SERVICE: GAS AND LVP (RVP ≤ 110 kPa @ 38°C), SWEET SERVICE		
TEMPERATURE: -45 to 230°C (-49 to 446°F)	DESIGN CODE: CSA Z662-07	PRESSURE CLASS: PN 50 (CL 300)
DESIGN PRESSURE: 4960 kPag (719 psig) @ 54ºC (130ºF) (Note 1)		CORROSION ALLOWANCE: 1.6 mm (0.063")
PRESSURE TEST: Recorded Hydrotest (Note 2)		PWHT: (Note 19)
MIN. LEAK TEST PRESSURE: 5456 kPag (791 psig) MAX. LEAK TEST PRESSURE: 6944 kPag (1007 psig) MIN. STRENGTH TEST PRESSURE: 6944 kPag (1007 psig) MAX. STRENGTH TEST PRESSURE: 7440 kPag (1079 psig) (Note 3)		JOINT NDE: (Note 4) Random 15% of all joints to be visually inspected Random 15% of all socket welds to undergo MT Random 15% of all butt welds to undergo RT

General Notes:

1. **Pipelines, pipeline risers, and pig launchers/receivers are not covered within the scope of this specification.**
2. **The design factors used for wall thickness calculations in CSA Z662-07 equation 4.3.5.1 are F = 0.80, L = 0.625, J = 1, and T = 1. The wall thicknesses must be reevaluated if actual design factors are not suitable.**

ITEM	NPS	RATING	CONN.	DESCRIPTION	NOTES
PIPE	½ to 1½	SCH 80 (XS)	SCRD / SW	ASTM A333 Grade 6 (SMLS) PE	5, 12, 13
	2	SCH 80 (XS)	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	3 to 6	SCH 40 (STD)	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	8	SCH 20	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	10 to 14	SCH 30	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	16	SCH 40 (XS)	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	18 to 20	SCH 30	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
	22	SCH 60	BW / RF	ASTM A333 Grade 6 (SMLS) BE	5
FITTINGS	½ to 1½	Class 3000	SCRD / SW	ASTM A350 LF2 Class 1	12, 13
	2 to 22	Match Pipe	BW	ASTM A420 Grade WPL6	6
FLANGES	2 to 22	Class 300	RFWN	ASTM A350 LF2 Class 1, Bored to Match Pipe	7, 16
BLIND FLANGES	2 to 22	Class 300	RF	ASTM A350 LF2 Class 1	7, 16
NIPPLES	½ to 1½	SCH 80 (XS)	SCRD	ASTM A333 Grade 6 (SMLS)	10, 11, 12
SWAGES	½ to 1½	SCH 80 (XS)	SCRD	ASTM A350 LF2 Class 1 or A333 Grade 6 (SMLS)	10, 12
THREADOLETS & SOCKOLETS	¾ to 1½	Class 3000 (Run ≤ 356)	SCRD / SW	ASTM A350 LF2 Class 1	12
	¾ to 1½	Class 6000 (Run > 356)	SCRD / SW	ASTM A350 LF2 Class 1	12
UNIONS	½ to 1½	Class 3000	SCRD / SW	ASTM A350 LF2 Class 1	12, 13
WELDOLETS	2 to 6	Match Pipe (Run ≤ 219)	BW	ASTM A350 LF2 Class 1	
	2 to 6	SCH XS (Run > 219)	BW	ASTM A350 LF2 Class 1	
SPEC. BLINDS	2 to 22	Class 300	RF	ASTM A516 Grade 70N	16
GASKETS	2 to 12	Class 300	RF	ASME B16.20 Spiral Wound, 304 SS / Flexible Graphite	16, 22
	14 to 22	Class 300	RF	ASME B16.20 Spiral Wound, 304 SS / Flexible Graphite, 304 SS Inner Ring	16, 22
STUDS				ASTM A193 Grade B7	
NUTS				ASTM A194 Grade 2H	
ORIFICE FLANGES	2 to 12	Class 300	RFWN	ASTM A350 LF2 Class 1, Bored to suit pipe c/w ½" taps and jack bolts	16
PLUGS	½ to 1	Class 3000	SCRD	Hex Head, ASTM A350 LF2 Class 1	12, 18
	1½	Class 3000	SCRD	Solid Round, ASTM A350 LF2 Class 1	12, 18
TUBING	¼" to ⅜" OD	0.035" WT	PE	ASTM A269, 304 Stainless Steel, annealed (SMLS)	12, 17, 20
	½" OD	0.049" WT	PE	ASTM A269, 304 Stainless Steel, annealed (SMLS)	12, 17, 20

