5-0.5	-	Ferrule, Grip Type Compression Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.5-0.5	-	Type Compression Cross, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip
	0.5-0.5	-	Type Compression Equal Tee, Swagelok or Eq, FEMALE BRANCH, NPT (TTF), A 182 Gr. F316/316L
	0.5-0.5	-	Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Equal Tee , Swagelok or Eq , MALE BRANCH, NPT (TTM) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
			Equal Tee, Swagelok or Eq, MALE POSITIONABLE BRANCH, ISO/BSP PARALLEL THREAD (TTR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
	0.5-0.5	-	Compression
			Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, SAE/MS STRAIGHT THREAD (TTS) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.5-0.5	-	Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE RUN, ISO/BSP PARALLEL
	0.5-0.5	_	THREAD (TRT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.0 0.0		Equal Tee , Swagelok or Eq , MALE POSITIONABLE RUN, SAE/MS STRAIGHT
	0.5-0.5	-	THREAD (TST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Equal Tee , Swagelok or Eq , MALE RUN, NPT (TMT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	_	Equal Tee , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
			Female Connector , Swagelok or Eq , BULKEAD NPT , A 182 Gr. F316/316L Dual
	0.5-0.5	-	Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, FEMALE NPT, A 182 Gr. F316/316L Dual
	0.5-0.5	-	Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, ISO/BSP Parallel Thread (RJ), A 182 Gr.
	0.5-0.5	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq., ISO/BSP Tapered Thread (RT), A 182 Gr.
	0.5-0.5	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Male Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Male Connector, Swagelok or Eq, MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Male Connector , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	_	Male Connector , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
			Male Connector , Swagelok or Eq , MALE SAE/MS STRAIGHT THREAD (ST) , A
	0.5-0.5	-	182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq, O-Seal (SAE/MS Straight Thread), A 182 Gr.
	0.5-0.5	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Plug Round Head, Swagelok or Eq, CTBE, A 182 Gr. F316/316L Dual Cert., 2
	0.5-0.5	-	Ferrule, Grip Type Compression Red. Tee , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
	0.5-1	0.375-0.5	Grip Type Compression
	0.5-1	0.375-0.5	Reducer Concentric, Swagelok or Eq, SWGLK X CTBE, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.5-1	0.375-0.5	Reducing Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	-	Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	_	Weld Connector , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
			Weld Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.5-0.5	-	Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, 0.75 x 0.5in Swagelok or Eq, PE x CTBE, A 182 Gr. F316, SS-
	0.75-0.75	-	810-1-12W Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1
Bolts	1-1	<u>-</u>	16W
Gaskets			
Flanges		<u>'</u> 	
Gate Valves		<u> </u>	
	I	<u> </u>	
Globe Valves		<u> </u>	
Check Valves			
Ball Valves			

PIPE SPEC: 1LCT2

Date: 8/4/2016 6:31:59 PM



Butterfly Valves

1LCT3 **PIPE SPEC:**

Date: 8/4/2016 6:32:51 PM



DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

MATERIAL: ASTM A213, TP316 TUBING **EXAMINATION:** Per ASME B31.1 - 2014

-20F to 1200F TEMPERATURE LIMIT: RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

Per ASME B31.1 - 2014 DESIGN CODE: STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES T

I TO CHANGE IF SE	ECIFIED IN NOTES
ΓEMP. F	PRESS. PSIG
-20	5526
100	5526
200	4780
300	4310
400	3951
500	3674
600	3481
650	3398
700	3343
750	3287
800	3260
850	3205
900	3177
950	3149
1000	3122
1050	3094
1100	3154
1150	2784
1200	2102

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 3 DO NOT MIX FITTING MANUFACTURERS.
- 4 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
				Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/TP316L Dual Cert.
	0.375-0.375	-	0.065" tubing	
Large Bore Fittings				
Small Bore Fittings			T	
	0.375-0.375	-	•	45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	-		45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression 90 Deg. Elbow , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual Cert. ,
	0.375-0.375	-		2 Ferrule, Grip Type Compression
	0.375-0.375	-		90 Deg. Elbow, Swagelok or Eq, MALE ISO/BSP TAPERED THREAD (RT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq, MALE NPT, A 182 Gr. F316/316L Dual Cert., 2
	0.375-0.375	-		Ferrule, Grip Type Compression
	0.375-0.375	-		90 Deg. Elbow , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	-		90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	-		90 Deg. Elbow, Swagelok or Eq, MALE POSITIONABLE SAE/MS STRAIGHT THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.375-0.375	-		Ferrule, Grip Type Compression 90 Deg. Elbow, Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-0.375	-		Dual Cert., 2 Ferrule, Grip Type Compression

PIPE SPEC:	1LCT3	- Date:	8/4/2016 6:32:51 PM	® Kiewit
	0.375-0.375	-	Bulkhead Union , Swagelok or Eq , SV Ferrule, Grip Type Compression	VGLK , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-0.375	-	Cap , Swagelok or Eq , SWGLK , A 18 Type Compression	82 Gr. F316/316L Dual Cert., 2 Ferrule, Grip
	0.375-0.375	_	· · · · · · · · · · · · · · · · · · ·	182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
		-	Equal Tee , Swagelok or Eq , FEMALI	E BRANCH, NPT (TTF) , A 182 Gr. F316/316L
	0.375-0.375	-	Dual Cert. , 2 Ferrule, Grip Type Com Equal Tee , Swagelok or Eq , FEMALI	pression E RUN, NPT (TFT) , A 182 Gr. F316/316L Dual
	0.375-0.375	-	Cert., 2 Ferrule, Grip Type Compress Equal Tee Swagelok or Eq. MALE P	sion BRANCH, NPT (TTM), A 182 Gr. F316/316L
	0.375-0.375	-	Dual Cert. , 2 Ferrule, Grip Type Com Equal Tee , Swagelok or Eq , MALE F	pression
	0.375-0.375	-	Compression Equal Tee , Swagelok or Eq , MALE F	
	0.375-0.375	-	Compression	POSITIONABLE RUN, ISO/BSP PARALLEL
	0.375-0.375	-	Compression	POSITIONABLE RUN, SAE/MS STRAIGHT
	0.375-0.375	-	Compression	
	0.375-0.375	-	Cert. , 2 Ferrule, Grip Type Compress	
	0.375-0.375	-	Grip Type Compression	(, A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
	0.375-0.375	-	Cert. , 2 Ferrule, Grip Type Compress	
	0.375-0.375	-	Cert. , 2 Ferrule, Grip Type Compress	
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip	ISO/BSP Parallel Thread (RJ) , A 182 Gr. Type Compression ISO/BSP Tapered Thread (RT) , A 182 Gr.
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip	• • • • • • • • • • • • • • • • • • • •
	0.375-0.375	-	, 2 Ferrule, Grip Type Compression	
	0.375-0.375	-	182 Gr. F316/316L Dual Cert., 2 Ferr	
	0.375-0.375	-	Male Connector , Swagelok or Eq , M/ Ferrule, Grip Type Compression	ALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-0.375	-	THREAD (PR), A 182 Gr. F316/316L	ALE POSITIONABLE ISO/BSP PARALLEL Dual Cert., 2 Ferrule, Grip Type Compression ALE SAE/MS STRAIGHT THREAD (ST), A
	0.375-0.375	-	182 Gr. F316/316L Dual Cert., 2 Ferr	` ,
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip	· · · · · · · · · · · · · · · · · · ·
	0.375-0.375	-	Ferrule, Grip Type Compression	
	0.375-0.375	-	Type Compression	182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip
	0.375-0.375	-	Weld Connector , Swagelok or Eq , M Cert. , 2 Ferrule, Grip Type Compress	ALE PIPE WELD , A 182 Gr. F316/316L Dual ion
	0.375-0.375	-	Dual Cert., 2 Ferrule, Grip Type Com	UBE SOCKET WELD , A 182 Gr. F316/316L pression , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
	0.5-1	0.375-0.375	Grip Type Compression	, SWGLK X CTBE , A 182 Gr. F316/316L Dual
	0.5-1	0.375-0.375	Cert. , 2 Ferrule, Grip Type Compress	
	0.5-1	0.375-0.375	Ferrule, Grip Type Compression	
	0.75-0.75	-	810-1-12W	ok or Eq , PE x CTBE , A 182 Gr. F316 , SS-
F	1-1	-	Male Connector , 1 x 0.5in Swagelok o	or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-
Bolts		<u> </u>		
Gaskets				
Flanges				
Gate Valves		1		
	,	•	!	-

Globe Valves

Check Valves

Ball Valves

PIPE SPEC: 1LCT3

Date: 8/4/2016 6:32:51 PM



Butterfly Valves

PIPE SPEC: 1LCU1 **Date:** 8/4/2016 6:33:41 PM

DESCRIPTION: INSTRUMENT PROCESS SENSING AND CHEMICAL FEED TUBING

4476

MATERIAL: ASTM A213, TP316 TUBING EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: -20F to 1000F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

650

DESIGN CODE: Per ASME B31.1 - 2014 STRESS RELIEF: Per ASME B31.1 - 2014

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG -20 6500 100 6500 200 6296 300 5677 400 5204 4740 500 600 4585

 700
 4403

 750
 4331

 800
 4294

 850
 4221

 900
 4185

 950
 4149

 1000
 4112

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DUAL RATED / CERTIFIED PIPING AND COMPONENTS SHALL BE USED. LOW CARBON STAINLESS STEEL AND CASTINGS COMPLYING WITH CF3 OR CF3M SHALL NOT BE USED OVER 800F. FOR TEMPERATURES EXCEEDING 800F, THE CARBON CONTENT SHALL BE EQUAL TO OR GREATER THAN .04%
- 3 DO NOT MIX FITTING MANUFACTURERS.
- ${\tt 4}$ TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

			1	
[B: 0.1/2.1	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				The Association This OTDE ACTIVA 040 TD040/040LD at 0.44
	0.375-0.375		0.083" tubing	Tube , Annealed Stainless Tubing , CTBE , ASTM A 213, TP316/316L Dual Cert.
Large Bore Fittings	0.375-0.375	<u>-</u>	U.UOS LUDING	
Large Dore i ittings				
Small Bore Fittings				
				45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-0.375	-		Ferrule, Grip Type Compression
				45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-0.375	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual Cert. ,
	0.375-0.375	-		2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A 182
	0.375-0.375	-		Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-0.375	-		Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual
	0.375-0.375	-		Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL
	0.375-0.375	_		THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.373-0.373	-		Trinead (FN), A 102 Gr. F310/310L Dual Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-0.375	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.0.0			90 Deg. Elbow , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-0.375	-		Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-0.375	-		Dual Cert., 2 Ferrule, Grip Type Compression
				Bulkhead Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.375-0.375	-		Ferrule, Grip Type Compression
				Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-0.375	-		Type Compression



