

Voegt

**Forged Steel
Valves**





Vogt Valves

A History in the Making

In the late 1890s, Vogt pioneered the early development of ammonia absorption refrigeration systems that made artificial ice. This business, plus Vogt's fledgling boiler business, created an internal need for quality valves that initiated Vogt's early entry into the valve manufacturing business.

The early reputation of Vogt's quality valves and rapidly growing petroleum processing industry created an outside demand that would firmly establish Vogt in the mass production of high-quality forged steel valves.

For more than 100 years, Vogt's leadership has been evident in the production of forged steel gate, globe, angle and check valves in most popular materials, trims and bonnet configurations.

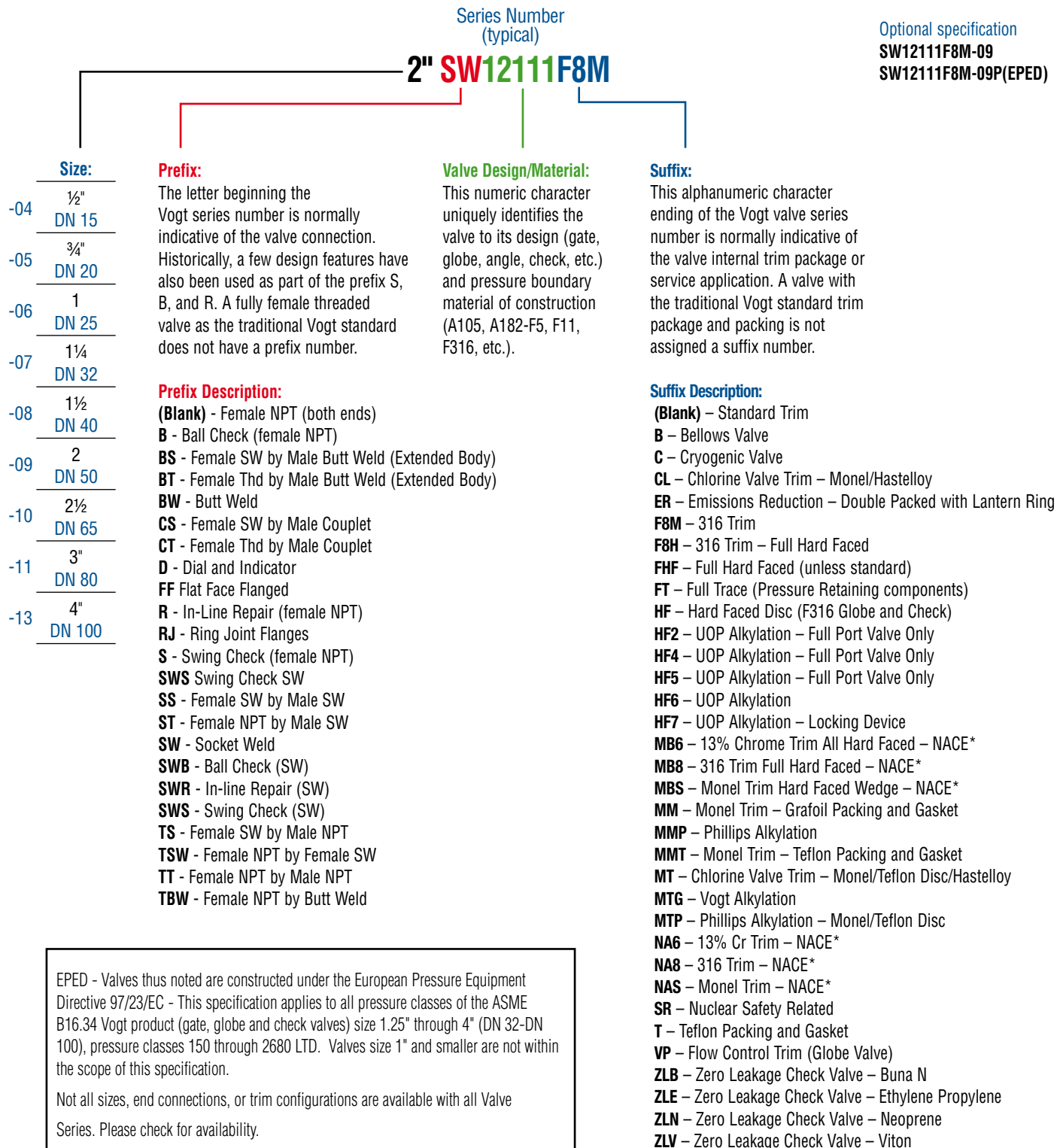
Today, Vogt valves support a worldwide network of distributors with access to the world's largest capability for manufacturing of forged steel valves.

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Description of Series Number System for Vogt Valves



*NACE – Materials meet requirements of NACE MR0103 for sour service

SERIES TYPE PAGE G = GATE L = GLOBE C = CHECK VALVE														SERIES INDEX	
S74	C 99	S698	C 102	R2522	L 56	12141B	L 63	13710	C 84	B15761	C 90	32353	G 12	35801	G 21
351	G 12	701	C 84	2591	L 55	12141ER	L 62	B13710	C 84	S15761	C 101	32363	G 13	35821	L 50
352	G 12	A701	C 91	R2591	L 56	CT12141	L 57	13718	C 84	15780	C 90	32373	G 14	36111	G 17
353	G 12	AB701	C 91	2610	C 96	ST12141	L 57	B13718	C 84	B15780	C 90	32443	L 66	36373	L 15
358	G 12	B701	C 84	R2610	C 97	TT12141	L 57	13750	C 84	15801	G 21	32461	L 64	36483	L 71
361	G 13	S701	C 100	2611	C 96	12161	G 18	B13750	C 84	BT15801	G 24	32473	L 40	36493	L 71
362	G 13	710	C 84	R2611	C 97	12181	L 46	13751	C 84	CT15801	G 24	32483	L 41	36701	C 90
363	G 13	A710	C 91	2622	C 96	12301	48	B13751	C 84	ST15801	G 24	32493	L 42	B36701	C 90
368	G 13	AB710	C 91	R2622	C 97	12188	L 46	13780	C 84	15821	L 50	32570	C 86	36710	C 90
371	G 14	B710	C 84	2691	C 96	12321	G 10	B13780	C 84	15831	G 21	B32570	C 86	B36710	C 90
372	G 14	718	C 84	R2691	G 97	12351	L 38	13921	G 10	15841	L 50	32573	C 86	36801	G 21
373	G 14	B718	C 84	2801	G 20	12401	G 10	15111	G 17	15851	G 21	B32573	C 86	41000	G 134
378	G 14	S718	C 100	2801B	G 30	12401C	G 31	BT15111	G 24	15861	G 21	32580	C 86	42211	G 28
473	L 40	730	C 106	BT2801	G 22	12421	G 10	CT15111	G 24	BT15901	G 24	B32580	C 86	42241	L 70
473B	L 63	750	C 84	CT2801	G 22	12443	L 66	ST15111	G 24	CT15901	G 24	32583	C 86	43111	G 29
473VP	L 66	B750	C 84	ST2801	G 22	12501	L 38	15141	L 45	ST15901	G 24	B32583	C 86	43211	G 28
478	L 40	751	C 84	TT2801	G 22	12501C	L 73	15321	G 17	15921	G 17	32590	C 88	43241	L 69
478VP	L 66	B751	C 84	2811	G 19	12521	G 10	15343	L 68	16111	G 17	B32590	C 88	B43721	C 92
483	L 41	S751	C 100	2821	L 49	12543	L 66	15351	L 45	16321	G 17	32593	C 88	52461	L 65
483B	L 63	S761	C 100	2831	G 20	12551	L 38	15373	G 15	16373	G 15	B32593	C 88	54853	C 94
483VP	L 66	780	C 84	2831B	G 30	12601	G 32	15378	G 15	16378	G 15	S32673	C 102	54863	C 94
488	L 41	B780	L 84	2841	L 49	12602	G 32	15401	G 17	16401	G 17	S32683	C 102	58431	L 77
488VP	L 66	801	L 47	2851	G 20	12603	G 32	15401C	G 31	16421	G 17	S32693	C 102	59851	G 27
493	L 42	810	L 51	2861	G 20	12604	G 32	15421	G 17	16521	G 17	32701	C 84	59951	G 27
493B	L 63	811	L 51	2891	L 76	12605	G 32	15443	L 68	16701	C 90	B32701	C 84	65703	G 21
493VP	L 66	822	L 51	BT2901	G 22	12921	G 10	15493	L 43	B16701	C 90	S32701	C 100	65713	G 21
498	L 42	851	L 46	CT2901	G 22	13111	G 10	15498	L 43	16710	C 90	32710	C 84	65733	L 50
498VP	L 66	891	L 51	ST2901	G 22	13111ER	G 28	15501	L 45	B16710	C 90	B32710	C 84	65723	L 50
570	C 86	1003	L 60	TT2901	G 22	13141	L 38	15521	G 17	16718	C 90	32801	G 20	65773	G 21
B570	C 86	1023	L 60	3801	G 20	13141B	L 63	15543	L 68	B16718	C 90	32801B	G 30	66703	G 26
573	C 86	1033	G 36	3801B	G 30	13141ER	L 62	15551	L 45	16750	C 90	32821	L 50	66713	G 26
B573	C 86	1043	G 36	3831	G 20	13321	G 10	15590	C 89	B16750	C 90	33111	G 10	66723	L 54
578	C 86	1331	L 75	3831B	G 30	13351	L 38	B15590	C 89	16751	C 90	33141	L 38	66733	L 54
B578	C 86	1510	L 52	3991	L 80	13361	G 13	15593	C 89	B16751	C 90	33363	G 13	66743	G 26
579	C 86	R1510	L 53	4835	C 98	13362	G 13	B15593	C 89	16760	C 90	33373	G 14	66773	G 26
B579	C 86	1511	L 52	4881	C 105	13363	G 13	15598	C 89	B16760	C 90	33701	C 84	66783	L 54
580	C 87	R1511	L 53	9091	C 93	13368	G 13	B15598	C 89	16761	C 90	B33701	C 84	66791	G 26
B580	C 87	1522	L 52	B9091	C 93	13371	G 14	15599	C 89	B16761	C 90	33710	C 84	66793	L 54
583	C 87	R1522	L 53	9821	L 79	13372	G 14	B15599	C 89	16780	C 90	B33710	C 84	82401	G 10
B583	C 87	1551	C 104	9841	L 78	13373	G 14	S15693	C 103	B16780	C 90	33801	G 20	82501	L 38
588	C 87	B1551	C 104	9871	L 78	13378	G 14	S15698	C 103	16801	G 21	33801B	G 30	82718	C 84
B588	C 87	1591	L 52	10103	L 59	13401	G 10	15701	C 90	16831	G 21	34835	C 98	82831	G 20
589	C 87	R1591	L 53	10403	L 58	13401C	G 31	B15701	C 90	16851	G 21	35111	G 24	83401	G 10
B589	C 87	1610	C 95	10603	L 61	13421	G 10	S15701	C 101	16861	G 21	35141	L 45	83501	L 38
590	C 88	1611	C 95	10683	L 61	13474B	L 63	15710	C 90	16921	G 17	35373	G 15	85401	G 17
B590	C 88	1622	C 95	11103	G 33	13483B	L 63	B15710	C 90	21000	G 134	35443	L 68	85831	G 21
593	C 88	1691	C 95	11403	G 34	13493B	L 63	15718	C 90	22141	L 72	35493	L 43	86401	G 17
B593	C 88	1871	L 75	11603	G 35	13501	L 38	B15718	C 90	22142	L 72	35590	C 89	86831	G 21
598	C 88	1971	L 44	12041	L 48	13521	G 10	S15718	C 101	22461	L 64	B35590	C 89	88300	L 74
B598	C 88	1971VP	L 68	11683	G 35	13551	L 38	15750	C 90	22483	L 71	35593	C 89		
599	C 88	2191	C 104	12111	G 10	13601	G 32	B15750	C 90	22493	L 71	B35593	C 89		
B599	C 88	2271	106	12111ER	G 28	13602	G 32	15751	C 90	22501	L 72	S35693	C 103		
S673	C 102	2510	L 55	BT12111	G 22	13603	G 32	B15751	C 90	22561	L 64	35701	C 90		
S678	C 102	R2510	L 56	CT12111	G 22	13604	G 32	S15751	C 101	23141	L 69	B35701	C 90		
S683	C 102	2511	L 55	ST12111	G 22	13605	G 32	15760	C 90	S32074	C 99	S35701	C 101		
S688	C 102	R2511	L 56	TT12111	G 22	13701	C 84	B15760	C 90	32111	G 10	35710	C 90		
S693	C 102	2522	L 55	12141	L 38	B13701	C 84	15761	C 90	32141	L 38	B35710	C 90		

GATE VALVE INDEX															
Press. Class	Material	Bonnet Joint	Gasket	End Connection	Bonnet Type	Wall Thick.	Ports	SERIES				Page			
								Threaded	Socket Weld	Butt Weld	Flanged				
150	A105	Bolted	Spiral Wound		OS&Y		Conv	See Class 800	See Class 800	See Class 300	353	12			
	A182 F316/F316 L				OS&Y	Conv				358	12				
	A350 LF2				OS&Y	Conv				32353	12				
300	A105	Bolted	Spiral Wound		OS&Y		Conv	See Class 800	See Class 800	BW363	363	13			
					Full			BW13363	13363		13				
	A182 F316/F316 L				OS&Y	Conv			BW368	368		13			
					Full			BW13368	13368		13				
	A350 LF2				OS&Y	Conv			BW32363	32363		13			
					Full			BW33363	33363		13				
600	A105	Bolted	Spiral Wound		OS&Y		Conv	See Class 800	See Class 800	BW373	373	14			
					Full			BW13373	13373		14				
					API 600	Full				11403		34			
	A182 F316/F316 L				OS&Y	Conv			BW378	378		14			
					Full			BW13378	13378		14				
	A350 LF2				OS&Y	Conv			BW32373	32373		14			
					Full			BW33373	33373		14				
	800			A105	Bolted	Spiral Wound		OS&Y		Conv	12111	SW12111	BW12111		10
								Full			13111	SW13111			10
			Conv					12601	SW12601	BW12601		32			
			Full					13601	SW13601			32			
			Full					11103	SW11103			33			
			Conv					12161	SW12161			18			
			ISS												
		Extended Male Thread end	OS&Y				Conv	TT12111					22		
		Extended Male Socket Weld end	OS&Y					ST 12111	SS12111				22		
		Extended Male Couplet end	OS&Y					CT12111	CS12111				22		
		Weld	Bellows Seal				OS&Y		Conv	2801	SW2801			20	
							OS&Y			2801B	SW2801B			30	
							ISS			2811	SW2811			19	
				Extended Male Thread end			OS&Y		Conv	TT2801				22	
							ISS			TT2811					
				Extended Male Socket Weld end			OS&Y		Conv	ST2801	SS2801			22	
				Extended Male Couplet end						CT2801	CS2801			22	
				Reinforced Ext. Male Couplet end						CT2901	CS2901			22	
							ISS			CT2911	CS2911				
							ISS		Conv	59851	SW59851			27	
							OS&Y		Conv	32111	SW32111			10	
									Full	33111	SW33111			10	
		Weld					OS&Y		Conv	32801	SW32801			20	
									Full	33801	SW33801			20	
							OS&Y		Conv	12401	SW12401	BW12401		10	
									Full	13401	SW13401			10	
								API 600	Conv	12602	SW12602	BW12602		32	
									Full	13602	SW13602			32	
		Weld					OS&Y		Conv	2831	SW2831			20	
				Extended Male Thread end						TT2831				20	
				Extended Male Socket Weld end				ST2831	SS2831			20			
								CT2831	CS2831			20			
				Extended Male Couplet end											
					ISS		Conv	59951	SW59951			27			
		Union	Spiral Wound		OS&Y		Conv	82401	SW82401			10			
								12421	SW12421			10			
								12921	SW12921			10			
								12321	SW12321			10			
								12521	SW12521			10			
1500	A105	Bolted	Spiral Wound		OS&Y		Conv	15111	SW15111	BW15111		17			
					OS&Y	API 600	Full	16111	SW16111			17			
								1033	SW1033			36			
								1043	SW1043			36			
				Ring Joint											
				Spiral Wound	Flanged		Conv				15373	15			
							Full				16373	15			
					OS&Y	API 600					11603	35			
				Ring Joint	Flanged - Ring Joint						11683	10			
				Weld			OS&Y		Conv	15801	SW15801			21	
								ST15801	SS15801			21			
		A350 LF2	Bolted	Spiral Wound		OS&Y		Conv	35111	SW35111		35373	24		
								15401	SW15401		15378	17			
		Weld				OS&Y		Conv	15831	SW15831			21		
								15321	SW15321			17			
		A182 F11, CL2	Bolted	Spiral Wound		OS&Y		Conv	15521	SW15521			17		
1500LTD	A105	Weld			OS&Y		Conv	65703	SW65703			21			
2500*	A105	Weld		Threaded	OS&Y		Full	66703	SW66703			26			
	A350 LF2							66743	SW66743			26			
	A182 F11, CL2							66713	SW66713			26			
	A182 F22 CL 3							66773	SW66773			26			
	A182 F91							66791	SW66791			26			

GLOBE VALVE INDEX													Page	
Press. Class	Material	Bonnet Joint	Gasket	SEAT	Configuration	Bonnet Type	Wall Thick.	Ports				SERIES		
								Threaded	Socket Weld	Butt Weld	Flanged			
150	A105	Bolted	Bellows Seal	Integral		OS&Y		Conv				473B	63	
	A182 F316/F316 L					OS&Y		Conv				478B	63	
	A105	Bolted	Spiral Wound	Integral		OS&Y		Conv	See Class 800	See Class 800		473	40	
	A182 F316/F316 L					OS&Y		Conv				478	40	
	A350 LF2					OS&Y		Conv				32473	40	
300	A105	Bolted	Bellows Seal	Integral		OS&Y		Conv				483B	63	
	A182 F316/F316 L					OS&Y		Conv				488B	63	
	A105	Bolted	Spiral Wound	Integral		OS&Y		Conv	See Class 800	See Class 800	BW483	483	41	
	A182 F316/F316 L					OS&Y		Conv			BW488	488	41	
	A350 LF2					OS&Y		Conv			BW32483	32483	41	
	A105	Bolted	Spiral Wound	Removable		OS&Y		Conv			BW22483	22483	71	
	A350 LF2					OS&Y		Conv				36483	71	
600	A105	Bolted	Bellows Seal	Integral		OS&Y		Conv				493B	63	
	A182 F316/F316 L					OS&Y		Conv				498B	63	
	A105	Bolted	Spiral Wound	Integral		OS&Y		Conv	See Class 800	See Class 800	BW493	493	42	
	A182 F316/F316 L					OS&Y		Conv			BW498	498	42	
	A350 LF2					OS&Y		Conv			BW32793	32493	42	
	A105	Bolted	Spiral Wound	Removable		OS&Y		Conv				22493	71	
	A350 LF2					OS&Y		Conv				36493	71	
	A105					OS&Y		Full	43241				69	
						OS&Y	API 600	Full				10403	58	
800	A105	Bolted	Bellows Seal	Integral		OS&Y		Conv		12141B	SW12141B		63	
	A182 F316/F316 L					OS&Y				12501B	SW12501B		63	
	A105	Bolted	Spiral Wound	Integral		OS&Y		Conv		12141	SW12141	BW12141	38	
						OS&Y		Full		13141	SW13141		38	
				Angle		OS&Y		Conv		1971	SW1971		44	
				Throttling		OS&Y		Conv		12443	SW12443		66	
				Needle Pt.		OS&Y				22461	SW22461		64	
				Removable		OS&Y				22141	SW22141		72	
						OS&Y		Full		23141	SW23141		69	
						OS&Y	API 600	Full		10103	SW10103		59	
				Integral		ISS		Conv		12181	SW12181		46	
				Integral	Extended Male Thread end	OS&Y		Conv		TT12141			57	
					Extended Male Socket	OS&Y				ST12141	SS12141		57	
					Weld end	OS&Y								
					Extended Male Couplet end	OS&Y				CT12141	CS12141		57	
		Weld		Integral		OS&Y		Conv		2821	SW2821		49	
					Y pattern	OS&Y		Full		810	SW810		51	
		Union	Spiral Wound	Integral		OS&Y		Conv		801	SW801		47	
						ISS				851	SW851		46	
	A350 LF2	Bolted	Spiral Wound	Integral		OS&Y		Conv		32141	SW32141		38	
						OS&Y		Full		33141	SW33141		38	
		Weld		Integral		OS&Y		Conv		32821	SW32821		50	
	A182 F316/F316 L	Bolted	Spiral Wound	Integral		OS&Y		Conv		12501	SW12501		38	
						OS&Y		Full		13501	SW13501		38	
		Weld		Integral		OS&Y		Conv		2841	SW2841		49	
	A182 F316H	Bolted	Spiral Wound	Integral		OS&Y		Conv		82501	SW82501		38	
	A182 F5					OS&Y				12251	SW12251			
	A182 F11, CL2	Weld		Integral		OS&Y		Full		811	SW811		51	
		Bolted	Spiral Wound	Integral		OS&Y		Conv		12351	SW12351		38	
	A182 F22 CL 3					OS&Y				12551	SW12551		38	
		Weld		Integral		OS&Y		Full		822	SW822		51	
	1500	A105	Bolted	Spiral Wound	Integral		OS&Y		Conv		15141	SW15141	BW15141	45
						OS&Y		Full		16141	SW16141			
				Throttling		OS&Y		Conv		15443	SW15443		15493VP	
			Ring Joint	Removable		OS&Y	API 600	Full		1003	SW1003		10683	
			Spiral Wound			OS&Y				1023	SW1023		10603	
				Integral	Flanged	OS&Y		Conv				BW15493	15493	
		Weld		Integral		OS&Y		Conv		15821	SW15821		50	
A350 LF2						OS&Y				35821	SW35821		50	
		Bolted	Spiral Wound	Integral		OS&Y		Conv		35141	SW35141		45	
A182 F316/F316 L						OS&Y				15501	SW15501		45	
		Weld		Integral		OS&Y		Conv		15841	SW15841		50	
A182 F11, CL2		Bolted	Spiral Wound	Integral		OS&Y		Conv		15351	SW15351		45	
A182 F22 CL 3						OS&Y				15551	SW15551		45	
		Weld		Integral		OS&Y		Conv			SW65723		50	
		Weld		Integral	Y pattern	OS&Y		Conv		1510	SW1510		52	
		Screw	Sp. Wound			OS&Y				R1510	SWR1510		53	
A350 LF2		Weld		Integral	Y pattern	OS&Y		Conv		31510	SW31510		52	
A182 F11, CL2	Weld		Integral	Y pattern	OS&Y		Conv		1511	SW1511		52		
	Screw	Sp. Wound			OS&Y				R1511	SWR1511		53		
A182 F22 CL 3	Weld		Integral	Y pattern	OS&Y		Conv		1522	SW1522		52		
	Screw	Sp. Wound			OS&Y				R1522	SWR1522		53		
2500* 2680*	A105	Weld		Integral		OS&Y		Full		66723	SW66723		50	
					Y pattern					2510	SW2510		55	
		Screw	Sp. Wound							R2510	SWR2510		56	
	A350 LF2	Weld		Integral		OS&Y		Full		66753	SW66753		54	
					Y pattern					32510	SW32510		55	
	A182 F11, CL2	Weld		Integral		OS&Y		Full		66733	SW66733		54	
					Y pattern					2511	SW2511		55	
		Screw	Sp. Wound			OS&Y				R2511	SWR2511		56	
	A182 F22 CL 3	Weld		Integral		OS&Y		Full		66793	SW66793		54	
					Y pattern					2522	SW2522		55	
		Screw	Sp. Wound			OS&Y				R2522	SWR2522		56	
	A182 F91	Weld		Integral		OS&Y		Full		66783	SW66783		54	

