

Flange Rating: 150 FF  
 Pipe Material: CS Elastomer Lined  
 Corrosion Allowance: 1/16" (1.6 mm) Plus Lining  
 Design Code: ASME B31.3  
 UE-1 Rev: 3  
 Max Hydrotest: NOTE 1364  
 MDMT: NOTE 1362

Services: (NOTE 1363)

-29 to 93 °C Slurry - Coarse, Plant 5 (>30% wt Solids).  
 -29 to 93 °C TOR Lean Froth Recycle.

BRANCH TABLE - 1

TEMPERATURE PRESSURE CHART

MECHANICAL PRESS - TEMP LIMITS  
 BASED ON: 150 CWP VALVES

TEMP deg C	kPa MIN	kPa MAX	TEMP deg F	PSIG MIN	PSIG MAX
-29	ATM	1034	-20	ATM	150
38	ATM	1034	100	ATM	150
66	ATM	1034	150	ATM	150
93	ATM	868	200	ATM	126

Rev.	From (NPS)	To (NPS)	SPM Code	Description	Pref.	Note
<b>Pipe</b>						
2 - 2	-		LPWS1060	PIPE, SMLS, XS, BE, SA106 B.		--
3 - 24	-		LPWR1055	PIPE, ERW, STD WT, BE, SA53 B.		--
30 - 30	-		LPWA1015	PIPE, SAW, STD WT, BE, API 5L B.		--
<b>Pipe Bends</b>						
2 - 2	-		LBB41435	PIPE BEND, 45, 5D, SMLS, XS, BE, SA106 B, 6" TANGENTS.		1283 -
2 - 2	-		LBB42875	PIPE BEND, 45, 3D, SMLS, XS, BE, SA106 B, 6" TANGENTS.		1283 -
2 - 2	-		LBB91429	PIPE BEND, 90, 5D, SMLS, XS, BE, SA106 B, 6" TANGENTS.		1283 -
2 - 2	-		LBB92886	PIPE BEND, 90, 3D, SMLS, XS, BE, SA106 B, 6" TANGENTS.		1283 -
3 - 24	-		LBB41440	PIPE BEND, 45, 5D, ERW, STD WT, BE, SA53 B, 6" TANGENTS.		1283 -
3 - 24	-		LBB42879	PIPE BEND, 45, 3D, ERW, STD WT, BE, SA53 B, 6" TANGENTS.		1283 -
3 - 24	-		LBB91438	PIPE BEND, 90, 5D, ERW, STD WT, BE, SA53 B, 6" TANGENTS.		1283 -
3 - 24	-		LBB92890	PIPE BEND, 90, 3D, ERW, STD WT, BE, SA53 B, 6" TANGENTS.		1283 -
30 - 30	-		LBB41444	PIPE BEND, 45, 5D, SAW, STD WT, BE, API 5L B, 6" TANGENTS.		1283 -
30 - 30	-		LBB42897	PIPE BEND, 45, 3D, SAW, STD WT, BE, API 5L B, 6" TANGENTS.		1283 -
30 - 30	-		LBB91442	PIPE BEND, 90, 5D, SAW, STD WT, BE, API 5L B, 6" TANGENTS.		1283 -
30 - 30	-		LBB92892	PIPE BEND, 90, 3D, SAW, STD WT, BE, API 5L B, 6" TANGENTS.		1283 -
<b>SmallBore Fittings</b>						
0.75 - 0.75	-		LFTP1084	PLUG, HEX BULL, THD, SA234 WPB-S9.		1017 -
<b>Fittings, Welded (BW)</b>						
2 - 2	-		LFW41169	ELBOW, 45, LR, XS, BW, SA234 WPB.	2	--
2 - 2	-		LFW91170	ELBOW, 90, LR, XS, BW, SA234 WPB.	2	--
2 - 2	-		LFWT1171	TEE, STR, XS, BW, SA234 WPB.		--
3 - 3	2 - 2		LFWZ1172	TEE, RED, XS, BW, SA234 WPB.		--
3 - 4	2 - 2		LFWE1174	REDUCER, ECC, XS, BW, SA234 WPB.		--
3 - 4	2 - 2		LFWR1173	REDUCER, CONC, XS, BW, SA234 WPB.		--
3 - 30	-		LFW41088	ELBOW, 45, LR, STD WT, BW, SA234 WPB.	2	--
3 - 30	-		LFW91089	ELBOW, 90, LR, STD WT, BW, SA234 WPB.	2	--
3 - 30	-		LFWT1090	TEE, STR, STD WT, BW, SA234 WPB.		--
4 - 30	3 - 24		LFWE1093	REDUCER, ECC, STD WT, BW, SA234 WPB.		--
4 - 30	3 - 24		LFWR1092	REDUCER, CONC, STD WT, BW, SA234 WPB.		--
4 - 30	3 - 24		LFWZ1091	TEE, RED, STD WT, BW, SA234 WPB.		--
<b>Weldolet</b>						
4 - 30	2 - 2		LQLW4735	WELDOLET, STD WT x XS, BW, SA105.		--
6 - 30	3 - 10		LQLW1210	WELDOLET, STD WT, BW, SA105.		--