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	0.375-0.375	-	Cross , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	-	Equal Tee , Swagelok or Eq , FEMALE BRANCH, NPT (TTF) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	-	Equal Tee , Swagelok or Eq , FEMALE RUN, NPT (TFT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.375-0.375	_	Equal Tee , Swagelok or Eq , MALE BRANCH, NPT (TTM) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.010 0.010		Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, ISO/BSP PARALLEL THREAD (TTR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.375-0.375	-	Compression Equal Tee, Swagelok or Eq, MALE POSITIONABLE BRANCH, SAE/MS STRAIGHT THREAD (TTS), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
	0.375-0.375	-	Compression Equal Tee , Swagelok or Eq , MALE POSITIONABLE RUN, ISO/BSP PARALLEL
	0.375-0.375	-	THREAD (TRT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Equal Tee , Swagelok or Eq , MALE POSITIONABLE RUN, SAE/MS STRAIGHT
	0.375-0.375	-	THREAD (TST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-0.375	-	Equal Tee, Swagelok or Eq, MALE RUN, NPT (TMT), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-0.375	-	Equal Tee, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual
	0.375-0.375	-	Cert. , 2 Ferrule, Grip Type Compression Female Connector , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual
	0.375-0.375	-	Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, ISO/BSP Parallel Thread (RJ), A 182 Gr.
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Female Connector, Swagelok or Eq, ISO/BSP Tapered Thread (RT), A 182 Gr.
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual Cert.
	0.375-0.375	-	, 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A
	0.375-0.375	-	182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Male Connector, Swagelok or Eq, MALE NPT, A 182 Gr. F316/316L Dual Cert., 2
	0.375-0.375	-	Ferrule, Grip Type Compression
	0.375-0.375	-	Male Connector , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL THREAD (PR) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , MALE SAE/MS STRAIGHT THREAD (ST) , A
	0.375-0.375	-	182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression Male Connector , Swagelok or Eq , O-Seal (SAE/MS Straight Thread) , A 182 Gr.
	0.375-0.375	-	F316/316L Dual Cert., 2 Ferrule, Grip Type Compression Plug Round Head, Swagelok or Eq, CTBE, A 182 Gr. F316/316L Dual Cert., 2
	0.375-0.375	-	Ferrule, Grip Type Compression Union , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-0.375 0.375-0.375	-	Type Compression Weld Connector, Swagelok or Eq, MALE PIPE WELD, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
	0.375-0.375	_	Weld Connector , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.5-0.5	0.375-0.375	Bulkhead Redng Union , Swagelok or Eq , CTBE , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
	0.75-0.75	-	Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W
	1-1	-	Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-16W
Bolts			
Gaskets			
Flanges			
Gate Valves			
Globe Valves			
Check Valves			
Ball Valves			
Butterfly Valves			
		•	

Date: 8/4/2016 6:33:41 PM

PIPE SPEC:

1LCU1

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PIPE SPEC: 1PEA1

Date: 8/4/2016 6:34:29 PM



DESCRIPTION: ABOVE GROUND GENERAL SERVICE WATER

MATERIAL: Undefined

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 0F to 212F RATING CLASS: 250, ASME B16.5 - 2010

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014
STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 0 250 212 250

- 1 DIELECTRIC FLANGE KITS (WITH GASKET), B16.21, CL150, FF, PER SPECIFICATION 81.33.08, 0.125" THICK SHALL BE USED TO ISOLATE UNDERGROUND POLYETHYLENE WRAPPED PIPING. DIELECTRIC FLANGE KIT SHALL NOT BE USED FOR SERVICE OF 220 DEG F.
- 2 CEMENT MORTAR LINING TO BE SUPPLIED WITHOUT SEAL COAT AND RATED TO NOT LESS THAN 212F.
- 3 BOLTS AND NUTS SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS TO PREVENT DAMAGE TO FITTING.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	3-24	-	CL350	Flgd Pipe , AWWA C115 , AWWA C151 , FFFE x PE , Ductile iron
	3-24	-	CL350	Flgd Pipe , AWWA C115 , AWWA C151 , FF , Ductile iron
	3-24	-	CL350	Bell and Spigot Pipe, AWWA C151, PE, A536 Gr.60-42-10
	30-48	-	CL250	Flgd Pipe , AWWA C115 , AWWA C151 , FF , Ductile iron
	30-48	-	CL250	Flgd Pipe , AWWA C115 , AWWA C151 , FFFE x PE , Ductile iron
Large Bore Fittings				
	3-24	-		45 Deg. Elbow , AWWA C110 , CL350 , FF , A536 Gr.70-50-05 , gland and bolt set
	3-24	-		90 Deg. Elbow , AWWA C110 , CL350 , FF , A536 Gr.70-50-05 , gland and bolt set
	3-24	-		Equal Tee , AWWA C110 , CL350 , FF , A536 Gr.70-50-05 , gland and bolt set
	3-18	2-16		Red. Tee, AWWA C110, CL350, FF, A536 Gr.70-50-05, gland and bolt set Reducer Concentric, AWWA C110, CL350, FF, A536 Gr.70-50-05, gland and bolt
	3-24	2-20		set
	3-24	2-20		Reducer Eccentric , AWWA C110 , CL350 , FF , A536 Gr.70-50-05 , gland and bolt
	3-18	2-16		set
Small Bore Fittings				
Bolts	1	<u> </u>		
Boits	<u> </u>			Ctd Dit 9 2Hau/Hov Nt ACME D10 21 2 / D10 2 2 A 207 D / A 562 A bay boy. Zipo
	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex , Zinc or Cad Plated
Gaskets				
			Į.	Insulating Gskt Set, B16.21, CL125, FF, Per Specification 81.33.08, 0.175" non
	3-48			compressed thickness
				Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.175" non
	3-48			compressed thickness
				Non Metal Flat Gskt, AWWA C115, FF, organic fiber, nitrile binder, ANSI-B16.21,
	3-48			Garlock 3000, 0.175" non compressed thickness
Flanges				
		I.	I	Flg. Adapter, AWWA C110, CL150, FFFE x PE, A536 Gr.70-50-05, gland and
	3-24	-		bolt set
				Flg. Adapter, AWWA C110, CL150, FFFE x PE, A536 Gr.70-50-05, gland and
	30-48	-		bolt set
Gate Valves				
	!		•	Gate VIv , Mueller B16.10 or eq. , CL150 , FF , Bltd Bonnet , Handwheel Operator , A
	2-24	-		126 Gr. B
				Gate Valve Underground , App. Mfg. , CL150 , MJ , Bltd Bonnet , A536 Gr.70-50-05 ,
	4-12	-		Valve Box with a Tee Handle Extension
Globe Valves				
Chook Volves	1	I	_	
Check Valves				Check Valve Swing LP , B16.10 App. Mfg. , CL150 , FF , Bltd Bonnet , A 216 Gr.
	2.5-24	-		WCB
Ball Valves				
		<u> </u>		· · · · · · · · · · · · · · · · · · ·
Butterfly Valves				

PIPE SPEC: 1PEA6 Date: 8/4/2016 6:35:25 PM

UNDERGROUND GENERAL SERVICE WATER DESCRIPTION: Ductile Iron Cement Lined Pipe & Fittings, Mech Joint MATERIAL:

EXAMINATION: Per ASME B31.1 - 2014

TEMPERATURE LIMIT: 0F to 212F

250, ASME B16.5 - 2010 RATING CLASS:

CORROSION ALLOWANCE: 0.0000 in

Per ASME B31.1 - 2014 **DESIGN CODE:** STRESS RELIEF: None Required

> PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 0 250 212 250

GENERAL NOTES

- 1 DIELECTRIC FLANGE KITS (WITH GASKET), B16.21, CL150, FF, PER SPECIFICATION 81.33.08, 0.125" THICK SHALL BE USED TO ISOLATE UNDERGROUND POLYETHYLENE WRAPPED PIPING. DIELECTRIC FLANGE KIT SHALL NOT BE USED FOR SERVICE OF 220 DEG F.
- 2 PIPE AND FITTINGS SHALL BE WRAPPED WITH 4 MIL THICK CROSS-LAMINATED HIGH DENSITY POLYETHYLENE.
- 3 CEMENT MORTAR LINING TO BE SUPPLIED WITHOUT SEAL COAT AND RATED TO NOT LESS THAN 212F.
- 4 BOLTS AND NUTS SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS TO PREVENT DAMAGE TO FITTING.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	3-24	-	CL350	Flgd Pipe , AWWA C115 , AWWA C151 , FFFE x PE , Ductile iron
	3-24	-	CL350	Flgd Pipe , AWWA C115 , AWWA C151 , FF , Ductile iron
				Bell and Spigot Pipe, AWWA C151, Mechanical Joint Bell End, A536 Gr.60-42-10
	3-24	-	CL350	
	3-24	-	CL350	Bell and Spigot Pipe, AWWA C151, PE, A536 Gr.60-42-10
	3-24	-	CL350	Bell and Spigot Pipe, AWWA C151, MJBE x PE, A536 Gr.60-42-10
	30-48	-	CL250	Bell and Spigot Pipe, AWWA C151, MJBE x PE, A536 Gr.60-42-10
	30-48	-	CL250	Bell and Spigot Pipe, AWWA C151, PE, A536 Gr.60-42-10
	30-48	-	CL250	Flgd Pipe , AWWA C115 , AWWA C151 , FF , Ductile iron
				Bell and Spigot Pipe, AWWA C151, Mechanical Joint Bell End, A536 Gr.60-42-10
	30-48	-	CL250	
	30-48	-	CL250	Flgd Pipe, AWWA C115, AWWA C151, FFFE x PE, Ductile iron
Large Bore Fittings				
				22.5 Deg. Elbow, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-
	3-24	-		05
	3-24	-		22.5 Deg. Elbow , AWWA C110 , CL350 , PE x MJBE , A536 Gr.70-50-05
				45 Deg. Elbow, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-
	3-24	-		05, gland and bolt set
				45 Deg. Elbow , AWWA C110 , CL350 , MJBE x PE , A536 Gr.70-50-05 , gland and
	3-24	-		bolt set
				90 Deg. Elbow, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-
	3-24	-		05, gland and bolt set
				90 Deg. Elbow , AWWA C110 , CL350 , MJBE x PE , A536 Gr.70-50-05 , gland and
	3-24	-		bolt set
				Cap, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-05, gland
	3-12	-		and bolt set
				Equal Tee, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-05,
	3-24	-		gland and bolt set
				Equal Tee , AWWA C110 , CL350 , PE x MJBE , A536 Gr.70-50-05 , gland and bolt
	3-24	-		set
	4-12	-		45 Deg. Y , C110 , CL350 , FF , A536 Gr.70-50-05 , gland and bolt set
				Lateral Wye , US pipe , CL350 , Mechanical Joint Bell End , A536 Gr.70-50-05 ,
	4-12	-		gland and bolt set
				Reducer Concentric , AWWA C110 , CL350 , Mechanical Joint Bell End , A536 Gr.70-
	4-24	3-20		50-05 , gland and bolt set
				Reducer Concentric , AWWA C110 , CL350 , PE x MJBE , A536 Gr.70-50-05 , gland
	4-24	3-20		and bolt set
				Reducer Eccentric, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-
	4-24	3-20		50-05 , gland and bolt set
		• • •		Reducer Eccentric , AWWA C110 , CL350 , PE x MJBE , A536 Gr.70-50-05 , gland
	4-24	3-20		and bolt set
	4.40			Wye , US pipe , CL350 , Mechanical Joint Bell End , A536 Gr.70-50-05 , gland and
	4-12	-		bolt set
	0.24	4.00		Red. Tee, AWWA C110, CL350, Mechanical Joint Bell End, A536 Gr.70-50-05,
	6-24	4-20		gland and bolt set
	0.24	4.00		Red. Tee , AWWA C110 , CL350 , PE x MJBE , A536 Gr.70-50-05 , gland and bolt
	6-24	4-20		set