* Threaded series rated at 2500 LTD and Socket Weld series rated at 2680 LTD

CHECK VALVE INDEX																														
Press. Class	Material	Bonnet Joint	Gasket	SEAT	Configuration	Type	Wall Thick.	Ports	SERIES				Page																	
150	A105	Bolted	Spiral Wound	Integral		Piston		Conv	Threaded	Socket Weld	Butt Weld	Flanged																		
						See Class 800			See Class 800		573	86																		
											570	86																		
	A182 F316/F316 L	Bolted	Spiral Wound	Integral		Swing		Conv				\$673	102																	
						Piston					578	86																		
						Pstn/Spring					579	86																		
	A350 LF2	Bolted	Spiral Wound	Integral		Swing		Conv				\$678	102																	
						Piston					32573	86																		
						Pstn/Spring					32570	86																		
	300	A105	Bolted	Spiral Wound	Integral		Swing		Conv	See Class 800	See Class 800			\$32673	102															
Piston															583	87														
Pstn/Spring															580	87														
A182 F316/F316 L		Bolted	Spiral Wound	Integral		Swing		Conv				\$683	102																	
						Piston					588	87																		
						Pstn/Spring					589	87																		
A350 LF2		Bolted	Spiral Wound	Integral		Swing		Conv				\$688	102																	
						Piston					32583	86																		
						Pstn/Spring					32580	86																		
600		A105	Bolted	Spiral Wound	Integral		Swing		Conv	See Class 800	See Class 800			\$32683	102															
	Piston														593	88														
	Pstn/Spring														590	88														
	A182 F316/F316 L	Bolted	Spiral Wound	Integral		Swing		Conv				\$693	102																	
						Piston					598	88																		
						Pstn/Spring					599	88																		
	A350 LF2	Bolted	Spiral Wound	Integral		Swing		Conv				\$698	102																	
						Piston					32593	88																		
						Pstn/Spring					32590	88																		
	800	A105	None Bolted	None Spiral Wound		Also available as ANGLE	Swing		Conv	S74	SWS74				99															
ZL Piston							701ZL							SW701ZL			85													
Ball							B701 (AB701)							SWB701			84													
Piston							701 (A701)							SW701	BW701		84													
Ball/Spring							B710 (AB710)							SWB710			84													
Pstn/Spring							710 (A710)							SW710			84													
Ball							B13701							SWB13701			84													
Piston							13701							SW13701			84													
Ball/Spring							B13710							SWB13710		84														
Pstn/Spring							13710							SW13710		84														
Swing							S701							SWS701		100														
Removable																														
API 600							4835							SW4835		98														
Union							Flat							Removable		Piston		Full	9091	SW9091			93							
																Ball			B9091	SWB9091		93								
																Integral			54853	SW54853		94								
A350 LF2							Bolted							Spiral Wound	Integral		Ball		Conv	B32701	SWB32701			84						
																	Piston			32701	SW32701		84							
																	Pstn/Spring			32710	SW32710		84							
A182 F316/F316 L							Bolted							Spiral Wound	Integral		Swing		Conv	S32701	SWS32701			100						
																	Ball			B718	SWB718			84						
																	Piston			718	SW718	BW718		84						
																	Ball/Spring			B780	SWB780			84						
																	Pstn/Spring			780	SW780			84						
																	Ball			B13718	SWB13718			84						
																	Piston			13718	SW13718			84						
																	Ball/Spring			B13780	SWB13780		84							
																	Pstn/Spring			13780	SW13780		84							
																	Swing			S718	SWS718		100							
																	Integral			54853	SW54853		94							
																	Union			Flat	Integral		Ball		Conv	82718	SW82718			84
																							Piston			B15701	SWB15701		90	
																							Ball			15701	SW15701	BW15593	15593	90
																	Integral													
1500							A105							Bolted	Spiral Wound	Integral		Ball		Conv	B15701	SWB15701			90					
																		Piston			15701	SW15701			90					
	Ball/Spring	16701	SW16701			90																								
	Pstn/Spring	B15710	SWB15710			90																								
	Swing	15710	SW15710		15590	90																								
	Full	16710	SW16710			90																								
	Conv	B15718	SWB15718			90																								
	Full	15718	SW15718	BW15598	15598	90																								
	Full	16718	SW16718			90																								
	Conv	B15780	SWB15780			15698		90																						
1690	A105	Weld		Integral	Y pattern	Pstn/Spring		Conv	15780	SW15780			90																	
						Swing			16780	SW16780			90																	
						Ball			1610	SW1610			95																	
						Piston			1611	SW1611			95																	
						Swing			1622	SW1622			95																	
						A182 F11, CL2			Weld		Integral	Y pattern	Pstn/Spring		Conv	2610	SW2610			96										
													Swing			2611	SW2611			96										
													Ball			2622	SW2622			96										
													Piston																	
													Swing																	
2680*	A182 F22 CL 3	Weld		Integral	Y pattern	Pstn/Spring		Conv	2622	SW2622			96																	
						Swing																								
						Ball																								
						Piston																								
						Swing																								

Gate Valve

Gate valves are designed to operate in a fully open or fully closed position. When open, the media will flow with minimal turbulence and pressure drop through the valve.

Vogt gate valves are available with a variety of bonnet types, body and trim materials, and stem packings, in addition to a broad range of pressure classes and end connections including extended bodies.

The rugged construction of forged gate valves provide an extended life of safe operation. Metal-to-metal seating surfaces accommodate the widest range of pressure-temperature conditions.

Dimensions in the catalog selection pages are in inches and millimeters.

Dimensions are subject to change without notice.

See pages 10-36 for gate valve selections.

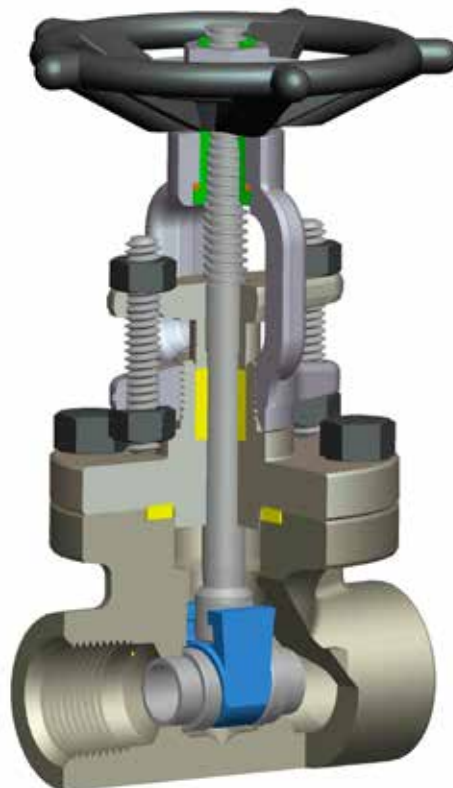
Drawings for currently available gate valve configurations are available at: http://VogtValves.vogtvalves.com/search_drawings.asp



12111 Gate Valve

Class 800 Gate Valve

Conventional Port
Full Port



See pages 12 - 14

The Core of the Pressure Class 150, 300, 600 & 800 Gate Valve

CONNECTION	CONV PORT	FULL PORT	BODY/BONNET	TRIM	RATING	
Threaded Socket Weld (SW) Threaded/Socket Weld (TSW) Butt Weld (BW)*	12111	13111	A105	13 Cr	1975 PSI @ 100 F	136.2 BAR @ 38 C
	32111	33111	A350 LF2	13 Cr	1975 PSI @ -50 F	136.2 BAR @ -46 C
	12401	13401	F316/F316L	316	1920 PSI @ 100 F	132.4 BAR @ 38 C
	82401	83401	F316H	316H		
	12321	13321	F11,Cl.2(1-1/4 Cr.)	13 Cr	2000 PSI @ 100 F	137.9 BAR @ 38 C
	12521	13521	F22,Cl.3(2-1/4 Cr.)			
	12421	13421	F5(5 Cr.)			
	12921	13921	F9(9 Cr.)			

(UOP) Universal Oil Products Approved - For HF Alkylation Service

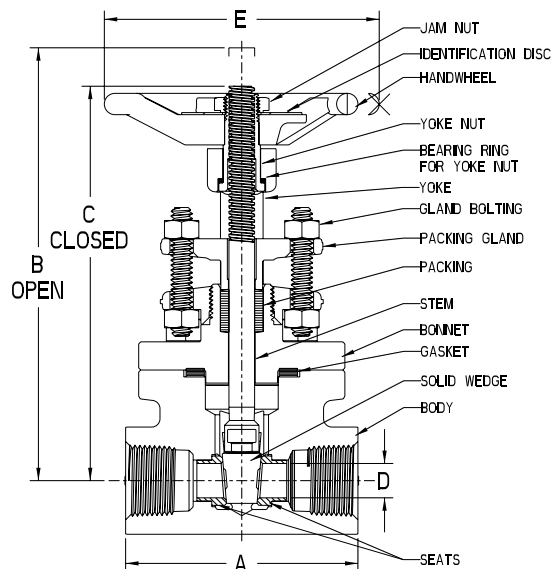
CONNECTION	CONV PORT	FULL PORT	BODY/BONNET	TRIM	RATING	
Threaded Socket Weld (SW)	12111HF6		A105	13 Cr	1975 PSI @ 100 F	136.2 BAR @ 38 C
		13111HF4	A105	Monel	1975 PSI @ 100 F	136.2 BAR @ 38 C
	12111HF7		A105	13 Cr	1975 PSI @ 100 F	136.2 BAR @ 38 C
		13111HF5	A105	Monel	1975 PSI @ 100 F	136.2 BAR @ 38 C

*See page 16 for Butt Weld Series Gate Valves

12111 Gate Valve

Class 800 Gate Valve

Round Bolted Bonnet
Spiral Wound Gasket
Outside Screw & Yoke
Bolted Gland
Solid Wedge
Hard Faced Seats
API 602
ASME B16.34



Dimensions

SIZE			A	B	C	D	E	WEIGHT	Cv	Conventional Port
-04	NPS	½	3.38	6.30	5.74	.50	4.00	5.0	9.6	
	DN	15	86	160	146	12.7	102	2.3		
-05	NPS	¾	3.38	6.30	5.74	.50	4.00	4.8	9.7	
	DN	20	86	160	146	12.7	102	2.2		
-06	NPS	1	4.00	8.37	7.43	.75	4.75	8.4	20.3	
	DN	25	102	213	189	19.1	121	3.8		
-07	NPS	1¼	4.75	10.12	8.71	1.25	5.75	16.7	80.5	
	DN	32	121	257	221	31.8	146	7.6		
-08	NPS	1 ½	4.75	10.12	8.71	1.25	5.75	16.2	91.6	
	DN	40	121	257	221	31.8	146	7.3		
-09	NPS	2	5.25	11.12	9.40	1.50	7.00	21.8	117.6	
	DN	50	133	282	239	38.1	178	9.9		
-10	NPS	2½	7.00	14.09	11.76	2.00	8.00	39.8	174	
	DN	65	178	358	299	50.8	203	18.1		
-11	NPS	3	8.00	17.96	15.01	2.75	9.75	75.0	203.9	
	DN	80	203	456	381	69.9	248	34.0		

-04	NPS	½	3.38	6.30	5.75	.50	4.00	5.0	9.6	Full port
	DN	15	86	160	146	12.7	102	2.3		
-05	NPS	¾	4.0	8.37	7.43	.75	4.75	8.6	28.7	
	DN	20	102	213	189	19.1	121	3.9		
-06	NPS	1	4.38	9.80	8.59	1.0	5.75	12.2	46.5	
	DN	25	111	249	218	25.4	146	5.5		
-07	NPS	1¼	4.75	10.12	8.71	1.25	5.75	16.7	80.5	
	DN	32	121	257	221	31.8	146	7.6		
-08	NPS	1½	5.25	11.12	9.40	1.50	7.0	23.0	109.6	
	DN	40	133	282	239	38.1	178	10.4		
-09	NPS	2	7.00	14.09	11.76	2.00	8.0	41.8	181.0	
	DN	50	178	358	299	50.8	203	19.0		

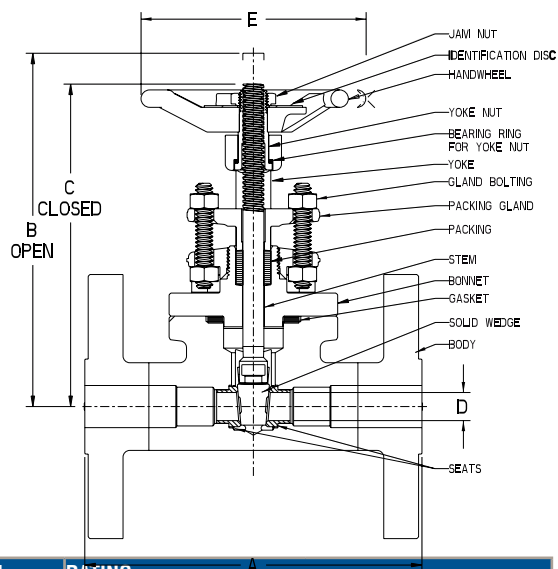
Refer to page 4 for optional trim and service configurations.
Refer to pages 126 & 127 for full materials description.

Refer to page 111-113 for end connections.
Refer to pages 114-115 for other ratings

Forged Gate Valves

Class 150 Gate Valve Conventional Port

Round Bolted Bonnet
Spiral Wound Gasket
Outside Screw & Yoke
Bolted Gland
Solid Wedge
Hard Faced Seats
API 602
ASME B16.34



CONNECTION	SERIES	BODY/BONNET	TRIM	RATING	
1/16 RF Flat Face	353	A105	13% Cr	285 PSI @ 100 F	19.6 BAR @ 38 C
	32353	A350 LF2	13% Cr	285 PSI @ 100 F	19.6 BAR @ 38 C
				285 PSI @ -50 F	19.6 BAR @ -46 C
	358	F316/F316L	316	275 PSI @ 100 F	19.0 BAR @ 38 C
	351	F11*, Cl.2	13% Cr	290 PSI @ 100 F	19.8 BAR @ 38 C
	352	F22*, Cl.3	13% Cr	290 PSI @ 100 F	19.8 BAR @ 38 C

*F11 & F22 not available in all sizes

Dimensions

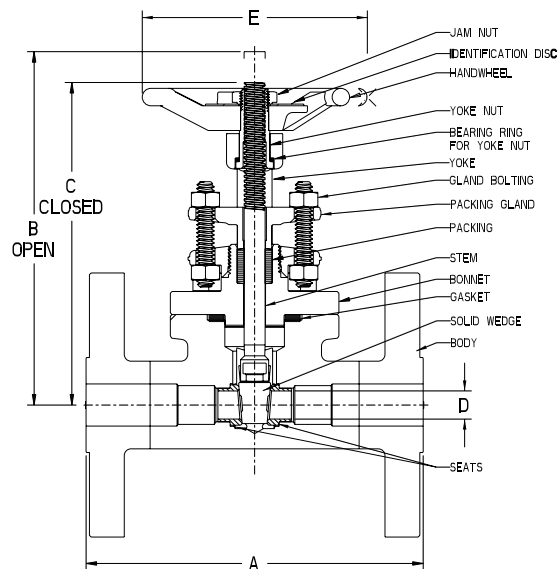
SIZE			A	B	C	D	E	WEIGHT	Cv	A105 ONLY
-04	NPS	½	4.25	6.30	5.74	.50	4.00	6.4	9.6	
	DN	15	108	160	146	12.7	102	2.9		
-05	NPS	¾	4.62	6.30	5.74	.50	4.00	8.0	9.7	
	DN	20	117	160	146	12.7	102	3.6		
-06	NPS	1	5.00	8.37	7.43	.75	4.75	12.3	20.3	
	DN	25	127	213	189	19.1	121	5.6		
-08	NPS	1½	6.50	10.12	8.71	1.25	5.75	23.0	91.6	
	DN	40	165	257	221	31.8	146	10.4		
-09	NPS	2	7.00	11.12	9.40	1.50	7.00	31.7	117.6	
	DN	50	178	282	239	38.1	178	14.4		
-10	NPS	2½	7.50	14.09	11.76	2.00	8.00	53.7	174	
	DN	65	191	358	299	50.8	203	24.4		
-11	NPS	3	8.00	14.09	11.76	2.00	8.00	57.6	203.9	
	DN	80	203	358	299	50.8	203	26.1		
-13	NPS	4	9.00	17.96	15.01	2.75	9.75	98.0	230.0	
	DN	100	229	456	381	69.9	248	44.5		

Forged Gate Valves

Class 300 Gate Valve

Conventional Port
Full Port

Round Bolted Bonnet
Spiral Wound Gasket
Outside Screw & Yoke
Bolted Gland
Solid Wedge
Hard Faced Seats
API 602
ASME B16.34



CONNECTION	CONV PORT	FULL PORT	BODY/BONNET	TRIM	RATING	
1/16 RF Flat Face FF	363	13363	A105	13% Cr	740 PSI @ 100 F	51.1 BAR @ 38 C
	32363	33363	A350 LF2	13% Cr	740 PSI @ 100 F	51.1 BAR @ 38 C
					740 PSI @ -50 F	51.1 BAR @ -46 C
	368	13368	F316/F316L	316	720 PSI @ 100 F	49.6 BAR @ 38 C
	361	13361	F11*,Cl.2	13% Cr	750 PSI @ 100 F	51.7 BAR @ 38 C
	362	13362	F22*,Cl.3	13% Cr	750 PSI @ 100 F	51.7 BAR @ 38 C

*F11 & F22 not available in all sizes

Dimensions

CONVENTIONAL PORT								
SIZE		A	B	C	D	E	WEIGHT	Cv
-04	NPS ½	5.5	6.30	5.74	.50	4.00	8.0	9.6
	DN 15	140	160	146	12.7	102	3.6	
-05	NPS ¾	6.00	6.30	5.74	.50	4.00	10.8	9.7
	DN 20	152	160	146	12.7	102	4.9	
-06	NPS 1	6.50	8.37	7.43	.75	4.75	15.5	20.3
	DN 25	165	213	189	19.1	121	7.0	
-08	NPS 1½	7.50	10.12	8.71	1.25	5.75	29.2	91.6
	DN 40	191	257	221	31.8	146	13.2	
-09	NPS 2	8.50	11.12	9.40	1.50	7.00	37.6	117.6
	DN 50	216	282	239	38.1	178	17.1	
-10	NPS 2½	9.50	14.09	11.76	2.00	8.00	61.6	174
	DN 65	241	358	299	50.8	203	27.9	
-11	NPS 3	11.12	14.09	11.76	2.00	8.00	71.6	203.9
	DN 80	282	358	299	50.8	203	32.5	
-13	NPS 4	12.00	17.96	15.01	2.75	9.75	121.9	230.0
	DN 100	305	456	381	69.9	248	55.3	

FULL PORT								
SIZE		A	B	C	D	E	WEIGHT	Cv
-04	NPS ½	5.50	6.30	5.74	.50	4.00	8.6	9.6
	DN 15	140	160	146	12.7	102	3.9	
-05	NPS ¾	6.00	8.37	7.44	.75	4.75	13.9	28.7
	DN 20	152	213	189	19.1	121	6.3	
-06	NPS 1	6.50	9.80	8.59	1.00	5.75	18.5	46.5
	DN 25	165	249	218	25.4	146	8.4	
-08	NPS 1½	7.50	11.12	9.40	1.50	7.00	33.2	109.6
	DN 40	191	282	239	38.1	178	15.1	
-09	NPS 2	8.50	14.09	11.76	2.00	8.00	53.1	181.0
	DN 50	216	358	299	50.8	203	24.1	

SEE PAGE 112 FOR BUTT WELD ENDS

Forged Gate Valves

Class 600 Gate Valve

Conventional Port

Full Port

Round Bolted Bonnet

Spiral Wound Gasket

Outside Screw & Yoke

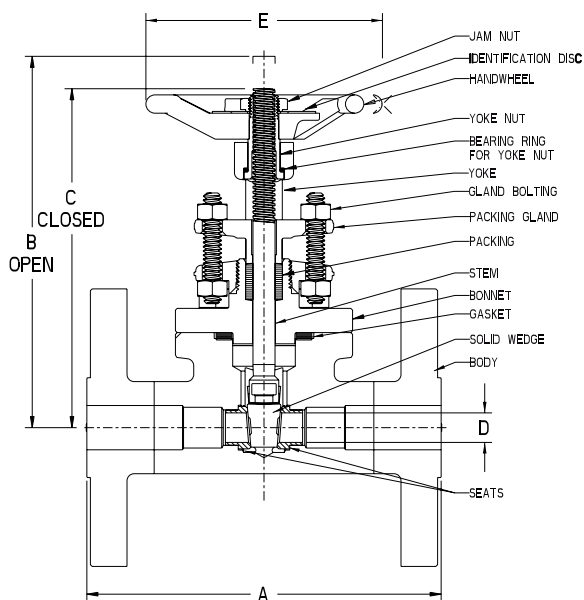
Bolted Gland

Solid Wedge

Hard Faced Seats

API 602

ASME B16.34



CONNECTION	CONV PORT	FULL PORT	BODY/BONNET	TRIM	RATING	
1/4 RF Ring Joint RJ	373	13373	A105	13% Cr	1480 PSI @ 100 F	102.1 BAR @ 38 C
	32373	33373	A350 LF2	13% Cr	1480 PSI @ 100 F	102.1 BAR @ 38 C
					1480 PSI @ -50 F	102.1 BAR @ -46 C
	378	13378	F316/F316L	316	1440 PSI @ 100 F	99.3 BAR @ 38 C
	371	13371	F11*, Cl.2	13% Cr	1500 PSI @ 100 F	103.4 BAR @ 38 C
	372	13372	F22*, Cl.3	13% Cr	1500 PSI @ 100 F	103.4 BAR @ 38 C