SERVICE: GAS AND LVP (RVP ≤ 110 kPa @ 38°C), SWEET SERVICE		
TEMPERATURE: -45 to 230°C (-49 to 446°F)	DESIGN CODE: CSA Z662-07	PRESSURE CLASS: PN 50 (CL 300)
DESIGN PRESSURE: 4960 kPag (719 psig) @ 54ºC (130ºF) (Note 1)	CORROSION ALLOWANCE: 1.6 mm (0.063")	
PRESSURE TEST: Recorded Hydrotest (Note 2)	PWHT: (Note 19)	
MIN. LEAK TEST PRESSURE: 5456 kPag (791 psig) MAX. LEAK TEST PRESSURE: 6944 kPag (1007 psig) MIN. STRENGTH TEST PRESSURE: 6944 kPag (1007 psig) MAX. STRENGTH TEST PRESSURE: 7440 kPag (1079 psig) (Note 3)	JOINT NDE: (Note 4) Random 15% of all joints to be visually inspected Random 15% of all socket welds to undergo MT Random 15% of all butt welds to undergo RT	

ITEM	NPS	RATING	CONN.	DESCRIPTION	NOTES
FLANGE ISOLATION KITS	2 to 24	Class 300	RF	Pikotek PGE or PSI LineBacker, Type F, G-10 retainer, Teflon seal material, full length G-10 sleeves, and G-10 single set washers (1/8" thick)	21, 22

ITEM	NPS	TAG	DESCRIPTION
BALL VALVES	½ to 1½	B-20S200	2000 psig CWP, SW, regular port, floating, lever operated, bolted or threaded body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	½ to 1½	B-20S210	2000 psig CWP, SW, full port, floating, lever operated, bolted or threaded body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	½ to 1½	B-20T200	2000 psig CWP, THD, regular port, floating, lever operated, bolted or threaded body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	½ to 1½	B-20T210	2000 psig CWP, THD, full port, floating, lever operated, bolted or threaded body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	2 to 6	B-03R200	Class 300 RF, regular port, floating, lever operated, bolted body, A350 LF2 or A352 LCC body, electroless nickel plated (1-1.5 mil) A350 LF2 ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	2 to 6	B-03R201	Class 300 RF, regular port, floating, lever operated, bolted body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	2 to 6	B-03R210	Class 300 RF, full port, floating, lever operated, bolted body, A350 LF2 or A352 LCC body, electroless nickel plated (1-1.5 mil) A350 LF2 ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	2 to 6	B-03R211	Class 300 RF, full port, floating, lever operated, bolted body, A350 LF2 or A352 LCC body, 316 stainless steel ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	8 to 24	B-03R220	Class 300 RF, regular port, trunnion mounted, gear operated, bolted body, A350 LF2 or A352 LCC body, electroless nickel plated (1-1.5 mil) A350 LF2 ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
	8 to 24	B-03R230	Class 300 RF, full port, trunnion mounted, gear operated, bolted body, A350 LF2 or A352 LCC body, electroless nickel plated (1-1.5 mil) A350 LF2 ball and stem, A193 B7 bolts, A194 2H nuts, manufacturer's standard seats, fire safe to API 607, ASME B16.34
CHECK VALVES	½ to 1½	C-08S200	Class 800, SW, swing check, A350 LF2 or A352 LCC body, bolted or screwed cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	C-08S220	Class 800, SW, piston check, A350 LF2 or A352 LCC body, bolted or screwed cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	C-08T200	Class 800, THD, swing check, A350 LF2 or A352 LCC body, bolted or screwed cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602