PIPE SPEC:	1PEA6	Date: 8/4/2016 6:35:25 PM



	6-12	4-10		Reducing 45 Deg. Y, C110, CL350, FF, A536 Gr.70-50-05, gland and bolt set Reducing 45 Deg. Y, US pipe, CL350, Mechanical Joint Bell End, A536 Gr.70-50-
	6-14	4-10		05 , gland and bolt set Reducing 45 Deg. Y , US pipe , CL350 , Mechanical Joint Bell End , A536 Gr.70-50-
	6-16	4-12		05 , gland and bolt set Cap , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-05 , gland
	14-48	-		and bolt set 22.5 Deg. Elbow , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-
	30-48 30-48	-		05 22.5 Deg. Elbow , AWWA C110 , CL250 , PE x MJBE , A536 Gr.70-50-05
	30-48	-		45 Deg. Elbow , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-05 , gland and bolt set
	30-48	-		45 Deg. Elbow, AWWA C110, CL250, MJBE x PE, A536 Gr.70-50-05, gland and bolt set 90 Deg. Elbow, AWWA C110, CL250, Mechanical Joint Bell End, A536 Gr.70-50-
	30-48	-		05 , gland and bolt set 90 Deg. Elbow , AWWA C110 , CL250 , MJBE x PE , A536 Gr.70-50-05 , gland and
	30-48	-		bolt set Equal Tee , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-05 ,
	30-48	-		gland and bolt set Equal Tee , AWWA C110 , CL250 , PE x MJBE , A536 Gr.70-50-05 , gland and bolt
	30-48	-		set Red. Tee , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-05 ,
	30-48 30-48	6-42 6-42		gland and bolt set Red. Tee , AWWA C110 , CL250 , PE x MJBE , A536 Gr.70-50-05 , gland and bolt set
	30-48	18-42		Reducer Concentric, AWWA C110, CL250, Mechanical Joint Bell End, A536 Gr.70-50-05, gland and bolt set
	30-48	18-42		Reducer Concentric , AWWA C110 , CL250 , MJBE x PE , A536 Gr.70-50-05 , gland and bolt set
	30-48	18-42		Reducer Eccentric , AWWA C110 , CL250 , Mechanical Joint Bell End , A536 Gr.70-50-05 , gland and bolt set
	30-48	18-42		Reducer Eccentric , AWWA C110 , CL250 , PE x MJBE , A536 Gr.70-50-05 , gland and bolt set
Small Bore Fittings				
Bolts				
	3-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 307 B / A 563 A, hvy hex , Zinc or Cad Plated
Gaskets				
	3-30			Dielectric FlangeKit, CL150, 0.175" non compressed thickness Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.175" non
	3-48 3-48			compressed thickness Non Metal Flat Gskt , AWWA C115 , FF , organic fiber, nitrile binder, ANSI-B16.21, Garlock 3000 , 0.175" non compressed thickness
Flanges	1			
	30-48	-		Flg. Adapter , AWWA C110 , CL150 , FF X MJBE , A536 Gr.70-50-05 , gland and bolt set
	3-24	-		FIg. Adapter, AWWA C110, CL150, FFFE x PE, A536 Gr.70-50-05, gland and bolt set
	3-24	-		Flg. Adapter , AWWA C110 , CL150 , FF X MJBE , A536 Gr.70-50-05 , gland and bolt set Flg. Adapter , AWWA C110 , CL150 , FFFE x PE , A536 Gr.70-50-05 , gland and
	30-48			bolt set
Gate Valves				
	3-8	-		Gate Valve Underground, App. Mfg., CL150, MJ, Bltd Bonnet, A536 Gr.70-50-05, Valve Box with a Tee Handle Extension Gate Vlv, Mueller B16.10 or eq., CL125, MJ, Bltd Bonnet, Wrench Operator, A
Globe Valves	3-16	-		126 Gr. B , FM 200 Approved , 2" Nut, Post Indicator Valve
Cione vaives		<u> </u>	<u> </u>	
Check Valves				
Ball Valves				
Butterfly Valves	<u> </u>			
*		-	-	

PIPE SPEC: 1WEA6

Date: 8/4/2016 6:36:23 PM



DESCRIPTION: UNDERGROUND GRAVITY DRAINS

MATERIAL: Ductile Iron Cement Lined Pipe & Fittings, Tyton Push-on Unrestrained Joint

EXAMINATION: Per ASME B31.1 - 2010

TEMPERATURE LIMIT: 32F to 212F RATING CLASS: None CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2010 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS
SUBJECT TO CHANGE IF SPECIFIED IN NOTES
TEMP. F PRESS. PSIG
32 6
212 6

- 1 DIELECTRIC FLANGE KITS SHALL BE USED TO ISOLATE UNDERGROUND POLYETHYLENE WRAPPED PIPING. DIELECTRIC FLANGE KIT SHALL NOT BE USED FOR SERVICE OF 220 DEG F.
- 2 PIPE AND FITTINGS SHALL BE WRAPPED WITH 4 MIL THICK CROSS-LAMINATED HIGH DENSITY POLYETHYLENE.
- 3 AWWA C153 INDICATES COMPACT FITTINGS.
- 4 PBLE = PUSH-ON BELL END.
- 5 THE ENGINEER SHALL SPECIFY THE FLANGE GASKET MATERIAL TO BE USED.
- 6 FASTITE PUSH ON JOINTS WITH FASTITE PLAIN SDR RUBBER GASKETS ARE AN ACCEPTABLE ALTERNATE TO TYTON JOINTS IN PIPE ONLY.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	4-24	-	CL350	Pipe , AWWA C151 , PE , A536 Gr.60-42-10
	4-24	-	CL350	Bell and Spigot Pipe, AWWA C151, MPE x PBLE, A536 Gr.60-42-10
Large Bore Fittings				
	4-24	-		11.25 Deg. Elbow , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		22.5 Deg. Elbow , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		45 Deg. Elbow , AWWA C153 , CL350 , MPE x PBLE , A536 Gr.70-50-05
	4-24	-		45 Deg. Elbow , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		45 Deg. Y , US pipe , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		90 Deg. Elbow , AWWA C153 , CL350 , MPE x PBLE , A536 Gr.70-50-05
	4-24	-		90 Deg. Elbow , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		Cross, AWWA C153, CL350, PBLE, A536 Gr.70-50-05
	4-24	-		Equal Tee , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	-		Plug Round Head, AWWA C153, PBLE, A536 Gr.70-50-05
	4-24	3-20		Red. Tee , AWWA C153 , CL350 , PBLE , A536 Gr.70-50-05
	4-24	3-20		Reducer Concentric, AWWA C153, CL350, MPE x PBLE, A536 Gr.70-50-05
	4-24	3-20		Reducer Concentric, AWWA C153, CL350, PBLE, A536 Gr.70-50-05
	4-24	3-20		Reducer Concentric, AWWA C153, CL350, PBLE x MPE, A536 Gr.70-50-05
	4-24	3-20	CL350	Reducing 45 Deg. Y , US pipe , CL350 , PBLE , A536 Gr.70-50-05
Small Bore Fittings				
- ·	0.5-2	-		Plug Square Head , B16.11 , MTE , A 105
Bolts				
				Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or
	0.5-24			Cad Plated
Gaskets				N. M. J. Fl. (O. J.) Brook Children F. M. B. J. Children C. (1971)
				Non Metal Flat Gskt , B16.21 , CL125 , FF , Neoprene Rubber , 0.125" non
-	4-16			compressed thickness
Flanges				
	4.40			Flg. Adapter , AWWA C110 , CL350 , FF X MJBE , A536 Gr.70-50-05 , gland and
Onto Volume	4-16	-		bolt set
Gate Valves				Octo VIII. Koosa I. AMANAA OE45 coosa OL405 EE BIGLBoosa I. Ilaa I. Isaal
	4.40			Gate VIv , Kennedy AWWA C515 or eq. , CL125 , FF , Bltd Bonnet , Handwheel
Claha Valvas	4-16	-		Operator , A536 Gr.60-42-10
Globe Valves				
Chook Volves		1 -		
Check Valves				
Ball Valves		 		
Dail valves				
Butterfly Valves		 		
Dutterily valves				

PIPE SPEC: 3BGI1 Date: 8/4/2016 6:37:15 PM

DESCRIPTION: PP PRESSURE PIPE

MATERIAL: AQUATHERM GREEN PIPE S, SDR11

EXAMINATION: Per ASME B31.3 - 2014

TEMPERATURE LIMIT: 32F to 140F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.3 - 2014 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
32	195
50	195
80	170
100	135
120	110
140	95

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE RATING FOR REDUCING WYE SHALL BE PER MANUFACTURER. PRESSURE RATING FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 3 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 PRESSURE RATING ONLY GOOD FOR PIPE 14" DIAMETER AND SMALLER.
- 6 IN SUN EXPOSED AREA USE UV PROTECTED PIPE (GREEN WITH BLACK EXTERIOR). FITTINGS AND PIPE LARGER THAN 10" MUST BE COATED WITH UV RESISTANT COATING OR INSULATED.
- 7 MINIMUM PIPE WALL THICKNESS SHALL BE SDR 7.4.
- 8 PIPE SADDLES SHALL NOT BE USED AS PIPE PRESSURE RATING IS DERATED TO SDR11.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-10	-	SDR 7.4	Pipe , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , IPS , MF UV, PP-R, Seamless
	1-18	-	SDR 11	Pipe , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , IPS , S, PP-R, Seamless
Large Bore Fittings				
	0.5-4	-	SDR 11	45 Deg Elbow , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R
	0.5-4	-	SDR 11	90 Deg Elbow , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R
	0.5-4	-	SDR 7.4	CAP , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R
	0.5-4	-	SDR 11	Coupling , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R
	0.5-6	-		Diaphragm VIv , Saunders or eq. , CL150 , FF , Handwheel Operator , A 126 Gr. B Flange Adapter , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-
	0.5-4	-	SDR 11	R
	0.5-4	-	SDR 11	Tee , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R Union , Aquatherm Green Pipe or eq. , ASTM F2389 , Socket Fusion , PP-R, with PP
	0.5-2.5	-		R Nut
	0.75-4	0.5-3	SDR 11	Reducing Tee, Aquatherm Green Pipe or eq., ASTM F2389, Socket Fusion, PP-R Union, Aquatherm Green Pipe or eq., ASTM F2389, Socket Fusion, PP-R, Brass
	1-2.5	-		Nut
	1.25-24	0.5-4	SDR 7.4	Fusion Outlet, Aquatherm Green Pipe or eq., ASTM F2389, Socket Fusion, PP-R Reducing Coupling, Aquatherm Green Pipe or eq., ASTM F2389, Socket Fusion,
	1.25-4	1-3	SDR 11	PP-R
	4-10	-	SDR 11	Wye , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R 45 Deg Elbow , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R, 3
	6-18	-	SDR 11	Piece Mitered 90 Deg Elbow , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R, 3
	6-18	-	SDR 11	Piece Mitered
	6-18	-	SDR 11	CAP, Aquatherm Green Pipe or eq., ASTM F2389, Butt Fusion, PP-R



PIPE SPEC: 3BGI1 **Date:** 8/4/2016 6:37:15 PM



FIFE SFEG.	SDGH	Date:	: 8/4/2016 6:37:15	5 PM
	6-18	-	SDR 11	Flange Adapter , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R
	6-8	3.5-4	SDR 11	Reducing Coupling , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion X Socket Fusion , PP-R
	6-8	4-4	SDR 11	Reducing Coupling , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion X Socket Fusion , PP-R
	6-18	4-16	SDR 11	Reducing Tee , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R
	6-18	-	SDR 11	Tee , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-R Concentric Reducer , Aquatherm Green Pipe or eq. , ASTM F2389 , Butt Fusion , PP-
	8-18 8-20	6-16 -	SDR 11	R Diaphragm VIv , Saunders or eq. , CL150 , FF , Gear Operator , A 126 Gr. B
	12-24	6-12	SDR 11	Fusion Outlet, Aquatherm Green Pipe or eq., ASTM F2389, Butt Fusion, PP-R
Small Bore Fittings				
Bolts				
	0.5-18			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				N. M. J. F. J. C. J. J. D. C. J. C. D. T. F. D.
	0.5-18	_		Non Metal Flat Gskt , B16.21 , CL150 , FF , PTFE , 0.175" non compressed thickness
Flanges				Delia Pia Academ Occas Pia Oldfo FF Octas Occid Management
	1-4	-	SDR 11	Backing Ring , Aquatherm Green Pipe , CL150 , FF , Carbon Steel with green epoxy powder coating - Backing Ring , Aquatherm Green Pipe , CL150 , FF , Carbon Steel with green epoxy
	6-18		SDR 11	powder coating -
Gate Valves				
Globe Valves				
Check Valves		T		
	1.5-12	-		Swing Chk VIv , Williams Valve or eq. , CL150 , FF , Bltd Bonnet , Cast Aluminum , Bronze B62 Seat
	14-14	-		Check Valve Swing LP , B16.10 App. Mfg. , CL150 , FF , Bltd Bonnet , A 106 Gr. B
Ball Valves				
	0.75-10 2-2	-		Ball VIv SP FB , American Valve B16.10 or eq. , CL150 , FF , Lever Operator , A 126 Teflon Fused Ball VIv FB , PBM or eq. , CL150 , FF , Lever Operator , B61, C92200
Butterfly Valves	2-2	<u> </u>		Ball VIV LB, FBIVI of eq., CE130, LL, Level Operator, Bot, C92200
	3-6	-	1	Butterfly Valve Lug Type , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Lever Operator , A536 Gr.65-45-12
	8-18	-		Butterfly Valve Lug Type , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Gear Operator , A536 Gr.65-45-12