*F11 & F22 not available in all sizes

Dimensions

CONVENTIONAL PORT									
SIZE			A	B	C	D	E	WEIGHT	Cv
-04	NPS	½	6.50	6.30	5.74	.50	4.00	8.6	9.6
	DN	15	165	160	146	12.7	102	3.9	
-05	NPS	¾	7.50	6.30	5.74	.50	4.00	11.8	9.7
	DN	20	191	160	146	12.7	102	5.4	
-06	NPS	1	8.50	8.37	7.43	.75	4.75	17.6	20.3
	DN	25	216	213	189	19.1	121	8.0	
-08	NPS	1½	9.50	10.12	8.71	1.25	5.75	32.0	91.6
	DN	40	241	257	221	31.8	146	14.5	
-09	NPS	2	11.50	11.12	9.40	1.50	7.00	43.2	117.6
	DN	50	292	282	239	38.1	178	19.6	
-10	NPS	2½	13.00	14.09	11.76	2.00	8.00	70.5	174
	DN	65	330	358	299	50.8	203	32.0	
-11	NPS	3	14.00	14.09	11.76	2.00	8.00	80.7	203.9
	DN	80	356	358	299	50.8	203	36.6	
-13	NPS	4	17.00	17.96	15.01	2.75	9.75	152.1	230.0
	DN	100	432	456	381	69.9	248	69.0	

A105 ONLY

FULL PORT									
SIZE			A	B	C	D	E	WEIGHT	Cv
-04	NPS	½	6.50	6.30	5.74	.50	4.00	8.6	9.6
	DN	15	165	160	146	12.7	102	3.9	
-05	NPS	¾	7.50	8.37	7.44	.75	4.75	14.7	28.7
	DN	20	191	213	189	19.1	121	6.7	
-06	NPS	1	8.50	9.80	8.59	1.00	5.75	20.4	46.5
	DN	25	216	249	218	25.4	146	9.3	
-08	NPS	1½	9.50	11.12	9.40	1.50	7.00	37.0	109.6
	DN	40	241	282	239	38.1	178	16.8	
-09	NPS	2	11.50	14.09	11.76	2.00	8.00	58.8	181.0
	DN	50	292	358	299	50.8	203	26.7	

SEE PAGE 112 FOR BUTT WELD ENDS

Recommended Valve Orientation

VALVE TYPE	STEM ORIENTATION HORIZONTAL LINE ⁽¹⁾	STEM ORIENTATION VERTICAL LINE ⁽²⁾
Gate	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem horizontal
Gate Valve ⁽³⁾ Motor/air-operated	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem horizontal
Globe-T pattern	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem horizontal
Globe-T pattern ⁽³⁾ Motor/air-operated	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem horizontal
Globe-Y pattern	Any Preferred stem at $\pm 50^\circ$ to pipe run in upright position.	Any Preferred stem at $\pm 50^\circ$ to normal of pipe run
Globe-Y pattern ⁽³⁾ Motor/air-operated	Any Preferred stem at $\pm 50^\circ$ to pipe run in upright position.	Any Preferred stem at $\pm 50^\circ$ to normal of pipe run
Angle	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem vertical upright
Angle ⁽³⁾ Motor/air-operated	Any (except vertical down) Preferred vertical stem upright	Any Preferred stem vertical upright
Ball or Piston lift check valve-T pattern (no spring) (includes stop check valve)	Preferred vertical Upright Rotation off top dead center $\pm 40^\circ$	Not recommended
Ball or Piston lift check valve-T pattern (spring-controlled)	Preferred vertical upright Rotation off top dead center $\pm 90^\circ$	Any
Piston lift check valve-Y pattern (spring-controlled)	Preferred vertical upright Rotation off top dead center $\pm 90^\circ$	Any
Swing check valve	Preferred vertical upright Rotation off top dead center $\pm 30^\circ$	Any, but upward vertical flow required
Stop check valves	Preferred vertical Upright Rotation off top dead center $\pm 40^\circ$	Not recommended

General

- Gate, globe, angle and spring-controlled check valve designs oriented with stems or body run vertical down orient the valve body cavities in such a manner that debris can be collected and not get flushed out. This may cause unreliable valve operation. A vertical stem down or body run down orientation is not recommended for fluid service that may include debris.
- Recommended orientation of motor/air-operated valves may be changed by the recommended orientation of the actuator.

Notes

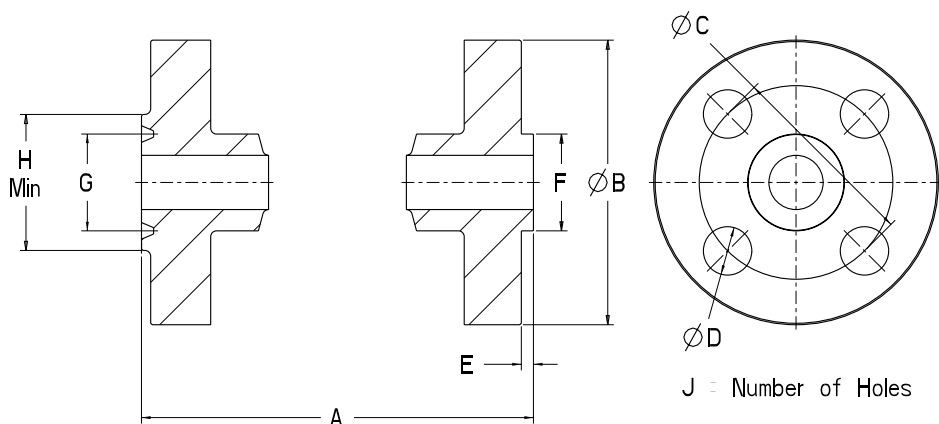
- ⁽¹⁾ A $\pm 5^\circ$ variation off horizontal for the pipe would not change the recommended except for swing check valves. This valve design will not close by gravity if the piping is off horizontal, which allows the swing check mechanism to swing away from the seat.
- ⁽²⁾ A $\pm 5^\circ$ off variation vertical for vertical piping does not change the recommendations in the table.
- ⁽³⁾ For small-bore socket welding and threaded valves equipped with a motor or air operator mounted in a horizontal plane, it is recommended that external supports be added to the piping arrangement to remove the load from the connecting socket welds or threads of the valve.

End Connections

Raised Face & Ring Joint Flange

Valve flanges conform to ASME Standard B16.5 and end-to-end dimensions conform to ASME B16.10

- A0 - Raised Face - Gate, Globe, Check
- A1 - Raised Face - Gate
- A2 - Raised Face - Globe, Check
- A3 - Ring Joint - Gate, Globe
- A4 - Raised Face - Swing Check



Dimensions

			CLASS 150									
SIZE			A1	A2	B	C	D	E	F	G	H	J
-04	NPS	½	4.25	4.25	3.50	2.38	0.62	0.06	1.38			4
	DN	15	108.0	108.0	88.9	60.45	15.8	1.52	35.1			
-05	NPS	¾	4.62	4.62	3.88	2.75	0.62	0.06	1.69			4
	DN	20	117.4	117.4	98.6	69.85	15.8	0.06	42.9			
-06	NPS	1	5.00	5.00	4.25	3.12	0.62	0.06	2.00	1.875	2.50	4
	DN	25	127.0	127.0	108.0	79.25	15.8	1.52	50.8	47.63	63.5	
-07	NPS	1¼	5.50	5.50	4.62	3.50	0.62	0.06	2.50	2.250	2.88	4
	DN	32	139.7	139.7	117.4	88.90	15.8	1.52	63.5	57.15	73.2	
-08	NPS	1½	6.50	6.50	5.00	3.88	0.62	0.06	2.88	2.562	3.25	4
	DN	40	165.1	165.1	127.0	98.55	15.8	1.52	73.2	65.07	82.6	
-09	NPS	2	7.00	8.00	6.00	4.75	0.75	0.06	3.62	3.250	4.00	4
	DN	50	177.8	203.2	152.4	120.65	19.1	1.52	92.0	82.55	101.6	
-10	NPS	2½	7.50	8.50	7.00	5.50	0.75	0.06	4.12	4.000	4.75	4
	DN	65	190.5	215.9	177.8	139.70	19.1	1.52	104.7	101.60	120.7	
-11	NPS	3	8.00	9.50	7.50	6.00	0.75	0.06	5.00	4.500	5.25	4
	DN	80	203.2	241.3	190.5	152.40	19.1	1.52	127.0	114.30	133.4	

-13	NPS 4	9.00	11.50	9.00	7.50	0.75	0.06	6.19	5.875	6.75	8
	DN 100	228.6	292.1	228.6	190.50	19.1	1.52	157.2	149.23	171.5	8

CLASS 300										
A1	A2	A4	B	C	D	E	F	G	H	J
5.50	6.00	6.00	3.75	2.62	0.62	0.06	1.38	1.344	2.00	4
139.7	152.4	152.4	95.3	66.55	15.8	1.52	35.1	34.14	50.8	4
6.00	7.00	7.00	4.62	3.25	0.75	0.06	1.69	1.688	2.50	4
152.4	177.8	177.8	117.4	82.55	19.1	0.06	42.9	42.88	63.5	4
6.50	8.00	8.50	4.88	3.50	0.75	0.06	2.00	2.00	2.75	4
165.1	203.2	215.9	124.0	88.90	19.1	1.52	50.8	50.80	69.9	4
7.00	8.50	9.00	5.25	3.88	0.75	0.06	2.50	2.375	3.12	4
177.8	215.9	228.6	133.4	98.55	19.1	1.52	63.5	60.33	79.3	4
7.50	9.00	9.50	6.12	4.50	0.88	0.06	2.88	2.688	3.56	4
190.5	228.6	241.3	155.5	114.30	22.4	1.52	73.2	68.28	90.4	8
8.50	10.50	10.50	6.50	5.00	0.75	0.06	3.62	3.250	4.25	8
215.9	266.7	266.7	165.1	127.00	19.1	1.52	92.0	82.55	108.0	8
9.50	11.50	11.50	7.50	5.88	0.88	0.06	4.12	4.000	5.00	8
241.3	292.1	292.1	190.5	149.35	22.4	1.52	104.7	101.60	127.0	8
11.12	12.50	12.50	8.25	6.62	0.88	0.06	5.00	4.875	5.75	8
282.5	317.5	317.5	209.6	168.15	22.4	1.52	127.0	123.83	146.1	8
12.00	14.00	14.00	10.00	7.88	0.88	0.06	6.19	5.875	6.88	8
304.8	355.6	355.6	254.0	200.15	22.4	1.52	157.2	149.23	174.8	8

Dimensions

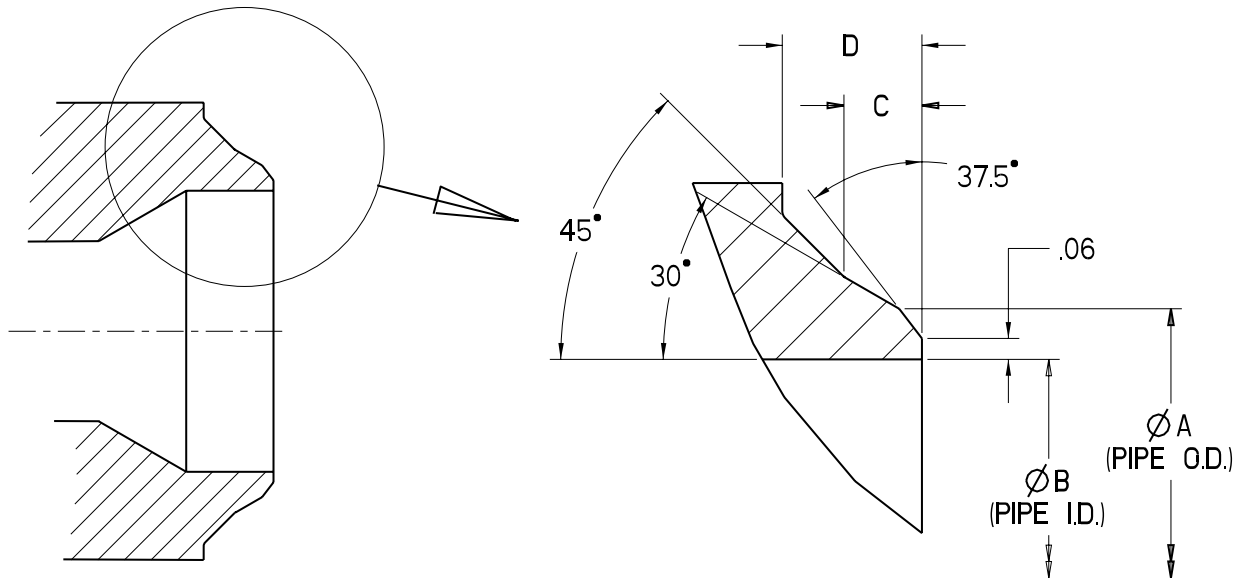
			CLASS 600									
SIZE			A1	A2	B	C	D	E	F	G	H	J
-04	NPS	½	6.50	6.50	3.75	2.62	0.62	0.25	1.38	1.344	2.00	4
	DN	15	165.1	165.1	95.3	66.55	15.8	6.35	35.1	34.14	50.8	
-05	NPS	¾	7.50	7.50	4.62	3.25	0.75	0.25	1.69	1.688	2.50	4
	DN	20	190.5	190.5	117.4	82.55	19.1	0.06	42.9	42.88	63.5	
-06	NPS	1	8.50	8.50	4.88	3.50	0.75	0.25	2.00	2.00	2.75	4
	DN	25	215.9	215.9	124.0	88.90	19.1	6.35	50.8	50.80	69.9	
-07	NPS	1¼	9.00	9.00	5.25	3.88	0.75	0.25	2.50	2.375	3.12	4
	DN	32	228.6	228.6	133.4	98.55	19.1	6.35	63.5	60.33	79.3	
-08	NPS	½	9.50	9.50	6.12	4.50	0.88	0.25	2.88	2.688	3.56	4
	DN	40	241.3	241.3	155.5	114.30	22.4	6.35	73.2	68.28	90.4	
-09	NPS	2	11.50	11.62	6.50	5.00	0.75	0.25	3.62	3.250	4.25	8
	DN	50	292.1	295.2	165.1	127.00	19.1	6.35	92.0	82.55	108.0	
-10	NPS	2½	13.00	13.12	7.50	5.88	0.88	0.25	4.12	4.000	5.00	8
	DN	65	330.2	333.3	190.5	149.35	22.4	6.35	104.7	101.60	127.0	
-11	NPS	3	14.00	14.12	8.25	6.62	0.88	0.25	5.00	4.875	5.75	8
	DN	80	355.6	358.7	209.6	168.15	22.4	6.35	127.0	123.83	146.1	
-13	NPS	4	17.00	17.12	10.75	8.50	1.00	0.25	6.19	5.875	6.88	8
	DN	100	431.8	434.9	273.1	215.90	25.4	6.35	157.2	149.23	174.8	

CLASS 1500									
A0	A3	B	C	D	E	F	G	H	J
8.50	8.50	4.75	3.25	0.88	0.25	1.38	1.562	2.38	4
215.9	215.9	120.7	82.55	22.4	6.35	35.1	39.67	60.5	
9.00	9.00	5.12	3.50	0.88	0.25	1.69	1.750	2.62	4
228.6	228.6	130.1	88.90	22.4	0.06	42.9	44.45	66.6	
10.00	10.00	5.88	4.00	1.00	0.25	2.00	2.000	2.81	4
254.0	254.0	149.4	101.60	25.4	6.35	50.8	50.80	71.4	
11.00	11.00	6.25	4.38	1.00	0.25	2.50	2.375	3.19	4
279.4	279.4	158.8	111.25	25.4	6.35	63.5	60.33	81.0	
12.00	12.00	7.00	4.88	1.12	0.25	2.88	2.688	3.62	4
304.8	304.8	177.8	123.95	28.5	6.35	73.2	68.28	92.0	
14.50	14.62	8.50	6.50	1.00	0.25	3.62	3.750	4.88	8
368.3	371.4	215.9	165.10	25.4	6.35	92.0	95.25	124.0	
16.50	16.62	9.62	7.50	1.12	0.25	4.12	4.250	5.38	8
419.1	422.2	244.4	190.50	28.5	6.35	104.7	107.95	136.7	
18.50	18.62	10.50	8.00	1.25	0.25	5.00	5.375	6.62	8
469.9	473.0	266.7	203.20	31.8	6.35	127.0	136.53	168.2	
21.50	21.62	12.25	9.50	1.38	0.25	6.19	6.375	7.62	8
546.1	549.2	311.2	241.30	35.1	6.35	157.2	161.93	193.6	

End Connections

Butt Weld End Valves

Conforms to ASME B16.25

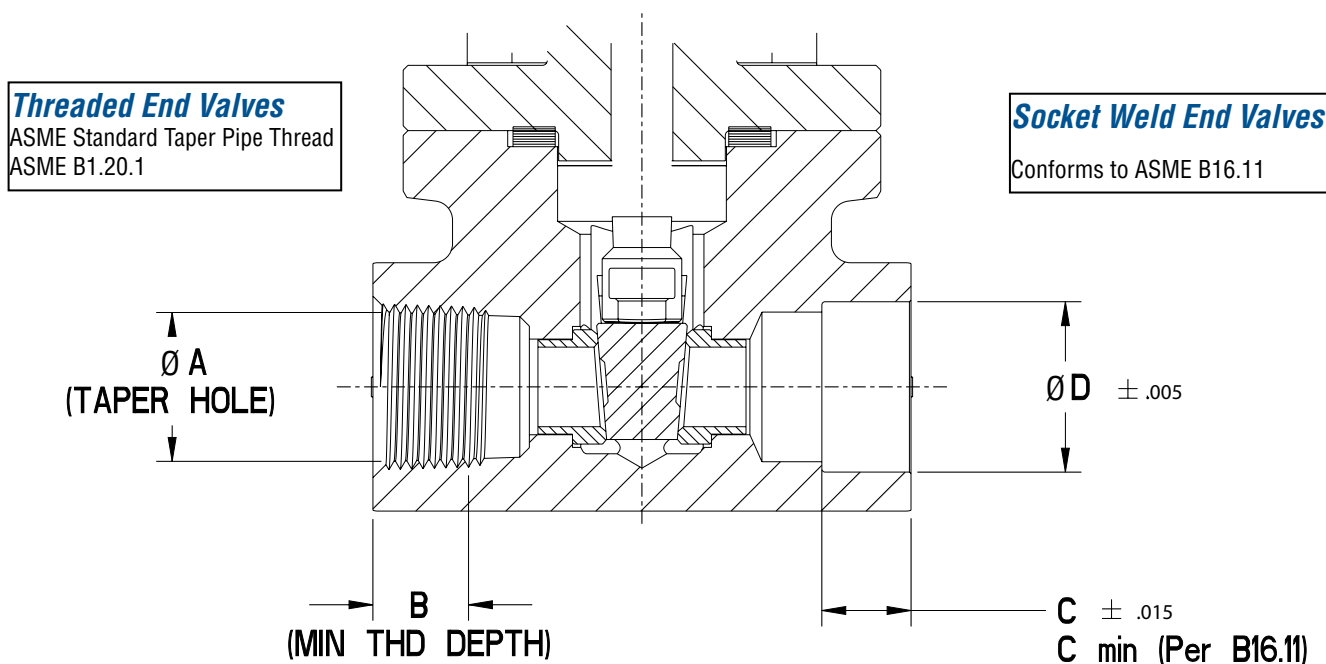


Dimensions

				SCH 40			SCH 80			SCH 160			SCH XXS			
SIZE				A	B	C	D	B	C	D	B	C	D	B	C	D
-04	NPS	½	0.84	0.622	0.16	0.22	0.546	0.22	0.29	0.466	0.28	0.37	0.252	0.44	0.59	
	DN	15	21.3	15.8	4.2	5.5	13.87	5.6	7.5	11.84	7.1	9.5	6.4	11.2	14.9	
-05	NPS	¾	1.05	0.824	0.17	0.23	0.742	0.23	0.31	0.614	0.33	0.44	0.434	0.46	0.62	
	DN	20	26.7	20.93	4.3	5.7	18.85	5.9	7.8	15.6	8.3	11.1	11.02	11.7	15.7	
-06	NPS	1	1.315	1.049	0.2	0.27	0.957	0.27	0.36	0.815	0.38	0.5	0.599	0.54	0.72	
	DN	25	33.4	26.64	5.1	6.8	24.31	6.8	9.1	20.7	9.5	12.7	15.21	13.6	18.2	
-07	NPS	1¼	1.66	1.38	0.21	0.28	1.278	0.29	0.38	1.16	0.38	0.5	0.896	0.57	0.76	
	DN	32	42.2	35.05	5.3	7.1	32.46	7.3	9.7	29.46	9.5	12.7	22.76	14.6	19.4	
-08	NPS	1½	1.9	1.61	0.22	0.29	1.5	0.3	0.4	1.338	0.42	0.56	1.1	0.6	0.8	
	DN	40	48.3	40.89	5.5	7.4	38.1	7.6	10.2	33.99	10.7	14.3	27.94	15.2	20.3	
-09	NPS	2	2.375	2.067	0.23	0.31	1.939	0.33	0.44	1.689	0.51	0.69	1.503	0.65	0.87	
	DN	50	60.3	52.5	5.9	7.8	49.25	8.3	11.1	42.9	13.1	17.4	38.18	16.6	22.2	
-10	NPS	2½	2.875	2.469	0.3	0.41	2.323	0.41	0.55	2.125	0.56	0.75	1.771	0.83	1.1	
	DN	65	73	62.71	7.7	10.3	59	10.5	14	53.98	14.3	19.1	44.98	21	28	
-11	NPS	3	3.5	3.068	0.32	0.43	2.9	0.45	0.6	2.624	0.66	0.88	2.3	0.9	1.2	
	DN	80	88.9	77.93	8.2	11	73.66	11.4	15.2	66.65	16.7	22.3	58.42	22.9	30.5	
-13	NPS	4	4.5	4.026	0.36	0.47	3.826	0.51	0.67	3.438	0.8	1.06	3.152	1.01	1.35	
	DN	100	114.3	102.26	9	12	97.18	12.8	17.1	87.33	20.2	27	80.06	25.7	34.2	