SERVICE: GAS AND LVP (RVP ≤ 110 kPa @ 38°C), SWEET SERVICE		
TEMPERATURE: -45 to 230°C (-49 to 446°F)	DESIGN CODE: CSA Z662-07	PRESSURE CLASS: PN 50 (CL 300)
DESIGN PRESSURE: 4960 kPag (719 psig) @ 54ºC (130ºF) (Note 1)		CORROSION ALLOWANCE: 1.6 mm (0.063")
PRESSURE TEST: Recorded Hydrotest (Note 2)		PWHT: (Note 19)
MIN. LEAK TEST PRESSURE: 5456 kPag (791 psig) MAX. LEAK TEST PRESSURE: 6944 kPag (1007 psig) MIN. STRENGTH TEST PRESSURE: 6944 kPag (1007 psig) MAX. STRENGTH TEST PRESSURE: 7440 kPag (1079 psig) (Note 3)		JOINT NDE: (Note 4) Random 15% of all joints to be visually inspected Random 15% of all socket welds to undergo MT Random 15% of all butt welds to undergo RT

ITEM	NPS	TAG	DESCRIPTION
CHECK VALVES (CON'T)	½ to 1½	C-08T220	Class 800, THD, piston check, A350 LF2 or A352 LCC body, bolted or screwed cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	2 to 24	C-03R200	Class 300 RF, swing check, A350 LF2 or A352 LCC body, bolted cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34
	2 to 24	C-03R230	Class 300 RF, tilting disc check, A350 LF2 or A352 LCC body, bolted cap, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34
GATE VALVES	½ to 1½	G-08S200	Class 800, SW, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, solid wedge, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	G-08T200	Class 800, THD, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, solid wedge, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	G-08X200	Class 800, SW x THD, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, solid wedge, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	2 to 10	G-03R210	Class 300 RF, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, flexible wedge, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 600
	12 to 24	G-03R211	Class 300 RF, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, flexible wedge, gear operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 600
GLOBE VALVES	½ to 1½	O-08S200	Class 800, SW, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, standard body, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	O-08T200	Class 800, THD, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, standard body, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	½ to 1½	O-08X200	Class 800, SW x THD, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, standard body, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34, API 602
	2 to 10	O-03R200	Class 300 RF, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, standard body, handwheel operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34
	12 to 24	O-03R201	Class 300 RF, OS&Y, A350 LF2 or A352 LCC body, bolted bonnet, standard body, gear operated, A193 B7 bolts, A194 2H nuts, API trim #8 (F6 and HF), ASME B16.34
NEEDLE VALVES	¼ to ¾	N-60T500	6000 psig CWP, FNPT x FNPT, 316 SS body and trim, threaded bonnet, NACE MR-0175 / ISO 15156
	¼ to ¾	N-60M500	6000 psig CWP, MNPT x FNPT, 316 SS body and trim, threaded bonnet, NACE MR-0175 / ISO 15156
	¾ x ½	N-60M501	6000 psig CWP, ¾" MNPT x ½" FNPT, 316 SS body and trim, threaded bonnet, NACE MR-0175 / ISO 15156

SERVICE: GAS AND LVP (RVP ≤ 110 kPa @ 38°C), SWEET SERVICE		
TEMPERATURE: -45 to 230°C (-49 to 446°F)	DESIGN CODE: CSA Z662-07	PRESSURE CLASS: PN 50 (CL 300)
DESIGN PRESSURE: 4960 kPag (719 psig) @ 54ºC (130ºF) (Note 1)	CORROSION ALLOWANCE: 1.6 mm (0.063")	
PRESSURE TEST: Recorded Hydrotest (Note 2)	PWHT: (Note 19)	
MIN. LEAK TEST PRESSURE: 5456 kPag (791 psig) MAX. LEAK TEST PRESSURE: 6944 kPag (1007 psig) MIN. STRENGTH TEST PRESSURE: 6944 kPag (1007 psig) MAX. STRENGTH TEST PRESSURE: 7440 kPag (1079 psig) (Note 3)	JOINT NDE: (Note 4) Random 15% of all joints to be visually inspected Random 15% of all socket welds to undergo MT Random 15% of all butt welds to undergo RT	