Rev.	From (NPS)	To (NPS)	SPM Code	Description	Pref.	Note
<b><u>Flanges</u></b>						
2 - 2	-		LLFE5315	END RING, LJ, CL 150, XS, CS, PER SD-L-609.	2	416 -
2 - 2	-		LLFL1198	FLANGE, LJ, CL 150, SA105.	2	1005 1006
2 - 2	-		LLFW1424	FLANGE, WN, CL 150, FF, XS, SA105.	2	416 -
2 - 3	0.75 - 2		LLFR1488	FLANGE, RED, THD, CL 150, RF, SA105.		--
2 - 12	-		LLFC1200	BLIND, SPEC, CL 150, RF, CS, PER SD-L-507.		--
2 - 24	-		LLFB1327	FLANGE, BLIND, CL 150, FF, SA105.		--
2 - 24	-		LLFS1422	FLANGE, SO, CL 150, FF, SA105.		416 1038
3 - 3	-		LLFM1451	FLANGE, MALE THD, CL 150, RF, CS, PER SD-L-610.		1017 -
3 - 3	-		LLFT1201	FLANGE, THD, CL 150, RF, SA105.		1017 -
3 - 24	-		LLFE5314	END RING, LJ, CL 150, STD WT, CS, PER SD-L-609.	2	416 -
3 - 24	-		LLFL1198	FLANGE, LJ, CL 150, SA105.	2	1005 1006
3 - 24	-		LLFW1423	FLANGE, WN, CL 150, FF, STD WT, SA105.	2	416 -
14 - 24	-		LLFA1194	BLIND & SPCR SET, CL 150, RF, CS, PER SD-L-507.		--
14 - 24	-		LLFD8446	SPACER, CL 150, RF, CS, PER SD-L-507.		1353 -
30 - 30	-		LLFA1193	BLIND & SPCR SET, CL 150, RF, CS, B16.47/A FLG, PER SD-L-507.		--
30 - 30	-		LLFB1485	FLANGE, BLIND, CL 150, FF, SA105, B16.47/A.		--
30 - 30	-		LLFS5312	FLANGE, SO, CL E, FF, SA105, AWWA C207.		416 1038
30 - 30	-		LLFW1489	FLANGE, WN, CL 150, FF, STD WT, SA105, B16.47/A.	2	416 -
30 - 30	-		LLFD8445	SPACER, CL 150, RF, CS, B16.47/A FLG, PER SD-L-507.		1353 -
<b><u>Nipples &amp; Swages</u></b>						
0.75 - 1.5	-		LNSL1590	PIPE NIPPLE, CLOSE, XXS, TBE, SA106 B.		1017 -
3 - 3	-		LNSL1590	PIPE NIPPLE, CLOSE, XXS, TBE, SA106 B.		1017 -
<b><u>Mechanical Couplings &amp; Rings</u></b>						
4 - 12	-		LMCC5584	COUPLING, VICTAULIC, STYLE 44.		--
4 - 12	-		LMCG5592	GASKET, VICTAULIC, FOR STYLE 44, GR T, FLUSH SEAL.		--