End Connections

Threaded End Valves



Dimensions

			THREADED			SOCKET WELD		
SIZE			A	B	THD'S/IN	C	C MIN	D
-04	NPS	½	0.725	0.59	14	0.44	0.38	0.860
	DN	15	18.42	15.0		11.2	9.7	21.84
-05	NPS	¾	0.935	0.59	14	0.56	0.50	1.070
	DN	20	23.75	15.0		14.2	12.7	27.18
-06	NPS	1	1.173	0.75	11½	0.56	0.50	1.335
	DN	25	29.79	19.1		14.2	12.7	33.91
-07	NPS	1¼	1.518	0.78	11½	0.56	0.50	1.680
	DN	32	38.56	19.8		14.2	12.7	42.67
-08	NPS	1½	1.756	0.81	11½	0.56	0.50	1.920
	DN	40	44.60	20.6		14.2	12.7	48.77
-09	NPS	2	2.231	0.84	11½	0.69	0.62	2.411
	DN	50	56.67	21.3		17.5	15.8	61.24
-10	NPS	2½	2.666	1.25	8	0.69	0.62	2.911
	DN	65	67.72	31.8		17.5	15.8	73.94
-11	NPS	3	3.293	1.31	8	0.69	0.62	3.540
	DN	80	83.64	33.3		17.5	15.8	89.92

Pressure-temperature Ratings for Vogt Products

		RATINGS ARE IN ACCORDANCE WITH ASME B16.34-2004, STANDARD CLASS. - PRESSURE (PSIG)																										
		CLASS 150					CLASS 300					CLASS 600					CLASS 800										CLASS 1500	
SERVICE	TEMP	A105	F316	F11	F22	LF2	A105	F316	F11	F22	LF2	A105	F316	F11	F22	LF2	A105	F5	F316	316H	LF2	F9	F11	F22	A105	F5	F316	
-50 F			275			285		720			740		1440			1480			1920		1975							3600
-20 TO 100 F	285	275	290	290	285	740	720	750	750	740	1480	1440	1500	1500	1480	1975	2000	1920	1920	1975	2000	2000	2000	2000	2000	3705	3750	3600
200 F	260	235	260	260	260	680	620	750	750	680	1360	1240	1500	1500	1360	1810	1965	1655	1655	1810	2000	2000	2000	2000	3395	3680	3095	
300 F	230	215	230	230	230	655	560	720	720	655	1310	1120	1445	1445	1310	1745	1865	1495	1495	1745	1940	1925	1940	3270	3495	2795		
400 F	200	195	200	200	200	635	515	695	695	635	1265	1025	1385	1410	1265	1690	1780	1370	1370	1690	1880	1850	1880	3170	3345	2570		
500 F	170	170	170	170	170	605	480	665	665	605	1205	955	1330	1330	1205	1610	1725	1275	1275	1610	1775	1775	1775	3015	3230	2390		
600 F	140	140	140	140	140	570	450	605	605	570	1135	900	1210	1210	1135	1515	1615	1205	1205	1515	1615	1615	1615	2840	3025	2255		
650 F	125	125	125	125	125	550	440	590	590	550	1100	885	1175	1175	1100	1465	1570	1180	1185	1465	1570	1570	1570	2745	2940	2210		
700 F	110	110	110	110	110	530	435	570	570	530	1060	870	1135	1135	1060	1415	1515	1160	1160	1415	1515	1515	1515	2655	2840	2170		
750 F	95	95	95	95	95	505	425	530	530	505	1015	855	1065	1065	1015	1350	1420	1140	1140	1350	1420	1420	1420	2535	2660	2135		
800 F	80	80	80	80	80	410	420	510	510	410	825	845	1015	1015	825	1100	1355	1125	1125	1100	1355	1355	1355	2055	2540	2110		
850 F	65	65	65	65	65	320	420	485	485	320	640	835	975	975	640	850	1300	1115	1115	850	1300	1300	1300	1595	2435	2090		
900 F	50	50	50	50	50	230	415	450	450	230	460	830	900	900	460	615	995	1105	1105	615	1200	1200	1200	1150	1870	2075		
950 F	35	35	35	35	35	135	385	320	385	135	275	775	640	755	275	365	735	1030	1030	365	1005	850	1030	685	1370	1930		
1000 F	20	20	20	20	20	85	365	215	265	85	170	725	430	535	170	225	530	970	970	225	675	575	710	430	995	1820		
1050 F									145	175			290	350			385		960		460	385	465		720			
1100 F								95	110				190	220			255		815		300	255	295		480			
1150 F								65	70				130	135			165		630		200	175	180		310			
1200 F								40	40				80	80			95		495		140	110	110		170			
1250 F																			390									
1300 F																				310								
1350 F																				255								
1400 F																				200								
1450 F																				155								
1500 F																				110								

	RATINGS ARE IN ACCORDANCE WITH ASME B16.34-2004, STANDARD CLASS. - PRESSURE (BAR)																										
	CLASS 150					CLASS 300					CLASS 600					CLASS 800					CLASS 1500						
SERVICE TEMP	A105	F316	F11	F22	LF2	A105	F316	F11	F22	LF2	A105	F316	F11	F22	LF2	A105	F5	F316	316H	LF2	F9	F11	F22	A105	F5	F316	
-46 C		19.0			19.6		49.6			51.1		99.3			102.1			132.4		136.2							248.2
-29 TO 38C	19.6	19.0	19.8	19.8	19.6	51.1	49.6	51.7	51.7	51.1	102.1	99.3	103.4	103.4	102.1	136.2	137.9	132.4	132.4	136.2	137.9	137.9	137.9	137.9	255.3	258.6	248.2
50 C	19.2	18.4	19.5	19.5	19.2	50.1	48.1	51.7	51.7	50.1	100.2	96.2	103.4	103.4	100.2	133.7	137.3	128.3	128.3	133.7	137.9	137.9	137.9	250.6	257.5	240.6	
100 C	17.7	16.2	17.7	17.7	17.7	46.6	42.2	51.5	51.5	46.6	93.2	84.4	103.0	103.0	93.2	124.3	134.5	112.5	112.5	124.3	137.4	137.3	137.4	233.0	252.2	211.0	
150 C	15.8	14.8	15.8	15.8	15.8	45.1	38.5	49.7	50.3	45.1	90.2	77.0	99.5	100.3	90.2	120.2	128.5	102.7	102.7	120.2	133.8	132.6	133.8	225.4	240.9	192.5	
200 C	13.8	13.7	13.8	13.8	13.8	43.8	35.7	48.0	48.6	43.8	87.6	71.3	95.9	97.2	87.6	116.8	123.4	95.1	95.1	116.8	129.6	127.9	129.6	219.0	231.3	178.3	
250 C	12.1	12.1	12.1	12.1	12.1	41.9	33.4	46.3	46.3	41.9	83.9	66.8	92.7	92.7	83.9	111.8	119.5	89.0	89.0	111.8	123.6	123.6	123.6	209.7	224.1	166.9	
300 C	10.2	10.2	10.2	10.2	10.2	39.8	31.6	42.9	42.9	39.8	79.6	63.2	85.7	85.7	79.6	106.2	114.3	84.3	84.3	106.2	114.3	114.3	114.3	199.1	214.4	158.1	
325 C	9.3	9.3	9.3	9.3	9.3	38.7	30.9	41.4	41.4	38.7	77.4	61.8	82.6	82.6	77.4	103.2	110.2	82.4	82.4	103.2	110.2	110.2	110.2	193.6	206.6	154.4	
350 C	8.4	8.4	8.4	8.4	8.4	37.6	30.3	40.3	40.3	37.6	75.1	60.7	80.4	80.4	75.1	100.2	107.3	80.9	80.9	100.2	107.3	107.3	107.3	187.8	201.1	151.6	
375 C	7.4	7.4	7.4	7.4	7.4	36.4	29.9	38.9	38.9	36.6	72.7	59.7	77.6	77.6	72.7	97.0	103.5	79.7	79.7	97.0	103.5	103.5	103.5	181.8	194.1	149.4	
400 C	6.5	6.5	6.5	6.5	6.5	34.7	29.4	36.5	36.5	34.7	69.4	58.9	73.3	73.3	69.4	92.6	97.6	78.5	78.5	92.6	97.6	97.6	97.6	173.6	183.1	147.2	
425 C	5.5	5.5	5.5	5.5	5.5	28.8	29.1	35.2	35.2	28.8	57.5	58.3	70.0	70.0	57.5	76.7	93.4	77.7	77.7	76.7	93.4	93.4	93.4	143.8	175.1	145.7	
450 C	4.6	4.6	4.6	4.6	4.6	23.0	28.8	33.7	33.7	23.0	46.0	57.7	67.7	67.7	46.0	61.3	90.2	76.9	76.9	61.3	90.2	90.2	90.2	115.0	169.0	144.2	
475 C	3.7	3.7	3.7	3.7	3.7	17.4	28.7	31.7	31.7	17.4	34.9	57.3	63.4	63.4	34.9	46.5	74.3	76.4	76.4	46.5	84.5	84.5	84.5	87.2	139.3	143.4	
500 C	2.8	2.8	2.8	2.8	2.8	11.8	28.2	25.7	28.2	11.8	23.5	56.5	51.5	56.5	23.5	31.4	57.0	75.3	75.3	31.4	75.3	68.6	75.3	58.8	106.9	140.9	
538 C	1.4	1.4	1.4	1.4	1.4	5.9	25.2	14.9	18.4	5.9	11.8	50.0	29.8	36.9	11.8	15.7	36.5	66.8	66.8	15.7	46.7	39.7	49.2	29.5	68.6	125.5	
550 C								12.7	15.6				25.4	31.3			32.1		66.5		40.0	33.9	41.7		60.2		
575 C								8.8	10.5				17.6	21.1			23.5		63.8		27.9	23.5	28.1		44.0		
600 C								6.1	6.9				12.2	13.8			16.2		53.1		19.1	16.3	18.4		30.3		
625 C								4.3	4.5				8.5	8.9			10.7		42.1		13.2	11.4	11.9		20.0		
650 C								2.8	2.8				5.7	5.7			6.3		33.8		9.4	7.6	7.6		11.8		
675 C																			27.5								
700 C																			22.3								
725 C																			18.7								
750 C																			15.6								
775 C																			12.1								
800 C																			9.3								
816 C																			7.7								

A105	ASTM A105 (2)	F9	ASTM A182 F9
LF2	ASTM A350 LF2 (2)	F91	ASTM A182 F91
F316	ASTM A182 F316/F316L (1)	F11	ASTM A182 F11 Cl 2 (3) (4)
316H	ASTM A183 F316H	F22	ASTM A182 F22 Cl 3 (3)
F5	ASTM A182 F5		

- (1) F316 Stainless Steel containing Max. Carbon of .030 - Do not use above 1000 F (538C)
- (2) A105 & LF2 are permitted but not recommended for prolonged use above 800 F (427C)
- (3) F11 & F22 are permitted but not recommended for prolonged use above 1100 F (593C)
- (4) F11 to be Normalized and Tempered only

Pressure-temperature Ratings for Vogt Products

STANDARD CLASS. - PRESSURE					SERVICE TEMP	RATINGS ARE IN ACCORDANCE WITH ASME B16.34-2004, LIMITED CLASS. - PRESSURE (PSIG)																							
CLASS 1500						CLASS 800 LTD				CLASS 1500 LTD				CLASS 1690 LTD				CLASS 2500 LTD				CLASS 2680 LTD							
316H	LF2	F9	F11	F22	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91					
	3705				-50 F																								
3600	3705	3750	3750	3750	-20 TO 100 F	2000	2000	2000	2000	3750	3750	3750	3750	4225	4225	4225	4225	6250	6250	6250	6250	6700	6700	6700	6700				
3095	3395	3750	3750	3750	200 F	2000	2000	2000	2000	3750	3750	3750	3750	4225	4225	4225	4225	6250	6250	6250	6250	6700	6700	6700	6700				
2795	3270	3640	3610	3640	300 F	1975	2000	1975	2000	3700	3750	3695	3750	4170	4225	4165	4225	6170	6250	6160	6250	6615	6700	6605	6700				
2570	3170	3530	3465	3530	400 F	1955	2000	1940	2000	3665	3750	3640	3750	4130	4225	4100	4225	6105	6250	6065	6250	6545	6700	6500	6700				
2390	3015	3325	3325	3325	500 F	1955	2000	1935	2000	3665	3750	3620	3750	4130	4225	4080	4225	6105	6250	6035	6250	6545	6700	6470	6700				
2255	2840	3025	3025	3025	600 F	1955	2000	1925	2000	3665	3750	3605	3750	4130	4225	4060	4225	6105	6250	6010	6250	6545	6700	6440	6700				
2210	2745	2940	2940	2940	650 F	1905	2000	1905	2000	3575	3750	3580	3750	4030	4225	4035	4225	5960	6250	5965	6250	6390	6700	6395	6700				
2170	2655	2840	2840	2840	700 F	1945	1955	1885	1955	3455	3665	3535	3665	3895	4130	3985	4130	5760	6110	5895	6110	6175	6550	6320	6550				
2135	2535	2660	2660	2660	750 F	1695	1945	1885	1945	3170	3645	3535	3645	3570	4105	3985	4105	5285	6070	5895	6070	5665	6505	6320	6510				
2110	2055	2540	2540	2540	800 F	1375	1920	1885	1920	2570	3600	3535	3600	2895	4055	3985	4055	4285	6000	5895	6000	4595	6430	6320	6430				
2090	1595	2435	2435	2435	850 F	1060	1805	1805	1805	1996	3385	3385	3385	2245	3815	3815	3815	3320	5645	5645	5645	3560	6050	6050	6050				
2075	1150	2245	2245	2245	900 F	765	1565	1600	1600	1435	2935	3000	3000	1615	3305	3380	3380	2395	4895	5000	5000	2565	5245	5360	6360				
1930	685	1885	1595	1930	950 F	465	1075	1275	1275	875	2040	2410	2410	990	2305	2725	2725	1485	3445	4075	4075	1595	3700	4380	4380				
1820	430	1270	1080	1335	1000 F	295	745	925	1160	570	1445	1785	2250	650	1640	2030	2555	1000	2520	3120	3925	1085	2725	3375	4245				
1800		855	720	875	1050 F		495	600	1160		960	1170	2250		1095	1330	2555		1680	2040	3925		1815	2205	4245				
1525		565	480	550	1100 F		330	375	1040		640	730	2015		730	835	2290		1120	1280	3520		1210	1385	3810				
1185		375	325	345	1150 F		225	235	765		435	460	1490		495	520	1695		760	800	2600		825	865	2810				
925		255	205	205	1200 F		145	145	495		275	275	960		310	310	1095		480	480	1680		520	520	1815				
735					1250 F																								
585					1300 F																								
480					1350 F																								
380					1400 F																								
290					1450 F																								
205					1500 F																								

STANDARD CLASS. - PRES-SURE					SERVICE TEMP	RATINGS ARE IN ACCORDANCE WITH ASME B16.34-2004, LIMITED CLASS. - PRESSURE (BAR)																							
CLASS 1500						CLASS 800 LTD				CLASS 1500 LTD				CLASS 1690 LTD				CLASS 2500 LTD				CLASS 2680 LTD							
316H	LF2	F9	F11	F22	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91	A105	F11	F22	F91					
	255.3				-46 C																								
248.2	255.3	258.6	258.6	258.6	-29 TO 38C	137.9	137.9	137.9	137.9	258.6	258.6	258.6	258.6	291.3	291.3	291.3	291.3	430.9	430.9	430.9	430.9	461.9	461.9	461.9	461.9				
240.6	250.6	258.6	258.6	258.6	50 C	137.9	137.9	137.9	137.9	258.6	258.6	258.6	258.6	291.3	291.3	291.3	291.3	430.9	430.9	430.9	430.9	461.9	461.9	461.9	461.9				
211.0	233.0	257.6	257.4	257.6	100 C	137.7	137.9	137.7	137.9	258.2	258.6	258.1	258.6	290.9	291.3	290.8	291.3	430.9	430.9	430.2	430.9	461.3	461.9	461.2	461.9				
192.5	225.4	250.8	248.7	250.9	150 C	136.1	137.9	135.9	137.9	255.2	258.6	254.8	258.6	287.5	291.3	287.1	291.3	425.3	430.9	424.6	430.9	455.9	461.9	455.2	461.9				
178.3	219.0	243.4	239.8	243.4	200 C	134.8	137.9	133.9	137.9	252.9	258.6	251.1	258.6	284.9	291.3	282.9	291.3	421.4	430.9	418.5	430.9	451.7	461.9	448.6	461.9				
166.9	209.7	231.8	231.8	231.8	250 C	134.8	137.9	133.3	137.9	252.6	258.6	249.9	258.6	284.6	291.3	281.6	291.3	421.1	430.9	416.5	430.9	451.4	461.9	446.5	461.9				
158.1	199.1	214.4	214.4	214.4	300 C	134.8	137.9	132.7	137.9	252.6	258.6	248.9	258.6	284.6	291.3	280.4	291.3	421.1	430.9	414.8	430.9	451.4	461.9	444.7	461.9				
154.4	193.6	206.6	206.6	206.6	325 C	133.6	137.9	132.3	137.9	250.6	258.6	248.0	258.6	282.3	291.3	279.4	291.3	417.6	430.9	413.3	430.9	447.7	461.9	443.1	461.9				
151.6	187.8	201.1	201.1	201.1	350 C	130.4	137.1	131.2	137.1	244.6	257.1	246.0	257.1	275.6	289.7	277.2	289.7	407.6	428.6	410.0	428.6	436.9	459.5	439.5	459.5				
149.4	181.8	194.1	194.1	194.1	375 C	125.6	134.7	130.0	134.7	235.5	252.5	243.8	252.5	265.3	284.5	274.7	284.5	392.5	420.9	406.3	420.9	420.8	451.2	435.6	451.2				
147.2	173.6	183.1	183.1	183.1	400 C	115.7	133.9	130.0	133.9	217.0	251.2	243.8	251.2	244.5	282.9	274.7	282.9	361.7	418.3	406.3	418.3	387.7	448.4	435.6	448.4				
145.7	143.8	175.1	175.1	175.1	425 C	95.9	132.4	130.0	132.4	179.8	248.2	248.3	248.2	202.6	279.6	274.7	279.6	299.6	413.7	406.3	413.7	321.2	443.5	435.6	443.5				
144.2	115.0	169.0	169.0	169.1	450 C	76.7	125.7	125.7	125.7	143.8	235.8	235.8	235.8	162.0	265.7	265.7	265.7	239.6	393.1	393.1	393.1	256.9	421.4	421.4	421.4				
143.4	87.2	158.2	158.2	158.2	475 C	58.1	114.0	114.0	114.0	109.0	213.7	213.7	213.7	122.8	240.8	240.8	240.8	181.6	356.3	356.3	356.3	194.7	382.0	382.0	382.0				
140.9	58.8	140.9	128.6	140.9	500 C	39.2	85.8	95.2	95.2	73.5	160.8	178.6	178.6	82.8	182.2	201.2	201.2	122.4	268.0	297.5	279.5	131.2	287.3	318.9	318.9				
125.5	29.5	87.5	74.5	92.2	538 C	20.4	51.4	63.6	80.0	39.4	99.5	123.1	155.1	44.8	113.1	139.9	176.2	69.0	173.7	215.2	270.7	74.6	187.8	232.6	292.7				
124.9		75.0	63.5	78.2	550 C		43.9	53.9	80.0		84.9	104.4	155.1		96.5	118.7	176.2		148.3	182.3	270.7		160.3	197.2	292.7				
119.7		52.3	44.0	52.6	575 C		30.4	36.3	78.9		58.8	70.3	152.8		68.8	79.9	173.7		102.7	122.9	266.9		111.1	132.9	288.6				
99.5		35.9	30.5	34.4	600 C		21.1	23.7	67.3		40.8	46.0	130.3		46.4	52.2	148.1		71.2	80.3	227.5		77.0	86.8	246.0				
79.1		24.8	21.3	22.3	625 C		14.7	15.4	50.4		28.4	29.8	97.6		32.3	33.9	110.9		49.7	52.1	170.4		53.8	56.3	184.2				
63.3		17.7	14.2	14.2	650 C		9.8	9.8	34.2		18.9	18.9	66.4		21.5	21.5	75.4		33.0	33.0	115.8		35.7	35.7	125.2				
51.6					675 C																								
41.9					700 C																								
34.9					725 C																								
29.3					750 C																								
22.8					775 C																								
17.4					800 C																								
14.1					816 C																								

A105	ASTM A105 (2)	F9	ASTM A182 F9
LF2	ASTM A350 LF2 (2)	F91	ASTM A182 F91
F316	ASTM A182 F316/F316L (1)	F11	ASTM A182 F11 Cl 2 (3) (4)
316H	ASTM A183 F316H	F22	ASTM A182 F22 Cl 3 (3)
F5	ASTM A182 F5		

- (1) F316 Stainless Steel containing Max. Carbon of .030 - Do not use above 1000 F (538C)
- (2) A105 & LF2 are permitted but not recommended for prolonged use above 800 F (427C)
- (3) F11 & F22 are permitted but not recommended for prolonged use above 1100 F (593C)
- (4) F11 to be Normalized and Tempered only