PIPE SPEC: 3DCC1

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DESCRIPTION: 300# REFRIGERATION AND PROCESS, LOW TEMPERATURE

MATERIAL: A312 Gr TP304, Stainless Steel EXAMINATION: Per ASME B31.3 - 2014

EXAMINATION: Per ASME B31.3 - 2014
TEMPERATURE LIMIT: -325F to 400F

RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE:

DESIGN CODE: Per ASME B31.3 - 2014

STRESS RELIEF: Per ASME B31.3 - 2014, All Welds

0.0000 in

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

	0. 20250
TEMP. F	PRESS. PSIG
-325	720
100	720
200	600
300	540
400	495

- 1 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ONLY ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS SHALL CONFORM TO ASME B18.21.
- 6 REFER TO PURCHASE SPECIFICATION. VALVE MATERIALS SHALL BE COMPATIBLE WITH THE SERVICE.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.25-2	-	S-80S	Pipe , B36.19M , PE , A 312 Gr. TP304 , Welded (E = 0.85)
	2.5-8	-	S-40S	Pipe , B36.19M , BEV x GRV , A 312 Gr. TP304 , Welded (E = 0.85)
	2.5-8	-	S-40S	Pipe , B36.19M , BE , A 312 Gr. TP304 , Welded (E = 0.85)
	10-12	-	S-40	Pipe , B36.10M , BEV x GRV , A 312 Gr. TP304 , Welded (E = 0.85)
	10-20	-	S-40	Pipe , B36.10M , BE , A 312 Gr. TP304 , Welded (E = 0.85)
	22-22	-	S-60	Pipe , B36.10M , BE , A 312 Gr. TP304 , Welded (E = 0.85)
	24-24	-	S-40	Pipe , B36.10M , BE , A 312 Gr. TP304 , Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 9" Long, Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple, B36.19M, TBE, A 312 Gr. TP304, 6" Long, SMLS
	0.5-2	-	MATCH	Nipple, B36.19M, TBE, A 312 Gr. TP304, 3" Long, SMLS
	0.5-2	-	MATCH	Nipple, B36.19M, TBE, A 312 Gr. TP304, 9" Long, SMLS
	0.5-2	-	MATCH	Nipple, B36.19M, PBE, A 312 Gr. TP304, 3" Long, Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple, B36.19M, PBE, A 312 Gr. TP304, 6" Long, Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple , B36.19M , PBE , A 312 Gr. TP304 , 9" Long, Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 3" Long, Welded (E = 0.85)
	0.5-2	-	MATCH	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 6" Long, Welded (E = 0.85)
				Adapter Nipple, Victaulic Grooved, GRV x BEV, A 312 Gr. TP304, No. 442 SS, 4
	2.5-3	-	MATCH	long
				Adapter Nipple, Victaulic Grooved, GRV x BEV, A 312 Gr. TP304, No. 442 SS, 6
	4-8	-	MATCH	long
				Adapter Nipple, Victaulic Grooved, GRV x BEV, A 312 Gr. TP304, No. 442 SS, 8
	10-12	-	MATCH	long
Large Bore Fittings				
	0.75-24	0.5-0.5		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304
	2.5-12	0.75-2		45 Deg Latrolet, Bonney Forge, CL3000, SWE, A 182 Gr. F304
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 403 Gr. WP304
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 403 Gr. WP304
	2.5-24	-	MATCH	Cap , B16.9 , BE , A 403 Gr. WP304
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304 , Class S
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , BLE/TSE , A 403 Gr. WP304 , Class S
	2.5-6	0.75-2	MATCH	Con. Swage , MSS SP-95 , TBE , A 403 Gr. WP304 , Class S
	2.5-6	0.75-2	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304 , Class S

PIPE SPEC:	3DCC1	Date:	8/4/2016 6:38:16	PM Wiewit		
	2.5-6 2.5-24	0.75-2 -	MATCH MATCH	Ecc. Swage , MSS SP-95 , BLE/TSE , A 403 Gr. WP304 , Class S Eq. Tee , B16.9 , BE , A 403 Gr. WP304		
	2.5-12	-	MATCH	Rigid Coupling, Victaulic Grooved, FGE, A 403 Gr. WP304, Style 489, Type E Gasket		
	2.5-24	0.75-2		Sockolet , MSS SP-97 , CL3000 , SWE , A 182 Gr. F304		
	2.5-24 3-24	0.75-2 2.5-22	MATCH	Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304 Con. Reducer, B16.9, BE, A 403 Gr. WP304		
	3-6	2.5-4	MATCH	Con. Swage , MSS SP-95 , BBE , A 403 Gr. WP304 , Class S		
	3-24	2.5-22	MATCH	Ecc. Reducer , B16.9 , BE , A 403 Gr. WP304		
	3-6 3-18	2.5-4 2.5-14	MATCH MATCH	Ecc. Swage , MSS SP-95 , BBE , A 403 Gr. WP304 , Class S Pipet , WFI , BE , A 182 Gr. F304		
	3-16	2.5-14	MATCH	Red. Tee , B16.9 , BE , A 403 Gr. WP304		
	4-4	1.5-1.5	MATCH	Con. Reducer , B16.9 , BE , A 403 Gr. WP304		
Small Bore Fittings	4-4	1.5-1.5	MATCH I	Con. Swage , MSS SP-95 , BBE , A 403 Gr. WP304 , Class S		
oman bore rittings	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304		
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304		
	0.5-2 0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304 Dieletric Union , Manuf. Std , CL3000 , MTE x SWE , A 182 Gr. F304 x A105		
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304		
	0.5-2	-		Union , B16.11 , CL3000 , SWE , A 182 Gr. F304		
	0.75-2 0.75-2	- 0.5-1.5	MATCH	Cap , B16.11 , CL3000 , SWE , A 182 Gr. F304 Con. Swage , MSS SP-95 , PBE , A 403 Gr. WP304 , Class S		
	0.75-2	0.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , PBE , A 403 Gr. WP304 , Class S		
Polto	1-2	0.75-1.5	Γ	Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304		
Bolts	0.5-24	1		Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated		
Gaskets	0.5-24			Dielectric FlangeKit , CL300 , 0.175" non compressed thickness		
	0.3-24			Sp. Wound Gskt , B16.20 , CL300 , FF , 304 SS, Graphite Fill, 304 SS CR , 0.175"		
	0.75-24			non compressed thickness		
	0.75-24			Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, 304 SS CR, 0.175" non compressed thickness		
Flanges	0.73 24			Tion compressed trionicss		
	0.75-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A 182 Gr. F304		
	2.5-24 0.75-2	-	MATCH MATCH	WN Flg. , B16.5 , CL300 , RF , A 182 Gr. F304 SW Flg. , B16.5 , CL300 , FF , A 182 Gr. F304		
	0.75-24	-	WIN CT OF T	Blind Flg. , B16.5 , CL300 , FF , A 182 Gr. F304		
Octo Values	2.5-24	<u>-</u>	MATCH	WN Flg. , B16.5 , CL300 , FF , A 182 Gr. F304		
Gate Valves				Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182		
	0.75-2	-		Gr. F304		
	2.5-6		MATCH	Gate Valve LP, B16.10 App. Mfg., CL300, BE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8		
	2.5-0	-	WATCH	Gate Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A		
Г 	8-24	-	MATCH	351 Gr. CF8		
Globe Valves				Globe Valve , Manf. Std. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182		
	0.5-2	-		Gr. F304, 316 SS Trim		
				Globe Valve , Manf. Std. , CL800 , FTE , Bltd Bonnet , Handwheel Operator , A 182		
	0.75-2	-		Gr. F304 Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 182		
	0.75-2	-		Gr. F304		
				Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Handwheel Operator		
	2.5-6	-	MATCH	, A 351 Gr. CF8 Globe Valve LP , B16.10 App. Mfg. , CL300 , RF , Bltd Bonnet , Handwheel Operator		
	2.5-6	-		, A 182 Gr. F304		
	0.40		MATOU	Globe Valve LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , Gear Operator , A		
Check Valves	8-12	<u>-</u>	MATCH	351 Gr. CF8		
	0.75-2	-		Check Valve Pistn Lft , App. Mfg. , CL800 , SWE , Bltd Bonnet , A 182 Gr. F304 Check Valve Swing LP , B16.10 App. Mfg. , CL300 , BE , Bltd Bonnet , A 351 Gr.		
	2.5-24	-	MATCH	CF8		
Ball Valves				Dell'Velor I D. FD. Arm Mar. Cl. COO. CIVIE. Three Disease Files Dell. Lavor Or creates		
	0.75-2	-		Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF8		
				Ball Valve LP FB , App. Mfg. , CL600 , FTE , Three Piece Fltg. Ball , Lever Operator		
	0.75-2	-		, A 351 Gr. CF8		
				Ball Valve , App. Mfg. , CL300 , RF , Split body Fltg. Ball , Lever Operator , A 182 Gr		
	0.75-2	-		F304		
	0.75-2	-		F304 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Split body Fltg. Ball , Lever		
	0.75-2 2.5-6	-		Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Split body Fltg. Ball , Lever Operator , A 351 Gr. CF8		
	2.5-6	- -		Ball Valve LP FB,B16.10 App. Mfg.,CL300,RF,Split body Fltg. Ball,Lever Operator,A 351 Gr. CF8 Ball Valve LP FB,B16.10 App. Mfg.,CL300,RF,Three piece Trun. Mount. Ball,		
Butterfly Valves		- - -		Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Split body Fltg. Ball , Lever Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8		
Butterfly Valves	2.5-6 8-12	- - -		Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Split body Fltg. Ball, Lever Operator, A 351 Gr. CF8 Ball Valve LP FB, B16.10 App. Mfg., CL300, RF, Three piece Trun. Mount. Ball, Gear Operator, A 351 Gr. CF8 Butterfly Valve Lug Type, Bray API 609 Cat. B, CL300, FF w/Integral Gaskets,		
Butterfly Valves	2.5-6	- - - -		Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Split body Fltg. Ball , Lever Operator , A 351 Gr. CF8 Ball Valve LP FB , B16.10 App. Mfg. , CL300 , RF , Three piece Trun. Mount. Ball , Gear Operator , A 351 Gr. CF8		

PIPE SPEC:

3DCC1

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Butterfly Valve , Bray , CL300 , FF w/Integral Gaskets , Gear Operator , A 351 Gr. CF8 $\,$