4 - 12	-		LMCG5593	GASKET, VICTAULIC, FOR STYLE 44, GR L, FLUSHSEAL.	2	1323 -
4 - 12	-		LMCR5449	RING COLLAR, VICTAULIC, TYPE C, FOR STYLE 44, CS, FOR ELASTOMER LINED PIPE, PER SD-L-612.		--
14 - 14	-		LMCC5585	COUPLING, VICTAULIC, STYLE 31.		--
14 - 14	-		LMCG5598	GASKET, VICTAULIC, FOR STYLE 31, GR S, FLUSH SEAL.		--
14 - 14	-		LMCG5599	GASKET, VICTAULIC, FOR STYLE 31, GR L, FLUSHSEAL.	2	1323 -
14 - 14	-		LMCR5450	RING COLLAR, VICTAULIC, TYPE C, FOR STYLE 31, CS, FOR ELASTOMER LINED PIPE, PER SD-L-612.		--
16 - 24	-		LMCC5586	COUPLING, VICTAULIC, STYLE 26.		--
16 - 24	-		LMCG5594	GASKET, VICTAULIC, FOR STYLE 26, GR S, FLUSH SEAL.		--
16 - 24	-		LMCG5595	GASKET, VICTAULIC, FOR STYLE 26, GR L, FLUSHSEAL.	2	1323 -
16 - 24	-		LMCR5451	RING COLLAR, VICTAULIC, TYPE C, FOR STYLE 26, CS, FOR ELASTOMER LINED PIPE, PER SD-L-612.		--
20 - 24	-		LMCC5587	COUPLING, VICTAULIC, STYLE 28 STC.		1322 -
20 - 24	-		LMCG5596	GASKET, VICTAULIC, FOR STYLE 28 STC, GR S, FLUSH SEAL.		--
20 - 24	-		LMCG5597	GASKET, VICTAULIC, FOR STYLE 28 STC, GR L, FLUSHSEAL.	2	1323 -
20 - 24	-		LMCR5452	RING COLLAR, VICTAULIC, TYPE C, FOR STYLE 28 STC, CS, FOR ELASTOMER LINED PIPE, PER SD-L-612.		--
30 - 30	-		LMCC5584	COUPLING, VICTAULIC, STYLE 44.		--
30 - 30	-		LMCG5592	GASKET, VICTAULIC, FOR STYLE 44, GR T, FLUSH SEAL.		--
30 - 30	-		LMCG5593	GASKET, VICTAULIC, FOR STYLE 44, GR L, FLUSHSEAL.	2	1323 -
30 - 30	-		LMCR5453	RING COLLAR, VICTAULIC, TYPE D, FOR STYLE 44, CS, FOR ELASTOMER LINED PIPE, PER SD-L-612.		--
<b><u>Gaskets &amp; Bolts</u></b>						
2 - 16	-		LGB35611	BOLT, STUD, A193 B7 W/1 A194 2H NUT.		--
2 - 24	-		LGB11114	BOLT, CAP SCREW, A193 B7.		--
2 - 24	-		LGB21426	BOLT, MACHINE, A307 B W/1 NUT.		1007 -