C_v Factors

TYPICAL SERIES NO.	NPS	½	¾	1	1¼	1½	2	2½	3	4
	DN	15	20	25	32	40	50	65	80	100
353, 363, 373, 353R, 12401C, 2801, 2811, 2831, 12111, 12161, 12321, 12401, 12421, 12521, 15111, 15373, 15801, ST15801, 32111, 35111, 42211MTG, 59851, 59951		9.6	9.7	20.3	80.5	91.6	117.6	174.0	203.9	230.0
13111, 13373, 16111, 43111MMP, SW-43211HF2		9.6	28.7	46.5	80.5	109.6	181.0	-	-	-
11103, 11403		9.6	28.7	46.5	80.5	109.6	181.0	242.3	322.7	-
2801B		9.6	9.7	20.3	-	109.6	117.6	-	-	-
CT-2801, ST-2801, TT-2801, CT-2831, ST-2831, TT-2831		6.5	9.0	27.7	-	78.0	-	-	-	-
CT-2901, CT, BT, TT, ST-12111		9.6	9.7	20.3	-	78.0	-	-	-	-
1033, 1043, 11603, 11683		11.8	28.7	32.0	83.2	109.6	181.0	-	-	-
66703, 66713		5.0	17.4	16.1	-	109.6	100.2	-	-	-
473, 483, 493, 801, 851, 2821, 12141, 12181, 12501, 12501C		2.4	4.3	7.3	14.2	20.4	23.1	-	-	-
473B, 483B, 493B, 12141B		2.2	5.7	5.2	-	21.1	20.5	-	-	-
22141CL, 22141F8M, 22141MT, 22493CL, 22493MT, 42241HF2		1.7	3.1	5.9	13.7	18.4	22.5	-	-	-
10103, 10403		3.4	7.3	11.9	15.5	28.2	46.9	-	85.1	-
SW-23141HF4, 43241MMP, 43241MTP		0.7	5.9	13.7	-	21.0	34.0	-	-	-
13141		3.0	6.8	14.5	17.2	24.4	37.6	-	-	-
CT-12141, ST-12141, TT-12141		2.4	4.3	7.3	-	20.4	-	-	-	-
12443		1.46	2.38	4.54	-	9.65	14.6	-	-	-
1971		2.6	4.5	11.9	21.0	31.4	52.0	-	-	-
22461		0.68	0.99	1.5	-	-	-	-	-	-
15141, 15493, 15821 SCH 160		3.1	3.3	5.9	-	13.8	21.4	-	-	-
1003, 1023, 10603, 10683		3.6	6.0	10.2	15.1	24.2	39.8	-	-	-
15443		1.46	2.38	4.54	-	11.5	13.0	-	-	-
1510, 1511, 1522 SCH 160		6.0	4.0	9.3	-	57.8	48.9	-	-	-
66723, 66733, 66793 SCH XXH		1.2	4.3	5.8	-	17.6	19.3	-	-	-
2510, 2511, 2522 SCH XXH		6.0	8.9	9.3	-	32.9	49.4	-	-	-
1331T, 1871T		2.9	3.8	8.1	15.3	18.4	25.5	-	-	-
2891T, 9841T		2.6	4.5	11.9	19.0	25.0	49.0	-	-	-
9821T, 9871T, 58431T		1.8	3.5	5.8	7.6	11.7	17.7	-	-	-
573, 583, 593, 701, 701ZL, B701, 718, B718, 32701, 82718		2.1	3.2	5.8	13.3	18.3	25.3	-	-	-
9091, B9091		3.6	6.7	11.8	20.2	26.1	43.3	-	-	-
SWB-43721HF2		0.7	5.9	11.8	-	22.6	32.6	-	-	-
4835		3.3	4.4	17.0	28.2	43.0	63.0	-	-	-
13701		3.2	6.9	16.0	18.3	25.5	36.9	-	-	-
54853, 54863		8.7	15.1	30.5	29.1	37.7	45.3	-	-	-
S74, S701		9.2	6.8	22.0	-	54.6	81.9	-	-	-
15593, 15701, B15701		3.2	3.3	6.3	13.3	11.0	19.6	-	-	-
1551, B1551		2.1	4.1	7.3	10.5	17.6	23.3	-	-	-
810, 811, 822		4.5	9.1	21.3	-	70.0	79.1	-	-	-

SCH 40 used for testing except as noted

Flow Data Utilizing Cv Factors

FORMULAS		
TYPE FLOW	FLOW RATE	PRESSURE DROP
LIQUID	$Q = C_v \sqrt{\frac{\Delta P}{S}}$	$\Delta P = S \left(\frac{Q}{C_v} \right)^2$
GAS WHEN $\Delta P < .5P_1$	$q_m = 22.6 C_v \sqrt{\frac{\Delta P \times P_1}{T_1 S_g}}$	$\Delta P = \frac{.00195 T_1 S_g}{P_1} \left(\frac{q_m}{C_v} \right)^2$
WHEN $\Delta P \geq .5P_1$	$q_m = \frac{13.9 P_1 C_v}{\sqrt{S_g T_1}}$	
DRY SATURATED STEAM	$W = 2.97 C_v \sqrt{\Delta P \times P_1}$	$\Delta P = \frac{.113}{P_1} \left(\frac{W}{C_v} \right)^2$
WHEN $\Delta P < .5P_1$		
WHEN $\Delta P \geq .5P_1$	$W = 1.82 C_v P_1$	
SUPERHEATED STEAM	$W = \frac{2.97 C_v \sqrt{\Delta P \times P_1}}{(1 = .0007s)}$	$\Delta P = \frac{.113}{P_1} \left(\frac{W (1 + .0007s)}{C_v} \right)^2$
WHEN $\Delta P < .5P_1$		
WHEN $\Delta P \geq .5P_1$	$W = \frac{1.82 C_v P_1}{(1 = .0007s)}$	

Fluid Flow Nomenclature

- Cv= Flow coefficient for valves and fittings.
- P₁= Absolute inlet pressure.
- ΔP= Pressure drop in pounds per square inch. (PSI)
- Q= Liquid flow in gallons per minute. (GPM)
- q_m= Rate of gas flow in cubic feet per minute at standard conditions, 14.7 psia and 60°F. (SCFM)
- S= Specific gravity of flowing liquid relative to water at 60°F.
- S_g= Specific gravity of gas relative to air.
- s= Number of degrees of superheat for steam in °F.
- T₁= Absolute inlet temperature in degrees Rankine °R.
- W= Steam or vapor flow rate in pounds per hour. (LBS./HR.)

Flow Data Utilizing Cv Factors (Metric Version)

FORMULAS		
TYPE FLOW	FLOW RATE	PRESSURE DROP
LIQUID	$Q = .865 C_v \sqrt{\frac{\Delta P}{S}}$	$\Delta P = 1.34 S \left(\frac{Q}{C_v} \right)^2$
GAS WHEN $\Delta P < .5P_1$	$q_H = 414.97 C_v \sqrt{\frac{\Delta P \times P_1}{T_1 S_g}}$	$\Delta P = \frac{5.81 \times 10^{-6} T_1 S_g}{P_1} \left(\frac{q_m}{C_v} \right)^2$
WHEN $\Delta P \geq .5P_1$	$q_H = \frac{255.2 P_1 C_v}{\sqrt{S_g T_1}}$	
DRY SATURATED STEAM	$W = 19.53 C_v \sqrt{\Delta P \times P_1}$	$\Delta P = \frac{.00262}{P_1} \left(\frac{W}{C_v} \right)^2$
WHEN $\Delta P < .5P_1$		
WHEN $\Delta P \geq .5P_1$	$W = 11.97 C_v P_1$	
SUPERHEATED STEAM	$W = \frac{19.1 C_v \sqrt{\Delta P \times P_1}}{(1 = 0.00123s)}$	$\Delta P = \frac{0.00274}{P_1} \left(\frac{W (1 + 0.00123s)}{C_v} \right)^2$
WHEN $\Delta P < .5P_1$		
WHEN $\Delta P \geq .5P_1$	$W = \frac{11.71 C_v P_1}{(1 = 0.00123s)}$	

Fluid Flow Nomenclature

- Cv= Flow coefficient for valves and fittings.
- P₁= Absolute inlet pressure. (BAR)
- ΔP= Pressure drop in bars.
- Q= Liquid flow in cubic meters per hour
- q_m= Rate of gas flow in cubic meters per minute at standard conditions, 1.01 BAR @ 15.6 °C
- S= Specific gravity of flowing liquid relative to water at 16°C.
- S_g= Specific gravity of gas relative to air.
- s= Number of degrees of superheat for steam in °C.
- T₁= Absolute inlet temperature in degrees Kelvin (°K).
- W= Steam or vapor flow rate in kilograms per hour. (KGS./HR.)

MATERIAL COMPATIBILITY CHART

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
1- Acceptable for Use												
0 - Not Acceptable for Use												
Chemical												
Acetaldehyde	1	1	1	1	1	1	1	0	0			
Acetate Solvents	1	1	1	1	1	1	1	0	0	1	0	
Acetic Acid (100%)	0	1	0	1	1	1	1	1	0	1	0	1
Acetic Acid (crude)	0	1		1	1							1
Acetic Acid Vapors	0	1	0	1	1	1						1
Acetic Anhydride	0	1	0	1	1	1	1	0				1
Acetone	1	1	1	1	1	1	1	0	0	1	0	1
Air	1	1	1	1	1	1	1	1	1	1	1	1
Alcohol - Amyl	1	1		1	1	1	1	1			1	1
Alcohol - Butyl	1	1	1	1	1	1	1	1			1	1
Alcohol - Diacetone	1	1		1	1	1	1	1			1	1
Alcohol - Ethyl	1	1	1	1	1	1	1	1	1	1	1	1
Alcohol - Isopropyl	1	1		1	1	1	1	1			1	1
Alcohol - Methyl	1	1	1	1	1	1	1	0	1	1	1	1
Alcohol - Oleyl				1				1			1	
Alkaform		1		1	1							
Alum 10%	0	1	1	1	1		1	1	1	1	1	1
Alumina					1	1		1	1	1		
Aluminum Acetate	0	1		1	1	1						
Aluminum Chloride	0	1	0	1	1	1	1	1	1	1	1	1
Aluminum Fluoride		1		1	1	1	1	1	1	1		
Aluminum Hydroxide		1	1	1	1	1	1	1	1	1		
Aluminum Sulfate 10% (boiling)	0	1		1	1	1	1	1	1	1		
Aluminum Sulfate, Saturate (boiling)	0	1		1	0	1	1	1	1	1		
Aluminum Sulfate, Saturate (room)	0	1		1	1	1	1	1	1	1		
Amines	1	1		1	1	1	1	0	1	1	0	
Ammonia (gas or liquid)	1	1		1	1	1	1			1		
Ammonia, Dry	1	1	1	1	1	1	1	0	1	1	0	
Ammonium Bicarbonate	1	1		1	0	1	1	1				
Ammonium Carbonate	1	1		1	1	1	1	1				
Ammonium Chloride	0	1	0	1	1	1	1	1	1	1	1	1
Ammonium Diphosphate		1		1	1	1	1	1	1	1	1	
Ammonium Hydroxide	1	1	1	1	0	1	1	1	1	1	1	1
Ammonium Hydroxide		1		1		1	1	1	1	1	1	1
Ammonium Monosulfate		1		1		1	1	1	0	1	1	
Ammonium Nitrate	1	1		1	0	0	1	1	1	1	1	1
Ammonium Oxalate	1	1		1	1	1						
Ammonium Persulfate	0	1		1	0	0						
Ammonium Phosphate(di)	1	1		1	1	1	1					
Ammonium Phosphate(mono)	1	1		1	0	1	1	1	1	1	1	1
Ammonium Phosphate(tri)	1	1		1	1	1		1				
Ammonium Sulfate	0	1		1	1	1					1	
Ammonium Thiocyanate						1	1					
Amyl Acetate	1	1	1	1	1	1	1	0	0	1	0	
Amyl Chloride	1	1		1	1	1	1	1	0	0	0	
Aniline Dyes		1		1	1	1	1					
Aniline Hydrochloride		0		0	1	1	1					
Aniline Oils		1		1	1	1	1	0				
Aniline Sulfite		1		1	1	1	1	0		0		
Aniline to 80F	1	1	1	1		1	1	0	0	0	0	1
Antimony Chloride					1	0	1					

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Chemical												
Antimony Trichloride	0	0		0	1		1	1				
Antioxidants					1		1		1			
Archlor	1											
Arsenic Acid	0	1		1	0		1	1	1	1	1	1
Arsenic Trichloride					1		1					
Asphalt	1	1		1	1		1	1	1	0	1	
Barium Carbonate	1	1		1	1	1	1	1	1	1	0	
Barium Chloride	0	1		1	1	1	1	1	1	1	1	
Barium Hydrate		1		1	1	1						
Barium Hydroxide	1	1	1	1	1		1	1	1	1	1	
Barium Nitrate	1	1		1								
Barium Sulfate		1		1	1		1	1	1	1	1	
Barium Sulfide	1	1	1	0		1	1	1	1	1	1	
Beer	0	1	1	1	1	1	1	1	1	0	1	
Beet Sugar Liquor	1	1	1	1	1		1	1	1	1	1	
Benzaldehyde	1	1		1	1		1	0	0	1	0	
Benzene(Benzol)	1	1	1	1	1	1	1	1	0	0	0	1
Benzensulfonic Acid					1	1						
Benzoic Acid	0	1		1	1	1	1	1	0	0	0	
Black Liquor	1	1		1	1		1	1	1	1	1	
Blast Furnace Gas			1					1				
Bleaching Powder, Wet	0	1		1	0	0	1		1	1	1	
Boiler Acid - Phosphate type					1			1				
Boiler Compounds (ph 8.0)					1			1				
Borax Liquors	1	1	1	1	1	1	1	1	0	1	1	
Bordeaux Mixture					1			1				
Boron Trichloride	1											
Boron Trifluoride	0	1		1								
Brine - Alkaline	0	1		1	1		1	0	1		0	
Bromine(dry)	0	0	0	0	1	0	1		0	0	1	
Bromine(wet)		1	0	1		0	1		0	0	1	
Butadiene	1	1	1	1	1		1			1		
Butane	1	1	1	1	1		1	1	1	0	1	
Buttermilk	0	1		1	0	1	1	1	1	1	1	
Butyl Acetate	1	1	1	1	1	1	1	0	0	0	0	
Butyl Catechol Tert					1							
Butyl Cellusolve		1		1	1							
Butyl Chloride 100%	0	1		1	1	1	1					
Butyl Stearate		1		1								
Butylene		1		1	1		1			0		
Butyl-p-Aminopheno					1							
Butyric Acid	0	1		1	1	1	1		1			
Cadmium Sulfate		1		1	1	1						
Calcium Acetate		1		1	1							
Calcium Bisulfite	0	1	0	1	0	1	1	1	1	1	1	1
Calcium Carbonate		1	1	1	1		1	1	1	1	1	
Calcium Chlorate	1	1		1	1	1						
Calcium Chloride	1	1		1	1	1	1	1	1	1	1	1
Calcium Hydroxide	1	1	1	1	1	1	1	1	1	1	1	1
Calcium Hypochlorite	0	1	0	1	0	1	1					1
Calcium Nitrate (40%)		1		1	1							
Calcium Sulfate	1	1	1	1	1	1	1	1	1	1	1	1

MATERIALS COMPATIBILITY CHART

1- Acceptable for Use
0 - Not Acceptable for Use

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Calgon		1	1	1	1	1	1	1	1	1	1	
Camphene	1											
Camphor	1	1	1	1	1	1						
Cane Sugar Liquor	1	1	1	1	1	1	1	1	1	1	1	1
Carbolic Acid (phenol)	1	1	1	1	1	1	1	0	0	0	1	
Carbon Dioxide(dry)	1	1	1	1	1	1	1				1	
Carbon Dioxide(wet)		1	1	1	1						1	
Carbon Disulfide	1	1	1	1	1	1	1	0	0	0	1	
Carbon Monoxide	1	1	1	1	1	1	1				1	
Carbon Tetrachloride	1	1	1	1	1	1	1	0	0	0	1	
Carbonated Beverages		1	1	1	1	1	1					
Carbonated Water		1	1	1	1	1	1	1	1	1	1	
Carbonic Acid	1	1	1	1	1	1						
Castor Oil		1	1	1	1	1	1	1	1	1	1	
Catechol					1							
Caustic Soda		1	1	1	1	1	1	1				
Cellosolve (butyl or ethyl)		1	1	1	1							
Cellosolve (methyl)		1	1	1								
China Wood Oil (tung)	1	1	1	1	1	1	1	0	0	1		
Chloracetic Acid	0	0	0	1	1	1	1	0	0			
Chlorbromomethane		1	1	1								
Chlorex		0	1	0	1							
Chloric Acid	0											
Chlorinated Water	0	1	1	0	0	1						
Chlorine (dry)	1	0	1	1	1	1					1	
Chlorine (wet)	0	0	0	0	0	0	1				1	
Chlorobenzene	1	1	1	1				0				
Chloroethane	1											
Chloroethylbenzene												
Chloroform (dry)	1	1	1	1	1	1	1	0	0	0	1	
Chlorosulfonic Acid (dry)	1	1	1	1	1	1						1
Chlorox				0	1	0	1	0				
Chrome Plating Solution		1	1	0								
Chromic Acid (contains SO3)	0	1	0	1	0	0	1	0	1	0		
Chromic Acid (free of SO3)	0	1	0	1	0	1	0	1	0			
Chromium Sulfate	0	1	1	1	1	1						
Cider		1	1	1	1			1				
Citric Acid	1	1	0	1	1	1	1	1	1	1	1	
Clay Slurries	1											
Coal Tar (creosote)	1	1	1	1	1	1					1	
Coca Cola Syrup	0	1	1									
Coconut Oil	1	1	1	1	1	1						
Cod Liver Oil		1	1	1				1				
Coffee	0	1	1	1	1	1	1	1	1	1		
Coke Oven Gas	1	1	1	1	1	1	1	1			1	
Copal Varnish		1	1	0	1							
Copper Acetate	0	1	1									
Copper Carbonate		1	1		1							
Copper Chloride	0	0	0	0	1	1	1	1	1	1		
Copper Cyanide	0	1	1	1	1	1						
Copper Nitrate	0	1	1	0	0	1	1	1	1	1		
Copper Sulfate	0	1	1	1	1	1	1	1	1	1	1	
Core Oil	1	1	1	1	1	1	1					

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Cornstarch Slurries	2				1			1				
Cottonseed Oil	1	1	1	1	1			1				
Cream of Tartar		1	1									
Cresylic Acid	0	1	1	1	1	1	1	0	0	0		
Cupric Chloride	0	0	0	1	0	0	1					
Cupric Nitrate		1	1	0	0							
Cyanogen Chloride	1											
Cyanohydrin	1											
Cyclohexane	1	1	1	1	1	1					1	
Cyclohexylamine				1								
DDT		1	1			1						
Detergents		1	1	1								
Developing Solutions	0	1	1	1		1						
Dextrose		1	1									
Diacetone				1	1					0		
Diamylamine				1	1			1	1			
Dichloroethane	0	1						0	0	0		
Dichloropentane				1				0	0			
Diesel Oil (light)	1	1	1	1	1	1	1	0	1	1		
Diethanolamine				1	1	1	1	1	1			
Diethyl Sulfate	1	1		1	1	1						
Diethylbenzene								0	0	0		
Diethylene Glycol	1	1	1	1	1	1	1	1	1	1	1	
Dimethyl Phthalate						1	0	0				
Dinitrochlorobenzene	0											
Dioctyl Phthalate	0											
Dioxane (dry)	1	1	1	1	1	1	1					
Dipentene - Pinene	1	1	1	1	1	1	1	1	0	1		
Diphenyl	1	1	1	1	1	1		0	1			
Diphenyloxide				1								
Disobutyl Ketone	1	1			1						1	
Distilled Water		1	1	1				1				
Distillery Wort		1	1									
Doctor Solution		1	1	1				1				
Dowtherm	1	1	1	1	1	1	1	0	0	0	1	
Dyewood Liquor	0	1	1									
Embalming Fluid	1											
Enamel				1	1	1	1	1	0	1		
Esters				1								
Ethanolamine	1	1	1	1	1	1	1	1	1	1		
Ether, Dibutyl	1	1	1	1	1	1	1	0	0			
Ether, Diethyl	1	1	1	1	1	1	1	0	0			
Ether, Petroleum	1	1	1	1	1	1	1	0	0			
Ethyl Acetate	1	1	1	1	1	1	1	0	0	1		
Ethyl Acrylate	1	1	1	1	1	1						
Ethyl Cellulose	1					1	1	1	1			
Ethyl Chloride (dry)	1	1	1	1	1	1	1	0	1	1	1	
Ethyl Mercaptan	1	1	1	1								
Ethyl Sulfate	1	1	1	1	1	1	1	1	1	1		
Ethylbenzene				1	1	1	0	0				
Ethylene (liquified)		1	1	1								
Ethylene Chloride		1	1	1							1	
Ethylene Chlorohydrin	1											
Ethylene Dibromide	1	1										

MATERIALS COMPATIBILITY CHART

1- Acceptable for Use
0 - Not Acceptable for Use

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Ethylene Dichloride	1	1	1	1	1	1	1	1	1	1	1	1
Ethylene Glycol	1	1	1	1	1	1	1	1	1	1	1	1
Ethylene Oxide	1	1	1	1	1	1	1	0	0	0	1	1
Fatty Acids	0	1	1	1	1	1	1					1
Ferric Chloride	0	0	0	0	0	0	1	1	1	1	1	1
Ferric Hydroxide					1	0						
Ferric Nitrate	0	1	0	1	0	0	1	1	1	1		
Ferric Sulfate	0	1		1	0	0	1	1	1	1		
Ferrous Ammonium Citrate					1							
Ferrous Chloride solution	0	0	0	0	0	1	1	1	1	1	1	1
Ferrous Sulfate 10%	0	1		1	1	1	1	1	1	1	1	1
Filter Aid					1				1			
Fish Oil	1	1		1	1	1	1				1	
Flue Gases	1	1		1	1	1	1					
Fluoboric Acid		1		1	1		1	1	1		1	
Fluorine (dry)	1	1	1	1	1	1	0					1
Fluosilicic Acid	0	1		1	1	1	1	1				
Formaldehyde cold	1	1		1	1	1	1	1				1
Formalin		1		1								
Formic Acid	0	1		1	1	1	1	1				1
Freon (dry)	1	1		1	1	1	1	1				1
Freon (wet)	0	1	1	1	1	1	1	1				1
Fruit Juices	0	1	0	1	1	1	1	1	1	1	1	
Fuel Oil	1	1	1	1	1	1	1	1	0	1	1	
Fumaric Acid			1				1	1	1		1	
Furfural	1	1	1	1	1	1	1		1	0	1	
Gallic Acid 5%	0	1	1	1	1	1	1	1	1	1	1	
Gasoline (antioxidant)					1				0			
Gasoline (refined)	1	1	1	1	1	1	1	1	0	1	1	
Gasoline (sour)	1	1		1	0	1	1	1	0	1	1	
Gelatin	1	1		1	1		1	1	1	1	1	
Ginger Ale	0	1		1								
Glauber's Salt		1		1	1			1				
Glucose	1	1	1	1	1		1	1	1	1	1	1
Glue (most)	1	1	1	1	1	1		1	1	1	1	1
Glutamic Acid		1		1		1						
Glycerine	1	1	1	1	1	1	1	1	1	1	1	1
Glycerol	1	1	1	1	1	1	1	1	1	1	1	1
Grease (edible)	1	1		1	1		1		0	1		
Green Sulfate Liquor		1	1	1	1			1				
Gypsum		1		1								
Hagan Solution					1							
Heptane (liquified)		1	1	1	1		1	1	0			
Hexamine		1		1		1						
Hexane	1	1		1	1	1	1					1
Hydobromic Acid	0	0	0		0		1	1				1
Hydrofluoric Acid (5%)	1	0	0	0	1	1	1	1		0	1	
Hydrofluoric Acid (50%)	0	0	0	0	0	1	1	1		0	1	
Hydrofluoric Acid (60%)	0	0	0	0	1	1	1	1		0	1	
Hydraulic Oil	1	1		1	1	1	1	1	0	1		
Hydrazine Hydrate		1		1	1							
Hydrocarbons (alkylated)					1	1		1			1	
Hydrocarbons (chlorinated)						1	1	0		1		