NOTES

1	Design pressure derates with higher design temperature per rating of ASME B16.5 to a maximum design temperature of 230°C.
2	Strength and leak hydrotest to be conducted with water or water with anti-freeze chemical. Test durations to be as noted below. Visual Leak Check to be conducted after Strength Test and before reducing hydrotest pressure below the Minimum Leak Test Pressure. Tests shall be chart recorded. (Strength test and leak test durations are consecutive times.) Un-insulated & Exposed Piping: Strength Test – Minimum 1 Hr Leak Test – Time Required to Visually Inspect All Joints Insulated or Covered Piping: Strength Test – Minimum 4 Hr Leak Test – Minimum 4 Hr
3	The maximum test pressure is based upon 1.5 times the cold working pressure ratings in Table 1 of CSA Z245.12-05 (max. design pressure). This value may be lower based on limitations of any valves, controls, equipment, and/or vessels connected to the piping system during hydrotest.
4	Joint NDE shall be increased to 100% in cyclic or vibrating service.
5	Pipe may be CSA Z245.1 Grade 241 Cat. II or III (SMLS) or dual certified ASTM A333 Grade 6 / CSA Z245.1 Grade 241 Cat. II or III (SMLS).
6	Fittings may be CSA Z245.11 Grade 241 Cat. II or III or dual certified ASTM A420 Grade WPL6 / CSA Z245.11 Grade 241 Cat. II or III.
7	Flanges may be CSA Z245.12 Grade 248 Cat. II or III or dual certified ASTM A350 LF2 / CSA Z245.12 Grade 248 Cat. II or III.
8	Pipe 4" NPS (114 mm) and larger shall be restricted to lengths of ≤ 50 meters between fittings, valves, or flanges.
9	Pressure retaining components shall be supplied with MTR's.
10	Pipe nipples and swages shall be minimum Schedule XXS for cyclic or vibrating service.
11	Pipe nipples shall be between 50 mm and 150 mm in length.
12	Thread sealant (pipe thread tape or dope) shall be used on all threaded connections. Combination use of pipe thread tape and dope is prohibited.
13	Socket Weld (SW) joints shall be used for GLYCOL piping 1½ and under.
14	Buttwelding fittings to ASME B16.9. Forged steel fittings to ASME B16.11. Orifice flanges to ASME B16.36. Line blanks to ASME B16.48.
15	Steel pipe unions to MSS SP-83. Swage(d) nipples to MSS SP-95. Forged Carbon Steel branch outlet fittings to MSS SP-97.
16	Greasing or doping of flange seating surfaces is prohibited.
17	Compression fittings shall be Swagelok. Ferrule and fitting hardness to be greater than tubing hardness.
18	Hub flange plugs to be solid round head.
19	Post Weld Heat Treatment (PWHT) is required if the effective throat of the items to be welded exceeds 31.8 mm, or if the mechanical properties of the weld or the residual stresses at the weld are unsatisfactory for the intended service without the use of stress relieving. Refer to Appendix E of Piping Material Guidelines for more information.
20	ASTM A269, 316 Stainless Steel, annealed (SMLS) may be substituted.
21	Maximum continuous operating temperature of flange isolation kit is 138°C (280°F). For higher temperatures, consult the manufacturer for material selection.
22	Gaskets specified for flange isolation kits shall be used for coated piping or joints with mismatched flange types, such as RF to RTJ joints. Isolation sleeves and washers are not required for these applications.