Rev.	From (NPS)	To (NPS)	SPM Code	Description	Pref.	Note
<b><u>Gaskets &amp; Bolts</u></b>						
	2 - 24	-	LGBF1490	GASKET, FLAT RING, CL 150, 1/8", NEOPRENE.		1022 -
	2 - 30	-	LGB31113	BOLT, STUD, A193 B7 W/2 A194 2H NUTS.		--
	18 - 24	-	LGB15610	BOLT, CAP SCREW, A193 B7 UNC.		1331 -
	18 - 24	-	LGB35612	BOLT, STUD, A193 B7 W/1 A194 2H NUT UNC.		1331 -
	30 - 30	-	LGBF1491	GASKET, FLAT RING, CL 150, 1/8", NEOPRENE, B16.47/A FLG.		1022 -
<b><u>Valves, Gate</u></b>						
	2 - 8	-	LVGR1358	VALVE, GATE, CL 150, RF, A216 WCB, TRIM 8, CAT. 2.		1004 -
<b><u>Valves, Butterfly</u></b>						
	2 - 4	-	LVFT1418	VALVE, BUTTERFLY, CL 150, TAPPED LUG, RF, A216 WCB, 316 SS SEAT, WO, CAT. 2.		1008 -
	6 - 24	-	LVFT1419	VALVE, BUTTERFLY, CL 150, TAPPED LUG, RF, A216 WCB, 316 SS SEAT, GO, CAT. 2.		1008 -
<b><u>Valves, Ball</u></b>						
	0.75 - 1.5	-	LVBT3646	VALVE, BALL, 720 CWP, 500 PSI @300 F, 200 PSI @350 F, THD, A105, RTFE SEATS, REGULAR PORT, HO, CAT. 1, FIRE SAFE.		--
	2 - 4	-	LVBR1772	VALVE, BALL, CL 150, RF, A216 WCB, PTFE SEATS, FULL PORT, WO, CAT. 2.		--
	3 - 3	-	LVBT3647	VALVE, BALL, 720 CWP, 500 PSI @300 F, 200 PSI @350 F, THD, A105, RTFE SEATS, FULL PORT, HO, CAT. 1, FIRE SAFE.		1017 -
	6 - 12	-	LVBR1773	VALVE, BALL, CL 150, RF, A216 WCB, PTFE SEATS, FULL PORT, GO, CAT. 2.		--
<b><u>Valves, Plug</u></b>						
	2 - 4	-	LVPR1766	VALVE, PLUG, CL 150, RF, A216 WCB, ECC, SP, ALL METAL PLUG, WO, CAT. 2.		--
	2 - 4	-	LVPR1768	VALVE, PLUG, CL 150, RF, A216 WCB, CONC PLUG, SP, PTFE SLEEVE, WO, CAT. 2.		1018 -
	6 - 8	-	LVPR1769	VALVE, PLUG, CL 150, RF, A216 WCB, CONC PLUG, SP, PTFE SLEEVE, GO, CAT. 2.		1018 -
	6 - 16	-	LVPR1767	VALVE, PLUG, CL 150, RF, A216 WCB, ECC, SP, ALL METAL PLUG, GO, CAT. 2.		--
<b><u>Valves, Knife Gate</u></b>						
	2 - 6	-	LVKF5446	VALVE, KNIFE GATE, 150 CWP, TAPPED WAFER RF, 304 SS BODY, CL 150 CS FLG, 304 SS TRIM, W/ DEFLECTION CONE, CAT. 2.		406 1034
	8 - 16	-	LVKF5447	VALVE, KNIFE GATE, 150 CWP, TAPPED WAFER RF, 304 SS BODY, CL 150 CS FLG, 304 SS TRIM, W/ DEFLECTION CONE, GO, CAT. 2.		406 1034
	12 - 16	-	LVKF4461	VALVE, KNIFE GATE, 150 CWP, TAPPED WAFER RF, 304 SS BODY, CL 150 CS FLG, 304 SS TRIM, W/ DEFLECTION CONE, PCO, CAT. 2.		406 1034
	18 - 18	-	LVKF5447	VALVE, KNIFE GATE, 150 CWP, TAPPED WAFER RF, 304 SS BODY, CL 150 CS FLG, 304 SS TRIM, W/ DEFLECTION CONE, GO, CAT. 2.		406 1034 1330
	18 - 24	-	LVKF4461	VALVE, KNIFE GATE, 150 CWP, TAPPED WAFER RF, 304 SS BODY, CL 150 CS FLG, 304 SS TRIM, W/ DEFLECTION CONE, PCO, CAT. 2.		406 1034 1330
<b><u>Chain Operators &amp; Chain</u></b>						
3	2 - 24	-	LXCC9285	CHAIN OPERATOR, 0, FOR 2" TO 4" OD HW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9286	CHAIN OPERATOR, 1, FOR 4-1/2" TO 5-3/4" OD HW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9287	CHAIN OPERATOR, 1-1/2, FOR 6" TO 7-1/2" OD HW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9288	CHAIN OPERATOR, 2, FOR 7-3/4" TO 9" OD HW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9289	CHAIN OPERATOR, 2-1/2, FOR 9-1/4" TO 12-1/2" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9290	CHAIN OPERATOR, 3, FOR 12-3/4" TO 15-1/2" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9291	CHAIN OPERATOR, 3-1/2, FOR 15-3/4" TO 19" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9292	CHAIN OPERATOR, 4, FOR 19-1/4" TO 22" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCC9293	CHAIN OPERATOR, 4-1/2, FOR 22-1/4" TO 26" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -

Rev.	From (NPS)	To (NPS)	SPM Code	Description	Pref.	Note
<b><u>Chain Operators &amp; Chain</u></b>						
3	2 - 24	-	LXCC9294	CHAIN OPERATOR, 5, FOR 26-1/4" TO 30" OD HW, HAMMER-BLOW, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCD9138	CHAIN, 2, FOR OPER NO. 0, GALV CS, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCD9139	CHAIN, 1/0, FOR OPER NO. 1, 1-1/2, 2, GALV CS, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCD9140	CHAIN, 4/0, FOR OPER NO. 2-1/2, 3, 3-1/2, GALV CS, (BABBITT OR EQUAL).		1151 -
3	2 - 24	-	LXCD9141	CHAIN, 5/0, FOR OPER NO. 4, 4-1/2, 5, GALV CS, (BABBITT OR EQUAL).		1151 -

**SERVICE CLASS NOTES:**

- 141 Valves larger than NPS 24 shall be selected on an individual basis.
- 1020 Pipe and pipe fittings to be elastomer lined per Specification X-5. Lining shall be a minimum of 1/4" on inside surfaces and 1/8" on joint faces. Lining material and thickness shall be noted on construction drawings.
- 1132 Check valves are not allowed in this service class.
- 1362 The minimum temperature listed in the "TEMPERATURE PRESSURE CHART:" is based on the MDMT of the thickest wall pipe wall provided. The MDMT for calculated wall piping components is listed in Appendix E.
- 1363 The "SERVICES:" temperature listed is the allowable operating temperature range for the Service, metallurgy, and corrosion allowance.
- 1364 See Appendix E for Hydrotest pressures.

**COMPONENT NOTES:**

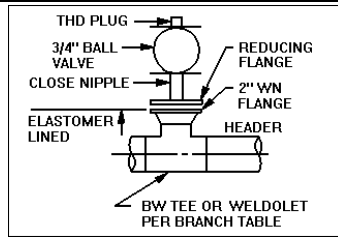
- 406 Tapped wafer knife gate valves to be installed with cap screws, except for the valve chest area where stud bolts with one nut shall be used.
- 416 Rubber lining when used shall be extended to the full face of the flange, lap joint end ring, or victaulic ring collar.
- 1004 Gate valves may be used in line vents, drains and flush water connections.
- 1005 Lap joint flanges may be fabricated from slip-on flanges per drawing SD-L-609.
- 1006 Flanges may be used subject to the limitations given in Specification L-1 Section 5.
- 1007 To be used when mating with cast iron flanges.
- 1008 Valves to be installed with cap screws.
- 1017 For instrumentation connections only.
- 1018 May be used in flush and drain services.
- 1022 Gaskets are not required for mating flanged valves and equipment to lined spools.
- 1034 Gaskets not required at joints where elastomer coated deflection cone used.
- 1038 Weld neck flanges shall be considered at high stress joints.
- 1151 Available to match handwheels up to 30" diameter.
- 1283 Designer shall specify bend angle, end preparation, and tangent length. Where possible standard bends of 30, 45 and 90 degree angles, and 6" tangent lengths shall be specified.
- 1315 For use with modified slip-on flanges per drawing SD-L-609.
- 1322 Style 28 STC couplings are intended for severe service pipeline applications in tailings and slurry transportation.
- 1323 Silicone gaskets are intended for low temperature installation. Use with caution in hydrocarbon services.
- 1330 Tapped holes for flange bolting require UNC (coarse thread series) bolts.
- 1331 For tapped wafer knife gate valves or ported gate valves requiring UNC (coarse thread series) bolting.
- 1353 To be used only when indicated on the P&ID.

															T	30
															T	24
														T	TR	20
														T	TR	18
														T	TR	16
														T	TR	14
														T	TR	12
														T	TR	10
														T	TR	8
														T	TR	6
														T	TR	4
														T	TR	3
														T	TR	2
2	3	4	6	8	10	12	14	16	18	20	24	30	Branch			

Header

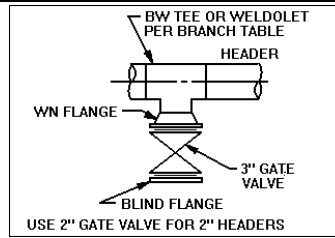
### Legend:

T	: Straight Tee	SOL	: Sockolet
TR	: Reducing Tee	RW	: Stub-in
SWOL	: Sweepolet/Insert Branch Fitting	RP	: Reinforced Stub-in
WOL	: Weldolet	LT	: 45° Lateral Tee
TOL	: Thredolet	LTR	: 45° Lateral Reducing Tee
RTR	: Reducing Tee and Reducer	C	: Full Coupling
FP	: Full Encirclement Reinforced Stub-in	F(xx)	: Fillet Weld in 1/16" increments, e.g., F04=1/4" fillet weld; F06=3/8" fillet weld.



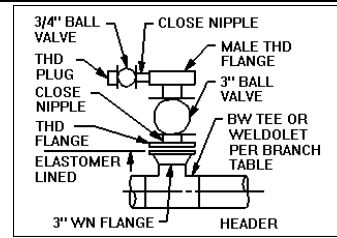
450

OPERATING VENTS, BUTTWELDED HEADERS



620

OPERATING DRAINS, BUTTWELDED HEADERS



860

INSTRUMENT AND PRESSURE CONNECTIONS, BUTTWELDED HEADERS