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Hydrocarbons (sweet)					1		1				1	
Hydrochloric Acid, Cold 10%	0	0	0	0	1	1						1
Hydrocyanic Acid 100%	1	1	1	1	1	1		1			1	
Hydrofluosilicic Acid 100%	0	1		1	1	1	1		1			1
Hydrogen Chloride (gas)	1	1		1	1	1	1					
Hydrogen Fluoride	1											
Hydrogen Gas	1	1	1	1	1		1	1	1	1	1	1
Hydrogen Peroxide 33%	0	1	0	1	1	1	1	0	1	1	0	1
Hydrogen Sulfide (dry) 100%	0	1	1	1	1	1	1	1		1		1
Hydrogen Sulfide (wet) 100%	0	1	1	1	0		1	1	1	1		1
Hydroquinone	1	1		1	1							
HYPO (hyposulfite soda)		1	1	1	1							
Idoform	0	1		1			1	1	0			
Ink	0	1		1	1		1	1				1
Iodine solution	0	1		1	0	1	1	1				1
Isobutane		1		1	1		1		0	0		
Isobutyl Acetate		1		1	1		1					
Isoctane	1	1		1	1	1	1		1	0		1
Isopropyl Acetate		1		1			1		0	0		
Isopropyl Ether	1	1		1	1	1	1		0	0		1
Jet Fuel	1	1		1	1	1	1	1		0	1	1
Kerosene	1	1	1	1	1	1	1	1		0	1	1
Ketchup	0	1		1	1	1	1	1	1			1
Ketones 100%	1	1		1	1	1	1	0	0		0	1
Lacquer Solvents	1	1	1	1	1	1	1	0	0	0	0	1
Lactic Acid diluted	0	1	0	1	0	1	1	1	1		0	1
Lard oil	1	1		1	1	1		1				1
Latex	1	1		1								
Lead Acetate	0	1		1	1	1	1		1			
Lead Nitrate	1							1				
Lead Sulfamate								1				
Levulinic Acid					1							
Lime Slurry	1	1		1	1		1		1	1	1	
Lime Sulfur		1		1	1		1		1	1	1	
Linoleic Acid	0	1		1	1		1					1
Linseed Oil	1	1	1	1	1	1	1	1	0	0	1	1
Liquid Petroleum Gas (L. P. G.)	1	1		1	1	1	1		0			1
Lithium Chloride	1	1		1	1		1					1
Lithium Hydroxide		1		1		1						
Lubricating Oils	1	1	1	1	1			1		0	1	
Magnesium Carbonate	1	1		1	1	1	1					
Magnesium Chloride	1	1		1	1	1	1	1	1	1	1	1
Magnesium Hydroxide	1	1	1	1	1	1	1	1	1	1	1	1
Magnesium Nitrate		1	1	1		0						
Magnesium Oxide					1			1				
Magnesium Oxychloride	0	0		0								
Magnesium Sulfate	1	1		1	1	1	1	1	1	1	1	
Maleic Acid 100%	1	1	0	1	1	1	1	1	1			1
Maleic Anhydride					1							
Malic Acid		1		1	1	1	1	1	1	1		1
Malt Beverages					1		1		1		1	
Manganese Carbonate		1		1	1							
Manganese Chloride		1		1	1							

MATERIALS COMPATIBILITY CHART

1- Acceptable for Use
0 - Not Acceptable for Use

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Manganese Sulfate	1	1	1	1	1	1						1
Mash		1	1	1	1	1						
Mayonnaise	0	1	1	1	1	1	1	1	1	1	1	
Melamine Resins		0	0	1	1	1						
Meraptobenzothiazole				1								
Mercaptans	1											
Mercuric Bichloride		1	1		0							
Mercuric Chloride	0	0	0	0	1	1	1	1	1	1	1	1
Mercuric Cyanide	0	1	1	1	1	1						1
Mercurous Nitrate	0	1	1		0							
Mercury	1	1	1	1	1	1	1	1	1	1	1	1
Mercury Salts		0	0			1	1	1	1	1	1	
Mesityl Oxide	1											
Methane	1	1	1	1	1	1	1				1	1
Methyl Acetate	1	1	1	1	1	1	1	0				1
Methyl Acrylate		1	1									
Methyl Benzene					1							
Methyl Cellosolve	1	1	1	1	1	1	1	1	0	0	1	
Methyl Chloride (dry)	0	1	1	1	1	1	1	0	0	0		
Methyl Ethyl Ketone	1	1	1	1	1	1	1	0	0	0	1	
Methyl Formate 100%	1	1	1	1	1	1	1			0		
Methyl Isobutyl Ketone		1	1	1		1	1	0	0			
Methyl Ketone												
Methyl Methacrylate	0											
Methylene Chloride	1	1	1	1	1	1	1					1
Milk	0	1	1	0		1	1	1	1	1	1	
Mine Water	0	1	1	0	0	1	1	1	1	1	1	
Mineral Oil U. S. P. pure	1	1	1	1	1	1	1	1	0	1	1	
Molasses	1	1	1	1	1	1	1	1	1	1	1	1
Monochloroacetic Acid	0	0	0	0	1	1	1	1			1	
Monochlorobenzene		1				1	0	0	1			
Monochlorodifluoromethane		1	1									
Monoethanolamine	1											
Mustard	0	1	1								1	
Nalco Solution					1			1				
Naphtha	1	1	1	1	1	1	1	1	0		1	
Naphthalene 100%	1	1	1	1	1	1	1	1	0	0	1	
Naphthalenic Acid	0	1	1									
Natural Gas	1	1	1	1	1	1	1	1	0	1	1	
Nickel Acetate								1				
Nickel Chloride	0	1	0	1	1	1	1	1	1	1	1	1
Nickel Nitrate		1	1	0	1	1	1	1	1	1	1	
Nickel Plating Solution		0	0	0								
Nickel Sulfate	0	1	1	1	1	1	1	1	1	1	1	1
Nitric Acid (10%)	0	1	0	1	0	1	1	0	0	0	1	
Nitric Acid (30%)	0	1	0	1	0	1	1	0	0	0		
Nitric Acid (60%)	0	1	0	1	0	1	1	0	0	0		
Nitric Acid (80%)	0	1	0	0	0	1	1	0	0	0		
Nitric Acid (crude)	0	0	0	0	0	0	1	0		0	1	
Nitrobenzene	1	1	1	1	1	1	1	0	0	0		
Nitroethane	1											
Nitropropane	1											
Nitrous Acid	0											

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Nitrous Oxide	0				0	0						
Nordihydroguaracetic Acid					0							
Oakite					1							
Octyl Alcohol					1			1				
Oleic Acid 100%	1	1	1	1	1	1	1	1	0		1	
Oleum spirits	1	1	1	0	1	1	1	0	0	0		
Olive Oil	0	1	1	1	1	1	1	1				
Organic Esters					1							
Oxalix Acid cold	0	1	0	1	1	1	1	1	1	1	1	1
Oxygen	1	1	1	1	1	1	1	1	1	1		
Ozone (wet)	0	1	1	1	1	1						
Palm Oil	0	1	1	1	1			1				
Palmitic Acid					1							
Palmitic Acid	1	1	1	1	1	1	1				1	
Paraffin	1	1	1	1	1	1	1	1	0	1		
Paraffin Oil	1	1	1	1	1			1			1	
Para-formaldehyde					1	1		0				
Paraldehyde					1	1		0				
Paregoric Compound	0	1	1									
Parez 607	0	0	0			1						
Peanut Oil		1	1	1								
Pectin	0											
Pelargonic Acid					0							
Penicillin Solution	0				1			1				
Pentane			1	1	1	1	1	1	0	1		
Perfume	0	1	1									
Petroleum Oils (refined)	1	1	1	1	1							
Petroleum Oils (sour)		1	1	0	1							
Phenol 100%	1	1	1	1	1	1		0		0	1	
Phenolic Resins		1	1									
Phenolic Sulfonate	1											
Phenosulfonic Acid		1	1		1							
Phoscaloid					1							
Phosgene	1											
Phosphoric Acid, <45%	0	1	0	1	0	1	1	1	1			
Phosphoric Acid, 0%-45%	0	1	0	1	1	1	1	1	1		1	
Phosphoric Acid, Crude	0	1	0	1	0	1	1	1	1			
Phosphoric Anhydride	0	1	1									
Phosphorus Trichloride		1	1		0							
Phosphorus, Molten	1	1	1	1	1						1	
Phtalic Acid	0						1	1				
Phtalic Anhydride		1	1	1	1			1				
Picric Acid, solution	0	1	1	0	1	1		1			1	
Pine Oil	1	1	1	1	1	1	1	0	0	1		
Pitch					1	1		0				
Plating Solution					0							
Potassium Alum						1		1		1		
Potassium Antimonate								1				
Potassium Bicarbonate		1	1					1				
Potassium Bichromate		1	1		0							
Potassium Bisulfate					0							
Potassium Bromide	0	1	1	1	1	1	1	1	1	1	1	1
Potassium Carbonate	1	1	1	1	1	1	1	1	1	1	1	1

MATERIALS COMPATIBILITY CHART

1 - Acceptable for Use
0 - Not Acceptable for Use

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Potassium Chlorate	1	1	1	1	1	0	1	1	1	1	1	
Potassium Chloride	0	1	1	1	1	1	1	1	1	1	1	
Potassium Chromate	1	1	1	1	1	1	1	1	1	1	1	1
Potassium Cyanide	1	1	1	1	1	1	1	1	1	1	1	
Potassium Dichromate	1	1	1	1	1	1	1	1	1	1	1	
Potassium Diphosphate		1	1	1			1	1	1			
Potassium Ferricyanide	0	1	1	1	1	1						
Potassium Ferrocyanide	0	1	1	1	1	1						
Potassium Hydrate		1	1	1	1							
Potassium Hydroxide	1	1	1	1	1	1	1	1	1	1	1	1
Potassium Hypochlorite	0	1	1	0	0	1						
Potassium Iodide	0	1	1	1	1	1	1	1	1	1	1	
Potassium Monophosphates		1	1	1		1	1	1	1	1	1	
Potassium Nitrate	1	1	1	1	1	1	1	1	1	1	1	1
Potassium Oxalate		1	1		1							
Potassium Permanganate	1	1	1	1	0	1	1	1	1	1	1	
Potassium Peroxide		1	1									
Potassium Phosphate (acid)	1			1		1	1	1	1	1	1	
Potassium Phosphate (alkaline)	1			1		1	1	1	1	1	1	
Potassium Sulfate	1	1	1	1	1	1	1	1	1	1	1	1
Potassium Sulfide	0	1	1	1	0		1	1	1	1	1	1
Potassium Triphosphate		1	1	1	1	1	1	1	1	1	1	
Prestone				1								
Producer Gas		1	1	1	1		1	1	0			
Propane Gas	1	1	1	1	1		1	1	0	1	1	
Propane, Liquified		1	1	1		1	1					
Propene, Liquified				1								
Propyl Alcohol	1	1	1	1				1				
Propylene Dichloride	1			1			0					
Propylene Glycol	1	1	1	1	1	1	1				1	
Propylene Oxide	1	1	1			1						
Pyrethrum Sol.				1								
Pyridine	1	0	1	0		1	0	0	0		0	
Pyrogalllic Acid	1	1	1	1	1	1	1					
Pyroligneous Acid	0											
Qualsol 80					0							
Querbracho				1			1					
Quinine Bisulfate	0	1	1	1	1							
Quinine Sulfate	0	1	1	1	1							
Resorcinol				1		1						
Rosin (dark)	0	1	1	1	1	1	1					
Rosin (light)	0	1	1	1	1	1						
Rustang				1								
Sal Ammoniac	0	1	1	1	1	1	1					
Salicylic Acid	0	1	1	1	1	1	1				1	
Santobrite				1		1	1	1	1		1	
Santomerse				1								
Santophen				0								
Santosite				0								
Shellac	1	1	1	1	1	1				1	1	
Shellac Orange		1	1	1	1		1			1		
Silicon Tetrachloride	1			1								
Silicon Tetraiodide				1								

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Silver Bromide	0	1	1	1	1	1						
Silver Chlorate	0	0	0	1	0							
Silver Cyanide	0	1	1	1	1	1	1					
Silver Nitrate		1	1	1	1	1	1	0	1	0		
Silver Plating Solution		1	1									
Sizing, Acid				0								
Sizing, Alkaline				1								
Sludge Acid		1	1	0								
Soap (molten)	1	1	1	1	1	1	1	1	1	1	1	
Sodium Acetate	1	1	1	0	1	1	1		1		1	
Sodium Acid Sulfate					1	1	1	1	1	1	1	
Sodium Aluminate	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Benzoate				1	1							
Sodium Bicarbonate		1	1	1	1	1	1	1	1	1	1	
Sodium Bichromate		1	1	1	0							
Sodium Bisulfate	0	1	1	1	1	1	1	1	1	1	1	1
Sodium Bisulfite		1	1	0		1	1	1	1	1	1	
Sodium Borate		1	1	1	1	1	1	1	1	1	1	
Sodium Bromide	0	1	0	1	1	1	1	1	1	1	1	
Sodium Chloride	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Chromate	2	1	1	1	1	1	1	1	1	1	1	
Sodium Citrate	3	1	1	1	1	1	1	1	1	1	1	
Sodium Coarbonate (soda ash)	1	1	1	1	1	1	1	1	1	1	1	
Sodium Cyanide	0	1	1	1	0	1	1	1	1	1	1	1
Sodium Dichromate	1	1	1			1	1	1	1	1	1	
Sodium Diphosphate		1	1	1								
Sodium Diphosphate		1	1	1				1				
Sodium Ethylate	1											
Sodium Ferrocyanide				1	1							
Sodium Fluoride	0	1	0	1	1		1	1	1	1	1	
Sodium Glutamate	1											
Sodium Hydroxide 0%-20%	1	1	1	1	1	1	1	0	1	1	1	1
Sodium Hydroxide 20% or Hot	0	1	0	1	1	1	1	0	1	1	1	1
Sodium Hydrsulfite				1	1							
Sodium Hypochlorite 20%	0	0	0	0	0	1						1
Sodium Hyposulfite	0	1	1	1	1	1		1				
Sodium Lactate	0											
Sodium Methylate				1								
Sodium Monophosphate		1	1	1	1	1		1	1	1	1	
Sodium Naphthsulfonate				1								
Sodium Nitrate	1	1	1	1	1	0	1	1	1	1	1	1
Sodium Nitrite		1	1	1				1	1			
Sodium Oleate	1											
Sodium Orthosilicate				1		1		1	1	1	1	
Sodium Perborate	1	1	1	1	1	1		1	1	1		
Sodium Peroxide	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Phosphate	1	1	1	1	1	1	1		1		1	
Sodium Plumbite				1								
Sodium Polyphosphate		1	1	1	1	1		1	1	1	1	
Sodium Pyrophosphate				1		1		1	1	1	1	
Sodium Resinate	1			1								
Sodium Salicylate	1											
Sodium Salts		1	1	1				1				

MATERIALS COMPATIBILITY CHART

1- Acceptable for Use
0 - Not Acceptable for Use

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Sodium Silicate	1	1	1	1	1	1	1	1	1	1	1	
Sodium Silicofluoride					1							
Sodium Sulfate	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Sulfide	0	1	1	1	1	1	1	1	1	1	1	1
Sodium Sulfite	1	1	1	1	0	0	1	1	1	1	1	1
Sodium Tetraborate	1		1	1			1		1	1	1	
Sodium Tetraphosphate					1				1			
Sodium Triphosphate	1		1	1			1	1	1	1	1	
Sodium-M-Phosphate	1		1	1			1		1	1	1	
Sodium-M-Silicate					1				1			
Sorbitol	0											
Soybean Oil	1	1	1	1	1	1	1		1		1	1
Stanic Chloride	0	0	0	0	0	1	1	1	1	1	1	1
Stannous Bisulfate						1						
Stannous Chloride	0	1		1								
Starch	1	1	1	1	1		1	1	1	1	1	
Steam	1	1	1	1	1		1		0	1	0	1
Steam Condensate	1	1	1	1	1	1	1		1			1
Stearic Acid 100%	1	1		1	1	1	1	1	1		1	1
Stoddard Solvent	1	1		1	1							
Styrene (dry)	1	1		1	1							1
Sugar Solution	0	1		1	1	1	1	1	1	1	1	
Sulfate Liquor		1	1	1	1				1			
Sulfate Oils						1						
Sulfite Liquor	0	1		1	0		1					1
Sulfur (molten)	0	1	1	1	1	1	1		0		0	1
Sulfur Chloride	0	0		0	1	1	1		0	0	0	
Sulfur Dioxide (dry) 100%	1	1	1	1	1	0	1		1	1	0	1
Sulfur Trioxide (dry) 100%	1	1		1	1	1	1		0		0	1
Sulfuric Acid (spent)					1							
Sulfuric Acid 0%-10%	0	1	0	1	1	1	1		0		0	1
Sulfuric Acid 10%-75%	0	1	0	1	1	1	1		0		0	1
Sulfuric Acid 75%-90%	0	0	0	0	0	1	1		0		0	
Sulfuric Acid 90%-95%	1	1	0	1	0	1	1		0		0	
Sulfuric Acid 95%-100%		1	0	1	0	1	1		0		0	0
Sulfurous Acid	0	1	0	1	0	1	1	1				1
Sulphonyl Chloride		0		0								
Talc Slurry					1				1			
Tall Oil	1	1		1	1	1	1					1
Tallow, Molten					1		1		1		1	
Tannic Acid	0	1		1	1	1	1	1	1	1	1	1
Tannin					1		1		1		1	
Tanning Liquor												
Tar	1	1	1	1	1		1	1	0	0		1
Tar Acids					1							
Tartaric Acid	0	1		1	1	1	1	1	1			1
Tennox					1							
Terpene Monocyclic	1											
Tetrachloroethane		1		1								
Tetramine												
Tetraphosphoglucosate					1		1		1			
Tetraphosphoric Acid						1						
Thiamine Hydrochloride							1					

Chemical

	A105, A182, F5, F9, F11, F22	A182, F316	13 CR	TYPE 316	Monel	Hastelloy	Teflon	Viton	Neoprene	Ethylene Propylene	Buna N	Flexible Graphite Packing
Thiophene					1							
Tin Plating Solution												
Titanium Tetrachloride	0				1	0						
Toluene or Toluol	1	1	1	1	1	1	1	1	0		0	1
Toluene Sulfanic Acid					1							
Tomato Juice		1		1	1	1						
Toxaphene					1							
Transmission Oil		1		1	1							
Tretolite					1							
Trichloroacetic Acid		0		0			1		1			
Trichlorobenzene									0			
Trichloroethylene	1	1	1	1	1		1		0	0	0	1
Trichloromonofluoroethane		1		1								
Trichloropropane	1	1		1		1	1					
Trichlorotrifluoroethane		1		1								
Triethanolamine		1	1	1	1		1		1		1	
Triethylamine					1		1		1		1	
Triodium Phosphate		1		1								
Triphenylphosphite		1		1								
Tripotassium Phosphate		1		1			1		1	1	1	
Trisodium Phosphate		1	1	1	1	1			1			
Turpentine	1	1		1	1	1	1		0	0	0	1
Uric Acid		1		1		1						
Varnish	1	1	1	1	1	1	1		0			1
Vegetable Oils	1	1		1	1	1	1	1			1	1
Vinegar	0	1		1	1	1	1		1		0	1
Vinyl Acetate	1	1		1	1	1	1					1
Vinyl Chloride	1	1	1	1		1						
Water - Fresh	1	1	1	1	1	1	1	1	1	1	1	1
Water - Sea	0	1	0	1	1	1	1		1			1
Wax (molten)	1	1		1	1				1			1
Whiskey and Wines	0	1	0	1	0		1	1	1	1	1	1
White Liquor		1	1	1	1							1
Xylene	1	1	1	1		1	1	1	0	0	0	1
Zeolite					1		1		1		1	
Zinc Acetate	0	1		1	1		1		1	1	1	
Zinc Ammonium Chloride							1		1	1	1	
Zinc Carbonate												
Zinc Chloride	0	1	0	1	1		1	1	1	1	1	1
Zinc Cyanide Solution	0											
Zinc Hydrosulfite		1		1			1	1	1	1	1	
Zinc Plating Solution												
Zinc Sulfate	0	1		1	1	1	1	1	1	1	1	1
Zinc Sulfate (acid)	0	1		1	1		1		1			

API 602 Trim Number Versus Vogt Trim Description

API TRIM No.	API NOMINAL TRIM DESC.	TRIM DESC.	SERIES SUFFIX	TYPICAL IN VALVE SERIES	NOTES
1	13 Cr (No Hardfacing)	Trim: 13% Cr	None (Standard)	22461 22141	(1) Offer Trim 8.
2	304 (No Hardfacing)	None	None	None	(2) Offer 316/316L Trim
3	310 (No Hardfacing)	None	None	None	
4	Hard F6 (No Hardfacing)	None	None	None	Offer 1/2 or FHF
5 5A	Hardfaced (13 Cr Stem)	Trim 13% Cr Wedge/Seats: HF	FHF	12111FHF	(3) 5=Stellite 5A=NiCr Hardfacing
		Trim 13% Cr Disc/Seat: HF	FHF None (If Standard)	12141FHF 1510 (4) 2510	
6	F6 and CuNi (13 Cr and Monel Overlay)	None	None	None	(5) Offer MM Trim
7	F6 and Hard F6 (13 Cr Stem)	None	None	None	Offer FHF Trim
8 8A	F6 and Hardfaced	Trim 13% Cr Seat: HF	None	12111	(6) 1/2 HF
		Trim 13% Cr Seat: HF	None	12141	
		Trim 13% Cr Seat: HF	HF	10403HF	
9	Monel	Trim: Monel	MM	12111MM	
10	316	Trim: 316	None	12501 718	
11	Monel & Hardfaced (Monel Trim 1/2 HF)	Trim: Monel Seat: HF	MM	12141MM 701MM	
12	316 & Hardfaced (1/2 HF 316)	Trim: 316 Seat: HF	F8M	12111F8M 12401	
		Trim: 316 Seat: HF	F8M	12141F8M 12501F8M	
13	Alloy 20	None	None	None	
14	Alloy 20 & Hardfaced (1/2 HF Alloy)	None	None	None	
15	Hardfaced (304 FHF Trim)	None	None	None	(7)
16	Hardfaced (316 FHF Trim)	Trim: 316 Wedge/Seat: HF	F8H	12111F8H 12401FHF	
		Trim: 316 Disc/Seat: HF	FHF	12501FHF	
17	Hardfaced (347 FHF Trim)	None	None	None	
18	Hardfaced (Alloy 20 FHF)	None	None	None	

1) Other Vogt Valves with Cr trim and no HF seating meet the API 602 Trim 1 except for minimum hardness. API Trim 8 can be substituted for Trim 1 under API 602 Table 12 alternative trim rules.