8-24

PIPE SPEC: 3LCR1 **Date:** 8/4/2016 6:39:48 PM

0.375-1

DESCRIPTION: REFRIGERATION AND PROCESS TUBING

MATERIAL: ASTM A213, TP316 TUBING EXAMINATION: Per ASME B31.3 - 2014 TEMPERATURE LIMIT: -325F to 400F RATING CLASS: 300, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per ASME B31.1 - 2014

STRESS RELIEF: Per ASME B31.3 - 2014, All Welds

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSIG

-325 3700

-325	3700
100	3700
200	3700
300	3700
400	3552

GENERAL NOTES

- 1 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE SPEC FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE SPEC MUST BE ENGINEER APPROVED.
- 2 DO NOT MIX FITTING MANUFACTURERS.
- 3 TUBE MATERIAL HARDNESS SHALL NOT EXCEED HRB80.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
				Tube , Annealed Stainless Tubing , CTBE , ASTM A269, TP316/TP316L, Dual Cert
	0.375-1	-	0.049" tubing	
Large Bore Fittings				
Small Bore Fittings				
	•	•		45 Deg. Elbow , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2
	0.375-1	-		Ferrule, Grip Type Compression
				45 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compressio
				90 Deg. Elbow , Swagelok or Eq , FEMALE NPT , A 182 Gr. F316/316L Dual Cert.
	0.375-1	-		2 Ferrule, Grip Type Compression
				90 Deg. Elbow, Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A 18
	0.375-1	-		Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression
				90 Deg. Elbow, Swagelok or Eq, MALE NPT, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression
				90 Deg. Elbow, Swagelok or Eq, MALE PIPE WELD, A 182 Gr. F316/316L Dual
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE ISO/BSP PARALLEL
	0.375-1	-		THREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , MALE POSITIONABLE SAE/MS STRAIGHT
	0.375-1	-		THREAD (ST), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compressio
				90 Deg. Elbow, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression
				90 Deg. Elbow , Swagelok or Eq , TUBE SOCKET WELD , A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression
				Bulkhead Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		Ferrule, Grip Type Compression
				Cap , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-		Type Compression
				Cross, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Gri
	0.375-1	-		Type Compression
				Equal Tee, Swagelok or Eq, FEMALE BRANCH, NPT (TTF), A 182 Gr. F316/316
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression
				Equal Tee, Swagelok or Eq, FEMALE RUN, NPT (TFT), A 182 Gr. F316/316L Du
	0.375-1	-		Cert., 2 Ferrule, Grip Type Compression
				Equal Tee , Swagelok or Eq , MALE BRANCH, NPT (TTM) , A 182 Gr. F316/316L
	0.375-1	-		Dual Cert., 2 Ferrule, Grip Type Compression
				Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, ISO/BSP
				PARALLEL THREAD (TTR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
	0.375-1	-		Compression
				Equal Tee , Swagelok or Eq , MALE POSITIONABLE BRANCH, SAE/MS
				STRAIGHT THREAD (TTS), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type
	0 275 1			Compression

Compression



	0.375-1	_	TH	qual Tee , Swagelok or Eq , MALE POSITIONABLE RUN, ISO/BSP PARALLEL HREAD (TRT) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type ompression
	0.070 1		Ed	qual Tee , Swagelok or Eq , MALE POSITIONABLE RUN, SAE/MS STRAIGHT HREAD (TST) , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type
	0.375-1	-		ompression qual Tee , Swagelok or Eq , MALE RUN, NPT (TMT) , A 182 Gr. F316/316L Dual
	0.375-1	-		ert. , 2 Ferrule, Grip Type Compression qual Tee , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule,
	0.375-1	-		rip Type Compression emale Connector , Swagelok or Eq , BULKEAD NPT , A 182 Gr. F316/316L Dual
	0.375-1	-	Fe	ert., 2 Ferrule, Grip Type Compression emale Connector, Swagelok or Eq, FEMALE NPT, A 182 Gr. F316/316L Dual
	0.375-1	-	Fe	ert. , 2 Ferrule, Grip Type Compression emale Connector , Swagelok or Eq , ISO/BSP Parallel Thread (RJ) , A 182 Gr.
	0.375-1	-	Fe	316/316L Dual Cert., 2 Ferrule, Grip Type Compression emale Connector, Swagelok or Eq, ISO/BSP Tapered Thread (RT), A 182 Gr.
	0.375-1	-	Ma	316/316L Dual Cert., 2 Ferrule, Grip Type Compression ale Connector, Swagelok or Eq, BULKEAD NPT, A 182 Gr. F316/316L Dual Cert.
	0.375-1	-	Ma	2 Ferrule, Grip Type Compression ale Connector , Swagelok or Eq , MALE ISO/BSP TAPERED THREAD (RT) , A
	0.375-1 0.375-1	-	Ma	32 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression ale Connector , Swagelok or Eq , MALE NPT , A 182 Gr. F316/316L Dual Cert. , 2 errule, Grip Type Compression
	0.375-1	-	TH	ale Connector, Swagelok or Eq, MALE POSITIONABLE ISO/BSP PARALLEL HREAD (PR), A 182 Gr. F316/316L Dual Cert., 2 Ferrule, Grip Type Compression ale Connector, Swagelok or Eq, MALE SAE/MS STRAIGHT THREAD (ST), A
	0.375-1	-	18	32 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip Type Compression ale Connector , Swagelok or Eq , O-Seal (SAE/MS Straight Thread) , A 182 Gr.
	0.375-1	-	F3	316/316L Dual Cert., 2 Ferrule, Grip Type Compression lug Round Head, Swagelok or Eq, CTBE, A 182 Gr. F316/316L Dual Cert., 2
	0.375-1	-		errule, Grip Type Compression nion , Swagelok or Eq , SWGLK , A 182 Gr. F316/316L Dual Cert. , 2 Ferrule, Grip
	0.375-1	-	W	ype Compression /eld Connector , Swagelok or Eq , MALE PIPE WELD , A 182 Gr. F316/316L Dual
	0.375-1	-	W	ert., 2 Ferrule, Grip Type Compression /eld Connector, Swagelok or Eq, TUBE SOCKET WELD, A 182 Gr. F316/316L
	0.375-1	-	Ви	ual Cert., 2 Ferrule, Grip Type Compression ulkhead Redng Union, Swagelok or Eq, CTBE, A 182 Gr. F316/316L Dual Cert.,
	0.5-1	0.375-0.75	Re	Ferrule, Grip Type Compression ed. Tee, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2 Ferrule,
	0.5-1	0.375-0.75	Re	rip Type Compression educer Concentric , Swagelok or Eq , SWGLK X CTBE , A 182 Gr. F316/316L Dual
	0.5-1	0.375-0.75	Re	ert., 2 Ferrule, Grip Type Compression educing Union, Swagelok or Eq, SWGLK, A 182 Gr. F316/316L Dual Cert., 2
	0.5-1 0.75-0.75	0.375-0.75	Ma	errule, Grip Type Compression ale Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS- 10-1-12W
	0.75-0.75	0.5-0.5		ale Connector , Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W
	1-1	-	Ma	ale Connector, 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-
Bolts				
Gaskets				
Flanges				
Gato Valvos	I	I	1	
Gate Valves	0.75.4	<u> </u>		ate Valve , App. Mfg. , CL1500 , SWE , Welded Bonnet , Handwheel Operator , A
Globe Valves	0.75-1	-	18	32 Gr. F316/316L Dual Cert.
Check Valves				

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PIPE SPEC:

Ball Valves

Butterfly Valves

3LCR1

®Kiewit

PIPE SPEC: FBAA1

Date: 8/4/2016 6:40:36 PM



DESCRIPTION: ABOVE GRADE FIRE PROTECTION

MATERIAL: Carbon Steel

EXAMINATION: Per NFPA 24 - 2013

TEMPERATURE LIMIT: -20F to 300F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0630 in

DESIGN CODE: Per NFPA 24 - 2013
STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 FIRE PROTECTION SHALL BE SCHEDULE 40.
- 3 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 4 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 5 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 6 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 7 FIRE PROTECTION PIPING AND FITTINGS SHALL MEET STANDARDS IDENTIFIED IN NFPA 24 TABLES 10.1.1 AND 10.2.1(a), RESPSECTIVELY.
- 8 FIRE PROTECTION VALVES SHALL BE UL LISTED AND/OR FM APPROVED OS&Y GATE VALVES.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 106 Gr. B , SMLS
	2.5-48	-	Calc	Pipe , B36.10M , BE , A 106 Gr. B , SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PBE , A 106 Gr. B , 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , PE/TE , A 106 Gr. B , 3" Long, SMLS
Large Bore Fittings				
	0.75-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-42	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-48	2-42	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL3000 , SWE , A105
	2.5-24	0.5-2		Sockolet , MSS SP-97 , CL6000 , SWE , A105
	6-48	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cplg. , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105

PIPE SPEC:	FBAA1	_ Date:	: 8/4/2016 6:40:36	S PM
2 0. 20.		Date.	. 0/4/2010 0.40.30	
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Plug Hex Head , B16.11 , MTE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105
	0.5-2	-		Union , MSS SP-83 , CL6000 , SWE , A105
	0.75-0.75	-		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
Bolts	0.5-48			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets	0.0 40			Old Bit d 211Vy110X14C, NOME B10.01.27 B10.2.2, N 100 B1 / N 104 211
	•	*	•	Non Metal Flat Gskt, B16.21, CL150, FF, Red Rubber or EPDM, 0.125" non
	0.5-48			compressed thickness
				Non Metal Flat Gskt, B16.21, CL150, RF, Red Rubber or EPDM, 0.125" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL150, FF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL300, FF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
	0.5.40			Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, CS CR, 0.175" non
Elangos	0.5-48	1	T	compressed thickness
Flanges	0.5-2	_	MATCH	SW Flg. , B16.5 , CL150 , RF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	0.5-24	_	1717 (1 01 1	Blind Flg. , B16.5 , CL300 , RF , A105
	26-48	<u>-</u>	MATCH	WN Flg. , B16.47 Sr. A , CL300 , FF , A105
	26-48	_	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A105
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , FF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	26-48	-		Blind Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , RF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , RF , A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL300 , FF , A105
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	26-48	-		Blind Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
Coto Volvos	0.5-24	<u>-</u>		Blind Flg. , B16.5 , CL150 , RF , A105
Gate Valves				
Globe Valves				
Check Valves		T		
	<u> </u>	1	1	
Ball Valves				
Duttorfly Values			_	
Butterfly Valves	L			

PIPE SPEC: FBAB1

Date: 8/4/2016 6:41:59 PM



DESCRIPTION: ABOVE GRADE FIRE PROTECTION

MATERIAL: Carbon Steel
EXAMINATION: Per NFPA 24 - 2013
TEMPERATURE LIMIT: -20F to 300F

RATING CLASS: 150, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per NFPA 24 - 2013 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F	PRESS. PSIG
-20	285
100	285
200	260
300	230

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 THREADED COMPONENTS, UNLESS NOTED OTHERWISE ON THE ISOMETRIC, ARE ONLY PERMITTED DOWNSTREAM OF VENT AND DRAIN ISOLATION VALVES. PLUGS OR CAPS MUST BE DRILLED WITH A 1/8" WEEP HOLE
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE LISED.
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 7 FIRE PROTECTION PIPING AND FITTINGS SHALL MEET STANDARDS IDENTIFIED IN NFPA 24 TABLES 10.1.1 AND 10.2.1(a), RESPSECTIVELY.
- 8 FIRE PROTECTION VALVES SHALL BE UL-LISTED AND/OR FM-APPROVED OS&Y GATE VALVES.
- 9 FIRE PROTECTION SHALL BE SCHEDULE 40.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-48	-	Calc	Pipe , B36.10M , BE , A 53 Gr. B , ERW
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. B, 6" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.10M, PE/TE, A 106 Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.10M , TBE , A 106 Gr. B , 6" Long, SMLS
Large Bore Fittings				
	0.75-12	0.5-2		45 Deg Latrolet , MSS SP-97 , CL3000 , FTE , A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A105
	1-24	0.5-2		Threadolet, MSS SP-97, CL6000, FTE, A105
	2.5-48	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-42	MATCH	Con. Reducer , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-42	MATCH	Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS
	2.5-48	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-48	2-42	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL3000, SWE, A105
	2.5-24	0.5-2		Sockolet, MSS SP-97, CL6000, SWE, A105
	6-48	2.5-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
Small Bore Fittings				
	0.5-2	-		45 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		45 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL3000 , SWE , A105
	0.5-2	-		90 Deg. Elbow , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , FTE , A105
	0.5-2	-		Cap , B16.11 , CL6000 , SWE , A105