2) API Trim 10 can be substituted for Trim 2 under API 602 Table 12 alternative trim rules.

3) Trim 5 requires Satellite (cobalt based) alloys. Trim 5A allows non-cobalt base hard facing alloys.

4) Many Vogt valves are supplied as standard with FHF trim but do not carry the FHF designator with the Series No. Typical of these as these Series 1510, 1610, 2510 and 2610. Most Class 1500 and higher F11 and F22 valves have FHF trims but are carried by the series designator.

5) API 602 Trim 8 can be substituted for Trim 6 under API 602 Table 12 alternative trim rules.

6) Most Vogt carbon and alloy steel gate and globe and 316/316L stainless steel gate valves have 1/2 HF seating surfaces. Such valves do not necessarily carry "HF" designator in their Series Suffix Number.

7) API Trim 16 can be substituted for Trim 15 under API 602 Table 12 alternative trim rules.

Cross-Reference of ASTM Material Specifications

Covering Cast and Forged Valves

MATERIAL	FORGINGS	CASTINGS	WROUGHT FITTINGS
Carbon Steel Cold Temperature Service	A105 A350-LF2	A216-WCB A352-LCC	A234-WPB A420-WPL6
Carbon-1/2 Moly Alloy Steel Cold Temperature Service	A182-F1	A217-WC1 A352-LC1	A234-WP1
3-1/2 Nickel Alloy Steel Low Temperature Service	A350-LF3	A352-LC3	A420-WPL3
1/2 Cr-1/2 Mo Alloy Steel 1/2 Cr-1/2 Mo-1 Ni Alloy Steel 3/4 Cr-1 Mo-3/4 Ni Alloy Steel 1 Cr-1/2 Mo Alloy Steel	A182-F2 A182-F12 CL2	A217-WC4 A217-WC5	A234-WP12 CL2
1-1/4 Cr-1/2 Mo Alloy Steel 2-1/4 Cr-1 Mo Alloy Steel 5 Cr-1/2 Mo Alloy Steel 5 Cr-1/2 Mo Alloy Steel 9 Cr-1 Mo Alloy Steel 13 Cr Alloy Steel	A182-F11 CL2 A182-F22 CL3 A182-F5 A182-F5a A182-F9 A182-F6	A217-WC6 A217-WC9 A217-C5 A217-C12 A743-CA15	A234-WP11 CL2 A234-WP22 CL3 A234-WP5 A234-WP9
Type 304 Stainless Steel (18 Cr-8 Ni) Standard Low Carbon High Temperature Service	A182-F304 A182-F304L A182-F304H	A351-CF8 A351-CF3 A351 CF10	A403-WP304 A403-WP304L A403-WP304H
Type 310 Stainless Steel (25 Cr-20 Ni) Type 316 Stainless Steel (16 Cr-12 Ni-2 Mo) Standard Low Carbon High Temperature Service	A182-F310H A182-F316 A182-F316L A182-F316H	A351-CK20 A351-CF8M A351-CF3M A351-CF10M	A403-WP310 A403-WP316 A403-WP316L A403-WP316H
Type 317 Stainless Steel (18 Cr-13 Ni-3 Mo) Type 321 Stainless Steel (18 Cr-10 Ni-Ti) Standard High Temperature Service	A182 - F317 A182-F321 A182-F321H	A351 - CG8M	A403-WP317 A403-WP321 A403-WP321H
Type 347 Stainless Steel (18 Cr-10 Ni-Cb) Standard High Temperature Service	A182-F347 A182-F347H	A351-CF8C	A403-WP347 A403-WP347H
Type 348 Stainless Steel (18 Cr-10 Ni-Cb) Standard High Temperature Service	A182-F348 A182-F348H		A403-WP348 A403-WP348H

Forging Materials

ASTM A105 Carbon Steel (0.24 Carbon max.) Where temperatures are moderate and corrosion resistance is not critical	ASTM A182, Grade F9 - 9Cr - 1Mo For services where the higher chrome alloys are preferred and where high temperature stability and oxidation resistance of the lower alloy steels are inadequate.
C 0.18 - 0.24 TS Min. psi(Mpa): 70,000(485) Mn 1.00 - 1.35 YS Min. psi(Mpa): 36,000(250) Si 0.15 - 0.30 EL (2" Min.): 22% P 0.030 Max. RA Min.: 30% S 0.015 - 0.040 Hardness, Bhn: Max. 187 Cr 0.20 Ni 0.20 Mo 0.06 V 0.02 Cb 0.02 Cu 0.20 Total Residuals = 0.50	C 0.15 Max. TS Min. psi(Mpa): 85,000(585) Mn 0.30 - 0.60 YS Min. psi(Mpa): 55,000(380) P 0.030 Max. EL (2" Min.): 20% S 0.030 Max. RA Min.: 40% Si 0.50 - 1.00 Hardness, Bhn: 179 - 217 Cr 8.00 - 10.00 Mo 0.90 - 1.10
ASTM A350, LF2 (0.24 Carbon max.) Where cold temperature (-50°F) impact strength is essential.	ASTM A182, Grade F91 - 9Cr - 1Mo - V For high temperature Boiler applications requiring high strength alloys.
C 0.18 - 0.24 TS Min. psi(Mpa): 70,000(485) Mn 1.00 - 1.35 YS Min. psi(Mpa): 36,000(250) Si 0.15 - 0.30 EL (2" Min.): 22% P 0.030 Max. RA Min.: 30% S 0.015 - 0.040 Hardness, Bhn: Max. 197 Cr 0.20 -50F Charpy: Min. Impact Ni 0.20 Energy (Ft/Lb): (J) Mo 0.06 Average of Each V 0.02 Set of 3 Specimen: 15(20) Cb 0.02 For One Specimen: 12(15) Cu 0.20 Total Residuals = 0.50	C 0.08 - 0.12 TS Min. psi(Mpa): 85,000(585) Mn 0.30 - 0.60 YS Min. psi(Mpa): 60,000(415) P 0.020 Max. EL (2" Min.): 20% S 0.010 Max. RA Min.: 40% Si 0.20 - 0.50 Hardness, Bhn: Max 248 Cr 8.00 - 9.50 Mo 0.85 - 1.05 Cb 0.06 - 0.10 Ni 0.40 Max V 0.18 - 0.25
ASTM A182, Grade F11, Class 2 (0.15 Carbon max.) 1-1/4Cr - 1/2Mo To minimize graphitization encountered with carbon and carbon moly steels at high temperatures	ASTM A182, Grade F316 / F316L - 18Cr - 8Ni - 3Mo For corrosion resistance applications where high temperature strength is required. Has restricted carbon level to minimize sensitization. Do not use for Service temperatures above 1000 °F.
C 0.10 - 0.15 TS Min. psi(Mpa): 70,000(485) Mn 0.30 - 0.80 YS Min. psi(Mpa): 40,000(275) P 0.040 Max. EL (2" Min.): 20% S 0.015 - 0.035 RA Min.: 30% Si 0.50 - 1.00 Hardness, Bhn: 143 - 207 Cr 1.00 - 1.50 Mo 0.44 - 0.65	C 0.030 Max. TS Min. psi(Mpa): 75,000(515) Mn 2.00 Max. YS Min. psi(Mpa): 30,000(205) P 0.040 Max. EL (2" Min.): 30% S 0.020 - 0.030 RA Min.: 30% Si 1.00 Max. Ni 10.00 - 14.00 Cr 16.00 - 18.00 Mo 2.00 - 3.00
ASTM A182, Grade F22, Class 3 (0.15 Carbon max.) 2-1/4Cr - 1/2Mo Where elevated temperature, surface stability and greater strength than F11 are needed	ASTM A182, Grade F316H - 18Cr - 8Ni - 3Mo For corrosion resistance applications where extreme temperature strength is expected. Has restricted carbon range for high temperature strength above 1000 °F.
C 0.15 Max. TS Min. psi(Mpa): 75,000(515) Mn 0.30 - 0.60 YS Min. psi(Mpa): 40,000(275) P 0.040 Max. EL (2" Min.): 20% S 0.015 - 0.035 RA Min.: 30% Si 0.50 Max. Hardness, Bhn: 156 - 207 Cr 2.00 - 2.50 Mo 0.87 - 1.13	C 0.04 - 0.10 TS Min. psi(Mpa): 75,000(515) Mn 2.00 Max. YS Min. psi(Mpa): 30,000(205) P 0.040 Max. EL (2" Min.): 30% S 0.020 - 0.030 RA Min.: 30% Si 1.00 Max. Ni 10.00 - 14.00 Cr 16.00 - 18.00 Mo 2.00 - 3.00
ASTM A182, Grade F5 - 5Cr - 1/2Mo With moderately corrosive fluids and in oil refineries where high temperature stability and oxidation resistance of the lower alloy steels are inadequate.	
C 0.15 Max. TS Min. psi(Mpa): 70,000(485) Mn 0.30 - 0.60 YS Min. psi(Mpa): 40,000(275) P 0.030 Max. EL (2" Min.): 20% S 0.015 - 0.035 RA Min.: 35% Si 0.50 Max. Hardness, Bhn: 143 - 217 Ni 0.50 Max. Cr 4.00 - 6.00 Mo 0.44 - 0.65	

Valve Trim Materials

Description and General Use

13% Chromium

Stainless Steel

Type 410

This stainless steel material lends itself to hardening by heat treatment and is excellent for contacting parts such as stems, gates and discs.

13% Chromium

Stainless Steel

Type 416

High-quality stainless steel yoke nut material having excellent anti-galling characteristics for better operating threads.

18% Chromium

8% Nickel

2% Molybdenum

Stainless Steel

Type 316

Type 316L

Provides excellent resistance to corrosive media at high temperatures and toughness for service at low temperatures.

18% Chromium

Stainless Steel

Type 440 C

Used for hardened balls in ball check valves.

Nickel-Copper

Monel

Alloy K500

This wrought material is precipitation hardened and possesses excellent corrosion resistance, high-strength properties and hardness for internal valve components.

Monel

Alloy 400

Non-hardened alloy, except by work hardened, that has high strength and toughness over a wide temperature range. Has excellent corrosion resistance in chlorine and alkyation service.

Alloy 20

Alloy 20 is corrosion resistant to hot sulfuric acids when compared to austenitic stainless steels such as such as 316 or 317.

Description and General Use

Cobalt Base

and Nickel Base

Hard-Facing Materials

Hard-facing materials, when used on seating surfaces of Gate, Globe and Check Valves, give extended service life and trouble-free operation.

Nickel-Moly-Chromium

Hastelloy C-276

A high-nickel alloy with exceptional resistance to corrosive attack by chlorine gas.

Precipitation-Hardened Stainless Steel

Grade 630 17-4 PH

Provides corrosion resistance and high strength for stems in NACE applications.

S-Monel

Grade M-25S

Material used for Monel castings.

ASTM A743, Grade CA-15

Material used for 13 CR castings. The cast equivalent to type 410 stainless steel.

Cast Cobalt

RCoCr-A

Material used for cobalt castings. The cast equivalent to Stellite #6.

Cast 316

Grade CF8M

Material used for 18-8 castings.

Inconel 625

Material is used for its high strength, excellent fabricability (including joining) and outstanding corrosion resistance.

Incoloy 825

Material is a nickel-iron-chromium alloy with additions of molybdenum, copper and titanium. The alloy's chemical composition is designed to provide exceptional resistance to many corrosive environments.

Meeting the Demands of Today

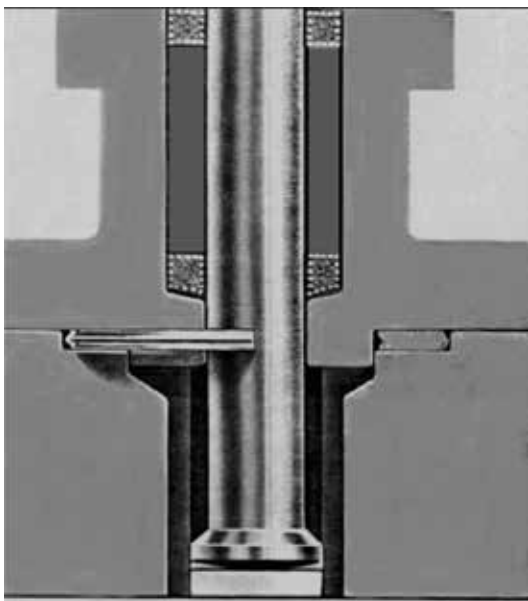
Asbestos-Free Valves

Asbestos-Free Packing
Asbestos-Free Gasket

SAFE – EFFICIENT in retaining high and low temperature media.

ADVANCED TECHNOLOGY PROVIDES:

- Environmental acceptance
- Elimination of media contamination
- Leak-proof integrity
- High thermal conductivity
- Self-lubricating operation
- Shrinkage resistance
- Corrosion-resistant inhibitor
- Less frequent maintenance
- Longer service life



STANDARD PACKING

Vogt standard valves are packed with one of the following asbestos-free packing sets:

FLEXIBLE GRAPHITE PACKING

A 95% by weight minimum carbon packing set that consists of a cylindrical ring of flexible graphite packing supported on the top and bottom and braided graphite filament packing rings. The packing dispersed and embedded active corrosion inhibitor to protect against stem pitting. It may be used in fluids having a pH range of 0-14. The packing has minimal residues as follows:

Leachable Chlorides: 100PPM maximum
Total Chlorides: 500PPM Maximum
Total Sulfur: 1000PPM Maximum
PTFE: None

MOLDED TFE TEFLON-SHAPED PACKING

Vogt valves that have a series number suffixed with the letter "T" are packed with a molded, shaped TFE packing. This virgin TFE material needs no corrosion inhibitor in its composition, and its self-energizing shape ensures superior service and low gland bolting loads in high pressure liquid and dry gas applications. It may also be used in fluids having a pH range of 0-14. Temperature range: -120°F to 500°F (-84° to 260°C).

Since this packing has directional sealing, it can be reoriented for valves used in vacuum and/or combination vacuum/pressure service.

OTHER PACKING

Other packing sets can be placed in Vogt valves at the user's option.

Glossary of Abbreviations and Terms Used in the Valve Industry

AARH - Arithmetic Average Roughness Height
AISI - American Iron and Steel Institute
API - American Petroleum Institute
ANSI - American National Standards Institute, Inc.
ASME - American Society of Mechanical Engineers
ASTM - American Society for Testing and Materials
AWS - American Welding Society

BB - Bolted Bonnet
BHN - Brinell Hardness Number
Blind Flange - A flange with no flow way bore, used to provide a pressure-tight closure of a flanged opening.
Btu - British Thermal Unit
BWE - Butt Weld Ends

C or Cel - Celsius Degrees
CI - Cast Iron
CI - Chlorine Institute
CR 13 - 13% Chromium Stainless Steel
CRES - Corrosion Resistant Steel
Cv - The number of U.S. gallons per minute of water at 700°F that will flow through a valve at a pressure drop of one psi.
CWP - Cold Working Pressure

DN - Diameter Nominal (Metric)

ELL - Elbow

FAS - Free Alongside Steamer
F or Fahr - Fahrenheit Degrees
F & D - Faced and Drilled
FF - Flat Face
FHF - Full Hard Faced
FLG - Flanged
FOB - Free On Board
FTTG - Fitting

G - Gas
gpm - Gallons per Minute

HF - Hard Faced
HW - Handwheel

IBBM - Iron Body Bronze Mounted
ID - Inside Diameter
INT - Integral
IPS - Iron Pipe Size
ISRS - Inside Screw Rising Stem
ISNRS - Inside Screw Non. Rising Stem

Kg - Kilograms
Km - Kilometers

LH - Left Hand

MAV - Motor Actuated Valve
mm - Millimeter
MOV - See MAV
MSS - Manufacturers Standardization Society of the Valve & Fitting Industry

NACE - National Association of Corrosion Engineers
NPS - National Pipe Size
NPT - National Standard Pipe Thread Taper
NRS - Non Rising Stem

OD - Outside Diameter
One-Piece-Stem - An inseparable Stem and Disc made from one piece of metal.
OS&Y - Outside Screw and Yoke
OWG - Oil, Water & Gas (See CWP)

PN - Pressure Nominal (Metric)
Psi - Pounds per square Inch
Psia - Pounds per square Inch absolute
Psig - Pounds per square Inch gage
P/T - Pressure - Temperature

Rc - Rockwell "C" Hardness
RF - Raised Face
RH - Right Hand
RMS - Root Mean Square Roughness Height
RS - Rising Stem
RTJ - Ring-Type Joint

S - Steam
SAE - Society of Automotive Engineers
SC - Swing Check Valve
Sch. Or Sched. - Schedule (Pipe Wall Thickness)
SCFM - Standard Cubic Feet per Minute
Screw Bonnet - Body and Bonnet threaded together
SE - Screwed Ends
Seal Weld - Threaded Joint Back Welded for Seal
SS - Stainless Steel
Stem Nut - Operating Nut
Stuffing Box - Packing Chamber
STD - Standard Wall Thickness
Stop Check - A Check Valve in which the closure member can be mechanically closed.
SWE - Socket Weld End
SWP - Steam Working Pressure

T - Tee
Thd. - Threaded
TIR - Total Indicator Reading

UB - Union Bonnet

W - Water
Wedge - Gate
WOG - Water, Oil and Gas (See CWP)
WSP - Working Steam Pressure
WWP - Working Water Pressure

XS - Extra Strong Wall Thickness
XXS - Double Extra Strong Wall Thickness

Y - Wye Valve, Fitting or Strainer
Yoke Bushing - Operating Stem Nut
Yoke Nut - Stem Nut

Refer to MSS-SP-96 for additional Abbreviations and Terms used in the Valve and Fitting Industry.
 (Manufacturers Standardization Society,
 127 Park Street N.E., Vienna, VA 22180)

Standards in the Valve Industry

Codes and standards play an important role in the design and production of forged steel valves, fittings and unions. These Codes and standards cover material, product dimensions, design, examination, inspection, testing procedure, pressure/temperature ratings and safety.

Material standards are developed by such organizations as the American Society for Testing and Materials (ASTM), the American Iron and Steel Institute (AISI), the Society of Automotive Engineers (SAE) and the National Association of Corrosion Engineers (NACE).

The American National Standards Institute, Inc. (ANSI) has a membership comprised of both user and producer groups and serves as the national coordinator for the majority of code and product standards related to the Valve and Fittings Industry. Product standards are also developed and issued by individual user and/or manufacturing agencies such as the American Society of Mechanical Engineers (ASME), American Petroleum Institute (API) and the Manufacturers' Standardization Society (MSS).

Procedural and Safety standards are issued by ANSI, MSS and ASME.

Following is a partial list of the codes and standards that have a direct bearing on the design and production of Vogt's forged steel valves, fittings and unions. The codes and standards are interrelated as the following descriptions project:

ASME Boiler & Pressure Vessel Code

Section I – Power Boilers
Section II – Material Specifications
Section III – Nuclear Power Plant Components
Section V – Non-destructive Examination
Section VIII – Pressure Vessels
Section IX – Welding and Brazing Qualifications

The previous codes (Sections I, III and VIII) cover construction requirements for Boilers, Pressure Vessels and Nuclear Components that require Authorized Inspection Agency involvement. Section I and VIII codes relate to the Boiler and Pressure Vessel proper and not to external piping. Section III code includes rules for nuclear components including piping. Section II, V and IX codes cover material, non-destructive examination and welding requirements, respectively, for ASME construction.

ASME Codes for Pressure Piping

B31.1 – Power Piping
B31.2 – Fuel Gas Piping
B31.3 – Process Piping
B31.4 – Pipeline Transportation Systems for Liquid Hydrocarbon and Other Liquids
B31.5 – Refrigeration Piping and Heat Transfer Components
B31.8 – Gas Transmission and Distribution Piping Systems
B31.9 – Building Services Piping Systems
B31.11 – Slurry Transportation Piping Systems

The above are piping construction codes that include requirements for design, materials, fabrication, examination, testing, inspection and components. Valve, fitting, and flange requirements used in these piping systems are normally referenced standards, as follows:

Inspection and Testing

MSS-SP-61 - Pressure Testing of Steel Valves

API-598 - Valve Inspection and Testing

The above highly recognized standards provide detailed instructions for the inspection and testing of valves.