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	0.5-2 0.5-2	-		Cplg. , B16.11 , CL3000 , SWE , A105 Cplg. , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL3000 , SWE , A105
	0.5-2	-		Equal Tee , B16.11 , CL6000 , SWE , A105
	0.5-2	-		Plug Hex Head , B16.11 , MTE , A105
	0.5-2	-		Union , MSS SP-83 , CL3000 , SWE , A105 Union , MSS SP-83 , CL6000 , SWE , A105
	0.5-2	-		UNION, IVISS SP-03, CL0000, SWE, A105
	0.75-0.75	-		Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A105 , SS-810-1-12W
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL3000 , SWE , A105
	0.75-2	0.5-1.5		Red. Tee , B16.11 , CL6000 , SWE , A105
Bolts				
1	0.5-48	1	T	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H
Gaskets				No Mari Flat Octor B40 04 OL450 FF NIM Occor Octor 0 405ll co
	0.5-48			Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.125" non
	0.5-46			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.125" non
	0.5-48			compressed thickness
	0.0 10			Sp. Wound Gskt, B16.20, CL150, FF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL150, RF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
				Sp. Wound Gskt, B16.20, CL300, FF, 304 SS, Graphite Fill, CS CR, 0.175" non
	0.5-48			compressed thickness
	0.5-48			Sp. Wound Gskt, B16.20, CL300, RF, 304 SS, Graphite Fill, CS CR, 0.175" non compressed thickness
Flanges	0.3-40	1		Compressed trickness
i idiigoo	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , FF , A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL300 , FF , A105
	0.5-24	-		Blind Flg. , B16.5 , CL300 , RF , A105
	26-48	-	MATCH	WN Flg., B16.47 Sr. A, CL300, FF, A105
	2.5-24	-	MATCH	WN Flg. , B16.5 , CL150 , RF , A105
	26-48	-	MATOLI	Blind Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	2.5-24 2.5-24	-	MATCH MATCH	WN Flg. , B16.5 , CL150 , FF , A105
	2.5-24 26-48	-	WATCH	WN Flg. , B16.5 , CL300 , RF , A105 Blind Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL150 , RF , A105/A105N
	26-48	-	MATCH	WN Flg. , B16.47 Sr. A , CL300 , RF , A105/A105N
	0.5-24	-	-	Blind Flg. , B16.5 , CL150 , RF , A105
	0.5-2	-	MATCH	SW Flg., B16.5, CL150, RF, A105
	0.5-2	-	MATCH	SW Flg., B16.5, CL300, FF, A105
	0.5-2	-	MATCH	SW Flg. , B16.5 , CL150 , FF , A105
Cata Values	0.5-2	.	MATCH	SW Flg. , B16.5 , CL300 , RF , A105
Gate Valves				
Globe Valves				
	<u> </u>	1	1	Globe Valve , Manf. Std. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 105
	0.5-2	<u>-</u>		
Check Valves				
I HOIL Molyco	ĺ		1	
Ball Valves			<u> </u>	

PIPE SPEC: FPEA6 **Date:** 8/4/2016 6:43:23 PM



MATERIAL: Ductile Iron, Cement Lined Pipe, Mechanical Joint

EXAMINATION: Per NFPA 24 - 2013

TEMPERATURE LIMIT: 0F to 120F

RATING CLASS: 125, ASME B16.5 - 2013

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per NFPA 24 - 2013
STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS SUBJECT TO CHANGE IF SPECIFIED IN NOTES TEMP. F PRESS. PSIG 0 250 120 250

GENERAL NOTES

1 ALL PIPING USED IN PRESSURIZED SYSTEMS SHALL UTILIZE RESTRAINED JOINT SYSTEMS. INSTALLATION METHODS FOR RESTRAINED JOINT SYSTEMS SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS. END PREP AS "RJBLE" = "Restrained Joint On Bell End"

(K) Kiewit

- 2 GASKET MATERIAL INDICATED INCLUDES FLANGED AND BELL AND SPIGOT JOINTS. DIMENSIONS AND RATING ARE PER THE TYPE OF GASKET SELECTED.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 PIPE FITTINGS AND VALVES MUST BE UL AND/OR FM APPROVED.
- 5 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 6 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 7 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION DETAILS.
- 8 THE INTERIOR SURFACES OF DUCTILE IRON PIPE SHALL BE CEMENT LINED ACCORDING TO AWWA C104/21.4. UNLESS OTHERWISE REQUIRED, EXTERIOR SURFACES OF DUCTILE IRON PIPE SHALL BE COATED BEFORE SHIPMENT WITH A BITUMINOUS MATERIAL IN ACCORDANCE WITH AWWA C153/A21.53.
- 9 UNDERGROUND VALVES SHALL BE PROVIDED WITH A VALVE BOX AS A MINIMUM.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	4-24	-	CL350	Flgd Pipe , CL125 , ASME B16.1 , TR Flex, AWWA C115/A21.15 , FFFE x PE , Ductile iron , FM APPROVED
	4-24	-	CL350	Flgd Pipe, CL125, ASME B16.1, TR Flex, AWWA C115/A21.15, FFFE x RJBLE, Ductile iron, FM APPROVED
	4-24	-	CL350	Pipe, TR Flex, AWWA C151/A21.51, PE, Ductile iron, FM APPROVED Bell and Spigot Pipe, TR Flex, AWWA C151/A21.51, RJBLE x SPE, Ductile iron,
	4-24	-	CL350	FM APPROVED
Large Bore Fittings				
	4-24	-		22.5 Deg. Elbow , TR Flex, AWWA C153/A21.53 , CL350 , RJBLE , FM Approved
	4-24	-		45 Deg. Elbow, TR Flex, AWWA C153/A21.53, CL350, RJBLE, FM Approved
	4-24	-		90 Deg. Elbow, TR Flex, AWWA C153/A21.53, CL350, RJBLE, FM Approved
	4-24	-		Cap , TR Flex, AWWA C153/A21.53 , CL350 , RJBLE , FM Approved
	4-24	-		Equal Tee , TR Flex, AWWA C153/A21.53 , CL350 , RJBLE , FM Approved
	4-24	-		Plug Round Head , TR Flex, AWWA C153/A21.53 , RJSPE , FM Approved
	4-24	-		Wye, TR Flex, AWWA C153/A21.53, CL350, RJBLE, FM Approved
	6-24	4-20		Red. Tee , TR Flex, AWWA C153/A21.53 , CL350 , RJBLE , FM Approved
	6-24	4-20	CL350	Reducing WYE, TR Flex, AWWA C153/A21.53, CL350, RJBLE, FM Approved Reducer Concentric, TR Flex, AWWA C153/A21.53, CL350, RJBLE, FM
	10-24	4-20		Approved
	10-24	8-20		Reducer Eccentric , TR Flex, AWWA C153/A21.53 , RJBLE , FM Approved
Small Bore Fittings				
Bolts				
	4-24	-	1	Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	•			No. March Flor Cold. B40.04. Oldos. FE. F. II. From Flores T. to. Nicoland

Non Metal Flat Gskt, B16.21, CL125, FF, Full Face Flange-Tyte, Neoprene, 0.125" non compressed thickness

PIPE SPEC: FPEA6 **Date:** 8/4/2016 6:43:23 PM



Flanges			
	4-24	-	Thd. Flg., AWWA C115, CL125, FF, Ductile Iron, Srrted Finish
			Flange Connecting Pc, TR Flex, AWWA C153/A21.53, CL125, FFFE x RJBLE,
	4-24	_	FM Approved
Gate Valves			I mr pprovod
			Gate VIv , B16.10 App. Mfg. , CL125 , FF , Bltd Bonnet , Wrench Operator , A 216
	6-10	-	Gr. WCB , UL LISTED, FM APPROVED , Underground
			Gate Valve Underground , B16.10 App. Mfg. , CL150 , FF , Bltd Bonnet , Post
	6-10	_	Indicator, A 126 Gr. B, UL LISTED, FM APPROVED
Globe Valves	0.10		Indicator, 77 120 Off. B , OE Eleves, TW/W T NoveB
Check Valves			
Ball Valves			
Butterfly Valves			
	·	·	

PIPE SPEC: FUGA6 Date: 8/4/2016 6:44:14 PM



EXAMINATION: Per NFPA 24-2013 ASTM F2164-2013

TEMPERATURE LIMIT: 32F to 120F

RATING CLASS: 250, AWWA C906-15 ASTM D3035-2014, Cell Class 445574C

CORROSION ALLOWANCE: 0.0000 in DESIGN CODE: Per NFPA 24 - 2013 STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES T

ГЕМР. F	PRESS. PSIG
32	250
80	250
90	225
100	195
105	186
110	177
120	157

GENERAL NOTES

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION **DETAILS**
- 2 FINAL LEAK TESTING SHALL BE HYDROSTATIC IN ACCORDANCE WITH ASTM F2164 AND NFPA 24.
- 3 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 4 ALL PIPE SHALL BE CONTINUOUSLY MARKED WITH DURABLE PRINTING, INCLUDING THE FOLLOWING INFORMATION: DIMENSION RATIO, MANUFACTURER'S NAME, CELL CLASS, ASTM BASIS, LOT NUMBER, AND FM DIAMOND LOGO MARKING.
- 5 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE **USED**
- 6 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 7 TEMP LIMIT 40-120 PER NFPA FOR FIRE WATER SERVICE.
- 8 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 9 PIPE FITTINGS AND VALVES MUST BE UL AND/OR FM APPROVED.
- 10 HDPE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND ASTM D2774.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	2-24	-	SDR 9	Pipe , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
				45 Deg Elbow , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	2-6	-	SDR 9	IPS , Molded
				90 Deg Elbow , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	2-6	-	SDR 9	IPS , Molded
	2-8	-	SDR 9	CAP , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS
				Flange Adapter , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	2-24	-	SDR 9	IPS -
				MJ Adapter, ISCO or eq., ASTM D3350, PE4710, Butt Fusion x MJPE, IPS, gland
	2-24	-	SDR 9	and bolt set
	2-6	-	SDR 9	Tee , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS , Molded
				Concentric Reducer, FM Approved ISCO or eq., ASTM D3350, PE4710, Butt
	3-24	2-22	SDR 9	Fusion, IPS
				Eccentric Reducer, Industrial Pipe Fittings, ASTM D3350, PE4710, Butt Fusion,
	3-24	2-22	SDR 7	IPS
				Reducing Tee , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	3-24	2-12	SDR 7	IPS , Branch Saddle
				45 Deg Elbow , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	8-24	-	SDR 7	IPS, 3 Piece Fabbed
				90 Deg Elbow , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion ,
	8-24	-	SDR 7	IPS , 5 Piece Fabbed



PIPE SPEC:

FUGA6

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	0.24		CDD 7	Tee , FM Approved ISCO or eq. , ASTM D3350, PE4710 , Butt Fusion , IPS ,
Const. Dans Fistings	8-24	<u>-</u>	SDR 7	Fabbed
Small Bore Fittings				
Bolts				
	2-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	2-24			Non Metal Flat Gskt, B16.21, CL150, FF, Synthetic Fiber, Rubber Binder, Garlock 3760, 0.125" non compressed thickness
Flanges				·
	2-24 2-24	- -	CL200	Backing Ring , FM Approved, ISCO or eq. , CL125 , FF Lap Flgd , Ductile Iron - Blind Flg. , B16.5 , CL150 , FF , Ductile Iron
Gate Valves				, , , , , , , , , , , , , , , , , , ,
	3-16	-		Gate VIv , Mueller B16.10 or eq. , CL125 , MJ , Bltd Bonnet , Wrench Operator , A 126 Gr. B , FM 200 Approved , 2" Nut
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves	1	Ī		

PIPE SPEC: FUGB6 Date: 8/4/2016 6:45:08 PM



MATERIAL: PVC

EXAMINATION: Per NFPA 24-2013 ASTM F2164-2013 & Factory Mutual (For Mech Joints w/Flgs)

TEMPERATURE LIMIT: 40F to 120F

RATING CLASS: 200, FM/ ASTM D3035-2014, Cell Class 445574C

CORROSION ALLOWANCE: 0.0000 in

DESIGN CODE: Per NFPA 24 - 2013

STRESS RELIEF: None Required

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

OT TO CHANGE IT S	I CON ILD IN NOTES
TEMP. F	PRESS. PSIG
40	305
73	305
80	269
90	229
100	190
110	153
120	122

- 1 REFER TO THE DESIGN DOCUMENT (PID, ISOMETRIC AND LINE LIST) FOR ACTUAL COMPONENT SELECTION, PLACEMENT, AND INSTALLATION DETAILS
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 ALL PIPE SHALL BE CONTINUOUSLY MARKED WITH DURABLE PRINTING, INCLUDING THE FOLLOWING INFORMATION: DIMENSION RATIO, MANUFACTURER'S NAME, CELL CLASS, ASTM BASIS, LOT NUMBER, AND FM DIAMOND LOGO MARKING.
- 4 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISTED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED
- 5 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 6 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08
- 7 FINAL LEAK TESTING SHALL BE HYDROSTATIC IN ACCORDANCE WITH ASTM F2164 AND NFPA 24.
- 8 TEMP LIMIT 40-120 PER NFPA FOR FIRE WATER SERVICE.
- 9 PIPE FITTINGS AND VALVES MUST BE UL AND/OR FM APPROVED.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	2-24	-	CL200	Pipe , FM Approved ISCO or eq. , CL200 , ASTM D3350, PE4710 , Butt Fusion , IPS
Large Bore Fittings				
	2-6	-	CL200	45 Deg Elbow, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt Fusion, IPS, Molded 90 Deg Elbow, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt
	2-6	-	CL200	Fusion , IPS , Molded
	2-8	-	CL200	CAP , FM Approved ISCO or eq. , CL200 , ASTM D3350, PE4710 , Butt Fusion , IPS Flange Adapter , FM Approved ISCO or eq. , CL200 , ASTM D3350, PE4710 , Butt
	2-24	-	CL200	Fusion, IPS - Tee, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt Fusion, IPS
	2-6	-	CL200	, Molded Concentric Reducer , FM Approved ISCO or eq. , CL200 , ASTM D3350, PE4710 ,
	3-24	2-22	CL200	Butt Fusion , IPS
	3-24	2-22	CL200	Eccentric Reducer , Industrial Pipe Fittings , ASTM D3350, PE4710 , Butt Fusion , IPS
	3-24	2-12	CL200	Reducing Tee, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt Fusion, IPS, Branch Saddle 45 Deg Elbow, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt
	8-24	-	CL200	Fusion , IPS , 3 Piece Fabbed
	8-24	-	CL200	90 Deg Elbow, FM Approved ISCO or eq., CL200, ASTM D3350, PE4710, Butt Fusion, IPS, 3 Piece Fabbed
	8-24	<u>-</u>	CL200	Tee , FM Approved ISCO or eq. , CL200 , ASTM D3350, PE4710 , Butt Fusion , IPS , Fabbed
Small Bore Fittings				



PIPE SPEC: FUGB6

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Bolts				
	2-24			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or Cad Plated
Gaskets				
	2-24			Non Metal Flat Gskt, B16.21, CL125, FF, NM Comp. Gskt., 0.125" non compressed thickness Non Metal Flat Gskt, B16.21, CL125, FF, NM Comp. Gskt., 0.175" non
	2-24			compressed thickness Non Metal Flat Gskt , B16.21 , CL150 , FF , Neoprene Rubber , 0.125" non
	2-24			compressed thickness
Flanges				
	2-24 2-24	-	CL200	Backing Ring , FM Approved, ISCO or eq. , CL125 , FF Lap Flgd , Ductile Iron - Blind Flg. , B16.5 , CL150 , FF , Ductile Iron
Gate Valves				
Globe Valves				
Check Valves				
Ball Valves				
Butterfly Valves				

PIPE SPEC: WMAJ1

CIRCULATING WATER

MATERIAL: Carbon Steel

EXAMINATION: Per AWWA C200 - 2012 TEMPERATURE LIMIT: 32F to 150F

RATING CLASS: CL.D, PER AWWA C207-2013

CORROSION ALLOWANCE: 0.0625 in

DESCRIPTION:

DESIGN CODE: Per AWWA C200 - 2012 STRESS RELIEF: NOT APPLICABLE

PRESSURE - TEMPERATURE RATINGS
SUBJECT TO CHANGE IF SPECIFIED IN NOTES
TEMP. F PRESS. PSIG
32 150
150 150

GENERAL NOTES

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- 1 PIPE SEAM WELDING SHALL MEET THE REQUIRESMENTS OF AWWA C200
- 2 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 3 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANICAL PIPING SPECIFICATION. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, NON-METALLIC GASKETS SHALL NOT BE FIBER-REINFORCED.
- 4 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 5 CAP SCREWS ARE ACCEPTABLE FOR USE ON LUGGED AND TAPPED BUTTERFLY VALVES. SCREWS MUST CONFORM TO ASME B18.2.1.
- 6 PRESSURE RATINGS FOR BUTTERFLY AND BALL VALVES ARE DEPENDENT ON MANUFACTURER'S SEAT RATINGS AT VARIOUS TEMPERATURES.
- 7 INTERIOR OF PIPE IS LINED. LINING MATERIAL SHALL BE PER SPECIFICATION 70.12.4 REQUIREMENTS.
- 8 GASKETS SHALL MEET OR EXCEED THE REQUIREMENTS OF AWWA C200 AND C207
- 9 THE LISTED MATERIALS ARE THE MINIMUM REQUIREMENTS AND MAY BE SUBSTITUTED WITH ENGINEER REVIEW AND APPROVAL. WHERE NOT LISTED, MATERIALS LISTED AS "AWWA C200 CS" SHALL BE SUBMITTED FOR ENGINEER REVIEW AND APPROVAL

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	0.5-2	=	Calc	Pipe , B36.19M , PE , A 312 Gr. TP304L , SMLS
	0.5-2	-	Calc	Pipe , B36.10M , PE , A 53 Gr. B , SMLS
	2.5-24	-	Calc	Pipe , B36.10M , BE , A 53 Gr. B , ERW
	30-84	-		Pipe , AWWA C200 , BE , AWWA C200 CS
	0.25-2	-	Calc	Nipple , B36.10M , PBE , A 53 Gr. B , 6" Long, SMLS
	0.25-2	-	Calc	Nipple, B36.10M, PBE, A 53 Gr. B, 6" Long, SMLS
	0.25-2	-	Calc	Nipple, B36.10M, PBE, A 53 Gr. B, 3" Long, SMLS
	0.25-2	-	Calc	Nipple , B36.10M , PE/TE , A 53 Gr. B , 3" Long, SMLS
	0.25-2	-	Calc	Nipple, B36.10M, TBE, A 53 Gr. B, 3" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PBE , A 312 Gr. TP304L , 9" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PBE, A 312 Gr. TP304L, 6" Long, SMLS
	0.5-2	-	Calc	Nipple , B36.19M , PBE , A 312 Gr. TP304L , 3" Long, SMLS
	0.5-2	-	Calc	Nipple, B36.19M, PE/TE, A 312 Gr. TP304, 3" Long, SMLS
	6-6	-	Calc	Nipple , B36.19M , PE x MTE , A 106 Gr. B , 3" Long, SMLS
Large Bore Fittings				
	2.5-24	-	MATCH	45 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. LR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	-	MATCH	90 Deg. SR Elbow , B16.9 , BE , A 234 Gr. WPB , SMLS
	2.5-24	0.5-2		Threadolet, MSS SP-97, CL3000, FTE, A 182 Gr. F304L
	3-3	1.5-1.5	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	3-3	1.5-1.5	MATCH	Ecc. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	4-4	2-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 234 Gr. WPB
	4-4	2-2	MATCH	Con. Swage , MSS SP-95 , BLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SML
	4-4	2-2	MATCH	Con. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	4-4	2-2	MATCH	Ecc. Swage, MSS SP-95, BLE/PSE, A 403 Gr. WP304L, SMLS
	4-24	-	MATCH	Eq. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS
	4-84	3-18	MATCH	Weldolet , MSS SP-97 , BE , A105 , SMLS
	6-24	-	MATCH	Cap , B16.9 , BE , A 234 Gr. WPB , SMLS
	6-6	1-1	MATCH	Con. Swage , MSS SP-95 , TLE/PSE , A 403 Gr. WP304/304L Dual Cert. , SML
	6-24	3-22	MATCH	Red. Tee , B16.9 , BE , A 234 Gr. WPB , SMLS



PIPE SPEC:	WMAJ1	Date:	: 8/4/2016 6:46:01 F	PM Wiewit	
Cmall Dans Fittings	8-24 8-24 26-84 26-84 26-84 30-84 30-84 30-84 30-84 30-84 36-84	6-22 6-22 - - - - - - - 30-72 30-72	MATCH	Con. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS Ecc. Reducer, B16.9, BE, A 234 Gr. WPB, SMLS 45 Deg Eq Lat Tee, AWWA C208, BE, AWWA C200 CS 90 Deg. Y, AWWA C208, BE, AWWA C200 CS Eq. Cross, AWWA C208, BE, AWWA C200 CS 45 Dg Mitr 2 Ct 2.5D, AWWA C208, BE, AWWA C200 CS 90 Dg 5pc Elbow 1.0D, AWWA C208, BE, AWWA C200 CS 90 Dg 5pc Elbow 1.5D, AWWA C208, BE, AWWA C200 CS 90 Dg 5pc Elbow 2.5D, AWWA C208, BE, AWWA C200 CS Eq. Tee, AWWA C208, BE, AWWA C200 CS Con. Reducer, AWWA C208, BE, AWWA C200 CS Ecc. Reducer, AWWA C208, BE, AWWA C200 CS	
Small Bore Fittings	0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.5-2 0.75-2 0.75-2 0.75-2 0.75-2 1-1	- - - - - - - 0.5-1.5	MATCH	45 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L 45 Deg. Elbow , B16.11 , CL3000 , SWE , A 53 Gr. B 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 182 Gr. F304L 90 Deg. Elbow , B16.11 , CL3000 , SWE , A 53 Gr. B Cplg. , B16.11 , CL3000 , SWE , A 182 Gr. F304/304L Dual Cert. Equal Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Plug Hex Head , B16.11 , MTE , A 182 Gr. F304L Union , MSS SP-83 , CL3000 , SWE , A 182 Gr. F304L Cap , B16.11 , CL3000 , FTE , A 182 Gr. F304L Con. Swage , MSS SP-95 , BLE/PSE , A 182 Gr. F304L Male Connector , 0.75 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1-12W Red. Tee , B16.11 , CL3000 , SWE , A 182 Gr. F304L Reducing Insert , MSS SP-79 , CL3000 , PE x SWE , A 182 Gr. F304L Male Connector , 1 x 0.5in Swagelok or Eq , PE x CTBE , A 182 Gr. F316 , SS-810-1	
Bolts	0.504			Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B7 / A 194 2H , Zinc or	
Gaskets	0.5-84			Cad Plated Dielectric FlangeKit , CL150 , 0.175" non compressed thickness, Non Fiber	
Flanges	0.5-24 0.5-24 0.5-24 0.5-48 0.5-48 0.75-24 0.75-24			Reinforced Non Metal Flat Gskt , B16.21 , CL150 , FF , NM Comp. Gskt. , 0.175" non compressed thickness, Non Fiber Reinforced Non Metal Flat Gskt , B16.21 , CL150 , RF , NM Comp. Gskt. , 0.175" non compressed thickness, Non Fiber Reinforced Sp. Wound Gskt , B16.20 , CL150 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness Sp. Wound Gskt , B16.20 , CL300 , RF , 304 SS, Graphite Fill, CS CR , 0.175" non compressed thickness Insulating Gskt Set , B16.21 , CL150 , FF , Per Specification 81.33.08 , 0.175" non compressed thickness, Non Fiber Reinforced Insulating Gskt Set , B16.21 , CL150 , RF , Per Specification 81.33.08 , 0.175" non compressed thickness, Non Fiber Reinforced Non Metal Flat Gskt , AWWA C207 , CL D , Ring , Neoprene Rubber , 0.175" non compressed thickness, Non Fiber Reinforced	
Flanges Gate Valves	0.5-2 0.5-2 2.5-24 0.5-2 2.5-24 30-72 30-84 2.5-24	- - - - - - - -	MATCH MATCH MATCH MATCH	SW Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L Blind Flg. , B16.5 , CL150 , RF , A 182 Gr. F304L Blind Flg. , B16.5 , CL150 , FF , A 53 Gr. B SW Flg. , B16.5 , CL150 , FF , A 182 Gr. F304L WN Flg. , B16.5 , CL150 , RF , A105 Blind Flg. , AWWA C207 , CL D , FF , AWWA C207 CS SO Flg Ring Type , AWWA C207 , CL D , FF , AWWA C207 CS WN Flg. , B16.5 , CL150 , FF , A105	
Gato varvoo	0.5-2 0.5-2 2.5-6	- - -	•	Gate Valve , App. Mfg. , CL800 , SWE x FTE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF8 Gate Valve , App. Mfg. , CL800 , SWE , Bltd Bonnet , Handwheel Operator , A 351 Gr. CF3 Gate Valve LP , B16.10 App. Mfg. , CL150 , RF , Bltd Bonnet , Handwheel Operator , A 216 Gr. WCB	
Globe Valves	0.5-2 0.5-2	-		Globe Valve, Manf. Std., CL800, SWE x FTE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF8 Globe Valve, Manf. Std., CL800, SWE, Bltd Bonnet, Handwheel Operator, A 351 Gr. CF3	
Check Valves					
Ball Valves				Dell Velve I D ED. App. Mar. Ol 000, OME. ETE. Thurs By E'', D. ''.	
Dutterffy Vel	0.5-2 0.5-2	-	ı	Ball Valve LP FB , App. Mfg. , CL600 , SWE x FTE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF8 Ball Valve LP FB , App. Mfg. , CL600 , SWE , Three Piece Fltg. Ball , Lever Operator , A 351 Gr. CF3	
Butterfly Valves		1		Bfly Vlv Lug Type, Bray API 609 Cat. B, CL150, FF w/Integral Gaskets, Lever	

Bfly Vlv Lug Type , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Lever Operator , A536 Gr.65-45-12

PIPE SPEC:	WMAJ1	Date: 8/4/2016 6:46:01 PM	® Kiewit
		Pfly Vly Lug Tyr	pe , Bray API 609 Cat. B , CL150 , FF w/Integral Gaskets , Gear
	8-24	- Operator, A536	
		•	rt Pt , Milliken AWWA C504 , CL D , FF , Gear Operator , A 126 Gr.
	30-48	- B	
		Butterfly Valve I	OblFlg Short Pt, Bray Controls or eq., 150PSIG, Lugged FF, Gear
	54-54	- Operator , A 12	
		, ,	be , Bray API 609 Cat. B , CL150 , Lugged FF w/ Integral Gaskets ,
	54-84		, A 126 Gr. B , EPDM Seat, 316 Disc
		•	OblFlg Short Pt, Bray Controls or eq., 150PSIG, Lugged FF, Gear
	66-66	- Operator , A 12	
		•	OblFlg Short Pt, Bray Controls or eq., 75PSIG, Lugged FF, Gear
	78-78	- Operator , A 12	
		Butterfly Valve I	OblFlg Short Pt, Bray Controls or eq., 150PSIG, Lugged FF, Gear

Operator , A 126 Gr. B

84-84

PIPE SPEC: WMHB6 Date: 8/4/2016 6:47:35 PM

150

115

DESCRIPTION: UNDERGROUND CIRCULATING WATER

MATERIAL: Prestressed Concrete EXAMINATION: Per AWWA C304 - 2007

TEMPERATURE LIMIT: 32F to 200F

RATING CLASS: CL.D, PER AWWA C207-2013

CORROSION ALLOWANCE: 0.0000 in

100

200

DESIGN CODE: Per AWWA C304 - 2007

STRESS RELIEF: Per AWWA C301-2014, C304 - 2007

PRESSURE - TEMPERATURE RATINGS

SUBJECT TO CHANGE IF SPECIFIED IN NOTES

TEMP. F PRESS. PSIG

32 150

- 1 ALL JOINTS SHALL BE FIELD TESTABLE. JOINTS SHALL BE AIR TESTED PER MFR PROCEDURE.
- 2 GASKET SELECTION SHALL BE BASED ON THE ISOMETRIC AND MECHANCIAL PIPING SPECIFICATION. METALLIC GASKETS ARE GENERALLY SPIRAL WOUND 304SS/GRAPHITE FILL WITH CENTERING RING AND INNER RING AS LISED IN THIS PIPE CODE. NON-METALLIC GASKETS SHALL BE SELECTED FOR THE RATING AND SERVICE CONDITIONS, GARLOCK (E.G. SERIES 3000, GYLON, ETC) OR ENGINEER APPROVED EQUAL SHALL BE USED.
- 3 GASKET THICKNESS AFTER COMPRESSION IS APPROXIMATELY 1/8".
- 4 PIPE SHALL BE WRAPPED AND/OR CATHODICALLY PROTECTED ACCORDING TO SPEC 81.33.08.
- 5 PRESSURE-TEMPERATURE RATINGS ARE DEPENDENT ON SELECTION OF MATERIALS WHICH MEET OR EXCEED THE PRESSURE-TEMPERATURE RATING OF THIS PIPE CODE FOR THE SPECIFIC FLUID. ANY DEVIATIONS OR SELECTION OF MATERIALS, INCLUDING GASKETS, VALVES, OR TRIM, WHICH IMPACTS THE RATING OF THIS PIPE CODE MUST BE ENGINEER APPROVED.
- 6 REFER TO THE DESIGN DOCUMENT; PID, ISOMETRIC AND LINE LIST; FOR ACTUAL COMPONENT SELECTION, PLACEMENT AND INSTALLATION
- 7 STEEL CYLINDER WALL LINING THICKNESS SHALL BE VERIFIED BY SUPPLIER TO MEET THE PRESSURE AND TEMPERATURE REQUIREMENTS SPECIFIED.
- 8 UNDERGROUND JOINTS TO BE CEMENT MORTAR COVERED PER MANUFACTURER'S INSTRUCTIONS.

	NPS 1	NPS2	SCH	Description:
Pipes & Nipples				
	16-144	-	HOLD	Pipe , AWWA C301 , Bell/Spigot End , AWWA C301 CS
	16-144	-	HOLD	Pipe , AWWA C301 , PE x SPE , AWWA C301 CS
Large Bore Fittings				
				45 Deg. 3D Elbow , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Kiewit Estimate
				45 Deg. Eq Lat Tee , AWWA C301 , Bell/Spigot Run, Bell Branch , AWWA C301 CS
	16-144	-	HOLD	, Lay Length Per Price Brothers
				45 Deg. Eq Lat Tee , AWWA C301 , Bell/Spigot Run, Spigot Branch , AWWA C301
	16-144	-	HOLD	CS , Lay Length Per Price Brothers
				45 Deg. LR Elbow , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Kiewit Estimate
				45 Deg. SR Elbow , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Kiewit Estimate
				90 Deg. 3D Elbow , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Kiewit Estimate
				90 Deg. Elbow Asym , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay
	16-144	-	HOLD	Length Per Price Brothers
				90 Deg. LR Elbow , AWWA C301 , BLE x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Kiewit Estimate
				Adapter Female , AWWA C301 , BLE , AWWA C301 CS , Lay Length Per Price
	16-144	-	HOLD	Brothers
				Adapter Flange Fem. , AWWA C301 , FF x BLE , AWWA C301 CS , Lay Length Per
	16-144	-	HOLD	Price Brothers
				Adapter Flange Male , AWWA C301 , FF x SPIGOT , AWWA C301 CS , Lay Length
	16-144	-	HOLD	Per Price Brothers
				Adapter Male, AWWA C301, SPIGOT, AWWA C301 CS, Lay Length Per Price
	16-144	-	HOLD	Brothers
	16-144	-	HOLD	Cap , AWWA C301 , BLE , AWWA C301 CS , Lay Length Per Kiewit Estimate
				Equal Tee , AWWA C301 , Bell/Spigot Run, Bell Branch , AWWA C301 CS , Lay
	16-144	-	HOLD	Length Per Price Brothers



MKiewit WMHB6 **PIPE SPEC: Date:** 8/4/2016 6:47:35 PM Equal Tee , AWWA C301 , Bell/Spigot Run, FFFE Branch , AWWA C301 CS , Lay HOLD Length Per Price Brothers 16-144 Equal Tee , AWWA C301 , Bell/Spigot Run, Spigot Branch , AWWA C301 CS , Lay HOLD Length Per Price Brothers 16-144 Concentric Reducer , AWWA C301 , BL LE x SPIGOT SE , AWWA C301 CS , Lay 18-144 16-102 HOLD Length Per Price Brothers Eccentric Reducer, AWWA C301, BL LE x SPIGOT SE, AWWA C301 CS, Lay 16-102 HOLD 18-144 Length Per Price Brothers Reducing Tee, Hanson, Bell/Spigot Run, Spigot Branch, AWWA C301 CS, Lay HOLD 30-108 18-78 Length Hanson **Small Bore Fittings** Bolts Std Blt & 2HvyHex Nt , ASME B18.31.2 / B18.2.2 , A 193 B8M / A 194 B8M 16-144 Gaskets Non Metal Flat Gskt , AWWA C207 , CL D , FF , NM Comp. Gskt. , 0.125" non 16-24 compressed thickness Insulating Gskt Set, B16.21, CL150, FF, Per Specification 81.33.08, 0.125" non 16-108 compressed thickness Non Metal Flat Gskt , AWWA C207 , CL D , Ring , NM Comp. Gskt. , 0.125" non 26-144 compressed thickness Flanges SO Flg. - Ring Type, AWWA C207, CL D, FF, AWWA C207 CS 16-144 Blind Flg., AWWA C207, CL D, FF, AWWA C207 CS 16-108 **Gate Valves** Globe Valves **Check Valves Ball Valves**

Butterfly Valves