Valve Standards

ASME B16.34 - Valves Flanged, Threaded and Welding End

API-600 / ISO 10434 – Bolted Bonnet Steel Gate Valves for Petroleum and Natural Gas Industries

API-602 / ISO 15761 – Steel Gate, Globe and Check Valves for Sizes DN 100 and Smaller for the Petroleum and Natural Gas Industries

MSS-SP-99 - Instrument Valves

MSS-SP-105 - Instrument Valves for Code Applications

MSS-SP-134 - Valves for Cryogenic Service Including Requirements for Body/Bonnet Extensions

The above are component (valve) standards used for construction of Vogt valves as noted in this catalog

Standards in the Valve Industry

Valve and Flange Details

ASME B16.5 - Pipe Flanges and Flanged Fittings

ASME B16.11 - Forged Fittings, Socket-Welding and Threaded

ASME B1.20.1 - Pipe Threads, General Purpose, Inch

ASME B16.10 - Face to Face and End to End Dimensions
of Valves

ASME B16.20 - Metallic Gaskets for Pipe Flanges: Ring
Joint, Spiral Wound, and Jacketed

ASME B16.25 - Buttwelding Ends

MSS-SP-6 - Standard Finishes for Contact Faces of Pipe
Flanges and Connecting-End Flanges of Valves
and Fittings

MSS-SP-25 - Standard Marking Systems for Valves, Fittings,
Flanges and Unions

MSS-SP-45 - Bypass and Drain Connections

The above standards are detailed dimensional, marking, finish and
bypass valve and fitting instructions for use in the manufacture of
valves, flanges and fittings. The product standards normally refer
to these standards for detailed instructions.

NACE Standard

MR0175 / ISO 15156-1 Petroleum and Natural Gas
Industries- Materials for use in H₂S-
containing Environments in Oil and
Gas Production.

This standard is a recognized practice for selection of materials
for construction of valves to be used in a sour environment. Such
materials are recommended when Stress Corrosion Cracking (SCC)
and/or Sulfide Stress Cracking (SSC) is anticipated.

MR0103 Materials Resistant to Sulfide Stress Cracking in
Corrosive Petroleum Refining Environments.

This standard is a recognized practice for selection of materials
for construction of valves to be used in a sour environment. Such
materials are recommended when Sulfide Stress Cracking (SSC)
is anticipated.

Chlorine Institute

Pamphlet # 6 – Piping Systems for Dry Chlorine

This publication is intended to provide useful information
concerning the construction of Chlorine piping systems
including valves.

For detailed Material Standards used by Vogt valves,
see pages 126 and 127

Addresses:

American Iron & Steel Institute (AISI)
1140 Connecticut Ave., NW
Suite 705
Washington, DC 20036

American National Standards Institute (ANSI)
1819 L Street, NW
6th floor
Washington, DC 20036

American Petroleum Institute (API)
1220 L Street, NW
Washington, DC 20005-4070

American Society of Mechanical Engineers (ASME)
ASME International
Three Park Avenue
New York, NY 10016-5990

American Society of Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Manufacturers Standardization Society of the Valve & Fitting
Industry
127 Park Street, N.E.
Vienna, VA 22180-4602

NACE International
1440 South Creek Drive
Houston, TX 77084-4906

Society of Automotive Engineers (SAE)
400 Commonwealth Drive
Warrendale, PA 15096-0001

The Chlorine Institute, Inc.
1300 Wilson Blvd.
Arlington, VA 22209

Replacement Parts

REPLACEMENT PARTS FOR VOGT VALVES

Vogt valves are carefully made from selected materials to give long, trouble-free service when properly installed in applications for which they were designed. Proper care and maintenance in the field can contribute significantly to maximum performance. Much of the field maintenance is of a routine nature and can be readily performed by the user. However, major repairs are discouraged and it is recommended that valves be returned to the factory for inspection and rework when major repairs are indicated.

The following information is offered as an aid to field maintenance of Vogt valves. However, Vogt valves repaired in the field do NOT carry the "Product Warranty" of valves repaired in our own facilities.

PRELIMINARY CONSIDERATIONS

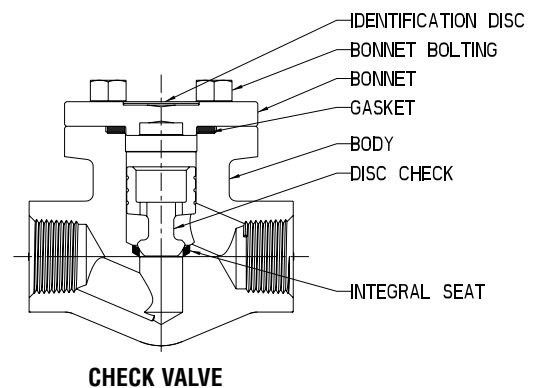
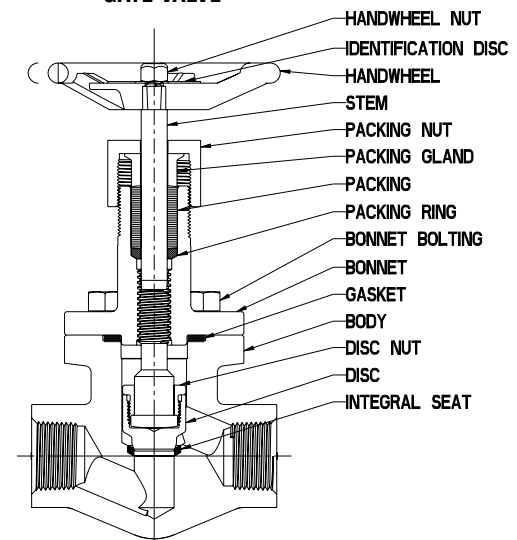
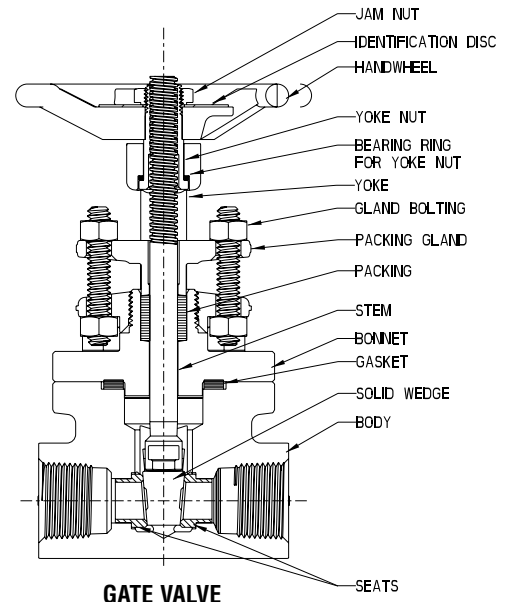
1. Use experienced, trained personnel.
2. Observe all standard safety precautions.
3. If possible, remove the valve from the line so that work can be done in a clean, well-lit area.
4. Use genuine Vogt replacement parts.
5. Use proper tools.
6. Pressure-test the valve before reinstalling. This is particularly essential on valves intended for critical service.
7. Remember that improper repairs can be hazardous.

REPLACEMENT PARTS – HOW TO ORDER

Genuine replacement parts are available for Vogt current standard valves and can usually be shipped from stock. All parts are made to gauge with the same careful inspection and laboratory control given original valves.

Orders for replacement parts should clearly identify the items required and should specify the correct name of the part, valve size, series number, drawing number, revision number and material, etc. This information is shown on the identification disc that is attached to the hand-wheel. The date of purchase and/or the order number will further identify the parts, especially those for special valves.

(See page 133 for Gasket and Packing Sets and page 134 for Bonnet assemblies)



Packing and Gaskets

A high degree of standardization of Vogt Valves permits a small stock of replacement packing and gaskets to service your Vogt valves. The following matrix and part number tables provide the details for the purchasing of replacement gaskets for your Vogt bolted bonnet valves and packing for our popular class 150, 300, 600, 800, 1500, 1690 and 2680 gate, globe and angle valves.*

Packing Matrix

PRESSURE CLASS	NPS DN	½ 15	¾ 20	1 25	1¼ 32	1½ 40	2 50	2½ 65	3 80	4 100
150 Conventional Port		B	B	C	D	D	E	F	F	G
300 Conventional Port		B	B	C	D	D	E	F	F	G
600 Conventional Port		B	B	C	D	D	E	F	F	G
800 Conventional Port		B*	B	C	D	D	E	F	F	-
1500 Conventional Port		J	J	D	E	E	F	-	-	-
600 and 800 Full Port		B	C	D	-	E	F	-	-	-
1500 Full Port		B	D	E	E	F	-	-	-	-
Class 800 LTD Class		C	C	D	-	F	F	-	-	-
Class 1690 LTD Class		C	C	E	-	G	G	-	-	-
Class 2680 LTD (Globe)		C	E	E	-	G	G	-	-	-
Class 2680 LTD Class (Gate)		C	E	E	-	H	H	-	-	-

Gasket Matrix (Spiral-wound Type)

PRESSURE CLASS	NPS DN	½ 15	¾ 20	1 25	1¼ 32	1½ 40	2 50	2½ 65	3 80	4 100
150 Conventional Port		A	A	B	C	C	D	E	E	F
300 Conventional Port		A	A	B	C	C	D	E	E	F
600 Conventional Port		A	A	B	C	C	D	E	E	F
800 Conventional Port		A*	A	B	C	C	D	E	F	-
1500 Conventional Port		A	A	B	C	C	D	-	-	-
600 and 800 Full Port		A	B	G	-	D	E	-	-	-
1500 Full Port		A	B	C	C	D	-	-	-	-

Packing Set Part Numbers

MATRIX	FLEXIBLE GRAPHITE		FLUOROPOLYMER
	PACKING SET PN**	PACKING CARTRIDGE PN***	PACKING SET PN**
B	55163	55175	55276
C	55166	55176	55286
D	55167	55177	55287
E	55169	55178	55288
F	55170	-	55289
G	55171	-	55285
J	55165	55179	55294
H	55173	-	-

* API 602/ASME B16.34 type valves—see valve description. For other valves, consult your Vogt Valves distributor.

** Order packing by Packing Set PN. Individual rings of complete set will be supplied.

*** One-piece or two-piece Packing Cartridge will be supplied when this PN is used.

Gasket Usage Table

GASKET	WHERE USED
304/Graphite	A105, A182-F5, F9, F11 Cl 2, F22 C I3 Valves
316/Graphite	A182, F316 Valves
316/fluoropolymer	"T" Suffix Trimmed Valves
Monel/Graphite	MM & HF Acid Trimmed Valves
Monel/fluoropolymer	Chlorine Valves

Gasket Part Numbers

GASKET MATRIX	PART NUMBER	SPIRAL-WOUND GASKET DESCRIPTION
A	55002	304/Graphite-filled
	55003	316/Graphite-filled
	55004	316/fluoropolymer-filled
	55005	Monel/Graphite-filled
	55006	Monel/fluoropolymer-filled
B	55007	304/Graphite-filled
	55008	316/Graphite-filled
	55009	316/fluoropolymer-filled
	55010	Monel/Graphite-filled
	55011	Monel/fluoropolymer-filled
C	55025	304/Graphite-filled
	55026	316/Graphite-filled
	55027	316/fluoropolymer-filled
	55028	Monel/Graphite-filled
	55029	Monel/fluoropolymer-filled
D	55017	304/Graphite-filled
	55018	316/Graphite-filled
	55019	316/fluoropolymer-filled
	55020	Monel/Graphite-filled
	55021	Monel/fluoropolymer-filled
E	55030	304/Graphite-filled
	55031	316/Graphite-filled
	55032	316/fluoropolymer-filled
	55033	Monel/Graphite-filled
	55034	Monel/fluoropolymer
F	55042	304/Graphite-filled
	55043	316/Graphite-filled
	55044	316/fluoropolymer-filled
	55045	Monel/Graphite-filled
	-	Monel/fluoropolymer
G	55012	304/Graphite-filled
	55013	316/Graphite-filled
	55014	316/fluoropolymer-filled
	55015	Monel/Graphite-filled
	55016	Monel/fluoropolymer

Class 800 Gate Valve Conventional Port Bonnet Replacement Assemblies

Emission Reduction
Standard

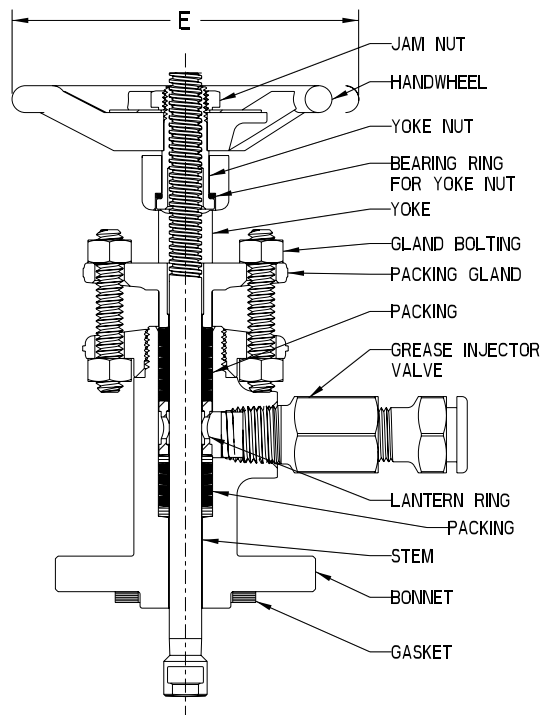
Some valve end users find it more expedient to replace the bonnet subassembly, complete with new packing, when repacking small bore valves. To support this maintenance philosophy, Vogt valve users may purchase A105 bonnet subassemblies for replacement on their Vogt valves by specifying the parts numbers noted below. The removed bonnet assemblies, if not damaged and are serviceable, can be repacked in a valve repair shop environment and be used during a later valve repacking cycle.

- Repacking made easy
- Promotes quick change
- Completely packed and ready to install
- Supports valve repacking in valve shop environment
- High degree of standardization permits retrofitting of popular Vogt Class 150, 300, 600 and 800, 13 Cr trimmed, bolted bonnet valves

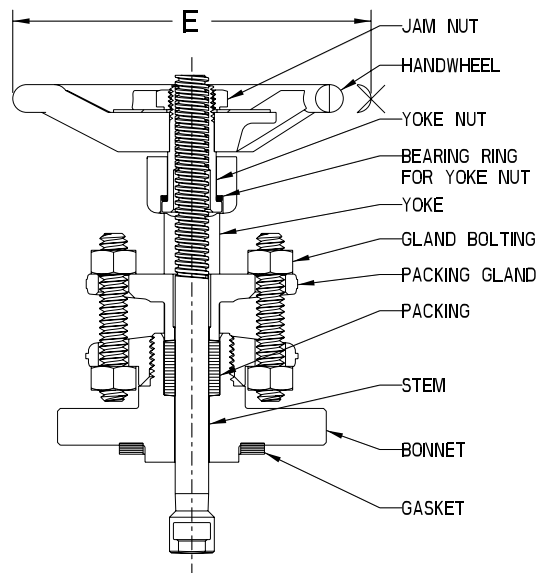
The Replacement Bonnet Assembly Packages can be easily installed on most existing in-line Compact Design Gate Valves in Classes 150, 300, 600 and 800, of A105 bolted bonnet design with 13 Cr. trim. Specify the desired replacement Bonnet Assembly Package for the valve size and series you intend to repack by replacing the bonnet subassembly.

SIZE	EMISSION REDUCTION RETROFIT BONNET ASSEMBLY PACKAGE	STANDARD RETROFIT BONNET ASSEMBLY PACKAGE	E	
			IN	MM
1/2 3/4	41000-04	21000-04	4.00	102
1	41000-06	21000-06	4.75	121
1-1/4 1-1/2	41000-08	21000-08	5.75	146
2	41000-09	21000-09	7.00	178

Write for Vogt's installation procedure covering instructions for proper field replacement of these bonnet subassemblies.



SERIES 41000
EMISSION REDUCTION
A105/13% CR. TRIM



SERIES 21000
STANDARD
A105/13% CR. TRIM

Torque Requirements

MAX HANDWHEEL CLOSING TORQUE FT-LB										
SIZE	CLASS 800 GATE	CLASS 800 FULL PORT GATE	CLASS 1500 GATE	CLASS 1500 FULL PORT GATE	CLASS 2500 FULL PORT GATE	CLASS 800 GLOBE	CLASS 800 FULL PORT GLOBE	CLASS 1500 GLOBE	CLASS 1690 GLOBE	CLASS 2680 FULL PORT GLOBE
½"	15	15	25	25	30	15	15	25	25	30
¾"	15	20	25	35	75	15	30	25	25	75
1"	20	40	35	55	75	30	40	35	40	75
1¼"	50	50	75	75				60		
1½"	50	70	75	115	175	40	75	60	125	175
2"	70	100	115	N/A	175	75	100	100	125	175

RECOMMENDED MAXIMUM BONNET BOLT TORQUES (DRY, UN-LUBRICATED VALUES)								
		½	¾	1	1 ¼	1 ½	2	3
CLASS 800	QTY - BOLT DIAMETER	4 - 3/8"	4 - 3/8"	4 - 7/16"	4 - 5/8"	4 - 5/8"	4 - 5/8"	8 - 3/4"
	TORQUE - B7 (ft-lb)	35	35	45	125	125	125	175
	TORQUE - B16 (ft-lb)	35	35	45	125	125	125	175
	TORQUE - B8M (ft-lb)	35	35	45	115	115	115	156
CLASS 1500	QTY - BOLT DIAMETER	4 - 1/2"	4 - 1/2"	4 - 9/16"	8 - 9/16"	8 - 9/16"	8 - 5/8"	
	TORQUE - B7 (ft-lb)	85	85	100	100	100	125	
	TORQUE - B16 (ft-lb)	85	85	100	100	100	125	
	TORQUE - B8M (ft-lb)	75	75	100	100	100	115	
REDUCE ABOVE VALUES BY 25% TO 30% IF ANY TYPE OF LUBRICATION IS USED ON BOLTING								

MAXIMUM PACKING GLAND BOLTING TORQUE				
SIZE	CLASS 150, 300, 600 & 800 CONV. PORT	CLASS 300, 600 & 800 FULL PORT	CLASS 1500	CLASS 1500 FULL PORT
½"	1.8 ft-lb	1.8 ft-lb	4.2 ft-lb	4.2 ft-lb
¾"	1.8 ft-lb	3.7 ft-lb	4.2 ft-lb	7.5 ft-lb
1"	3.7 ft-lb	4.0 ft-lb	7.5 ft-lb	13.9 ft-lb
1¼"	4.0 ft-lb		13.9 ft-lb	13.9 ft-lb
1½"	4.0 ft-lb	7.5 ft-lb	13.9 ft-lb	15.9 ft-lb
2"	7.5 ft-lb	8.5 ft-lb	15.9 ft-lb	
2½"	8.5 ft-lb			
3"	8.5 ft-lb			
4"	12.0 ft-lb			

Care and Maintenance of Vogt Forged Steel Valves

Valve Care Before Installation

Vogt valves are carefully made from selected materials to give long, trouble-free service when properly installed in applications for which they were designed. Proper care and maintenance in the field can contribute significantly to maximum performance.

The care the valve receives between the time it is shipped by the manufacturer and installed in the piping system is important. During this period, the valve can be handled many times and can be kept in storage for long periods. Industrial valves are not delicate, but they are mechanical devices that should be treated as such and handled with care.

Vogt always provides valves with appropriate end covers to protect the end connections and to prevent foreign material from entering the valve. In addition, small valves are shipped in sealed cartons while larger valves are usually palletized. If at all practical, keep the valves in the cartons or on pallets with the end covers in place until ready to be installed. Storing the valves off the ground and indoors is always preferable. When stored outside, valves should be off the ground and protected by a weatherproof cover.

Prior to installation, the valves and nameplates should be checked for proper identification to be sure the valve is the proper type and of suitable pressure class. Actuate the valve to check for possible damage from shipping and handling. Also, it is extremely important to inspect the interior of both the valve and the adjoining pipe for cleanliness. By far, the major cause of seat leakage and seat damage is foreign material in the line. Also, inspect the end connections to be sure that pipe threads and flange faces are free of scratches, nicks or dents.

Routine Inspection and Maintenance

Once the right valve is properly installed, field maintenance is of a generally routine nature and can be readily performed by the user. The critical areas of the valve include the stem threads and those locations where leakage will most likely occur – the stem packing, the bonnet joint, the seat and the end connections. It is desirable that a maintenance program be established that will include periodic inspection of the noted critical areas. Stem threads should be lubricated prior to installation and periodically as part of the regular inspection. A high pressure and temperature lubricant such as Dow Corning Molykote™ G-n paste should be used.

The most common location of a noticeable leak is at the stem seal. Leakage at the stem can usually be stopped by adjusting the packing. If leakage cannot be stopped by packing adjustment, repacking is indicated. However, back-seating the valve and attempting to repack under pressure is hazardous and is not recommended. Rather than attempting to repack under pressure, it is preferable to use the backseat to control stem leakage until a shutdown provides safe repacking conditions.

Major Field Repair

Maintenance involving rework or replacement parts is considered major repair. When circumstances dictate field repair of Vogt valves, the following information is offered as an aid. It must be pointed out, however, that the Vogt valves repaired in the field are no longer under "Product Warranty," and in no event is Vogt liable for any cause whatsoever. There are no warranties of any kind whatsoever, expressed or implied, other than those stated in Vogt's current Terms and Conditions.

Preliminary Considerations for Valve Repair:

1. Use experienced, trained personnel.
2. Observe all standard safety precautions.
3. If possible, remove the valve from the line so that work can be done in a clean, well-lit area.
4. Use genuine Vogt replacement parts.
5. Use proper tools.
6. Pressure test the valve before reinstalling. This is particularly essential on valves intended for critical service.
7. Remember that improper repairs can be hazardous.

Care and Maintenance of Vogt Forged Steel Valves

Replacement Parts ... How to Order

Genuine replacement parts are available for Vogt current standard valves and can usually be shipped from stock. All parts are made to gauge with the same careful inspection and laboratory control given original valves.

Orders for replacement parts should clearly identify the items required and should specify the correct name of the part, valve size, series number, drawing number, revision number and material, etc. This information is shown on the identification disc that is attached to the hand-wheel. The date of purchase and/or the order number will further identify the parts, especially those for special valves.

The embossed number on each hand-wheel, having a prefix letter "V", is the pattern number of the hand-wheel and has no relation to the ordering of other valve parts. Prices for valve parts will be furnished on application.

Tools For Installing Replacement Parts

Wrenches are available (price on application) for the removal and replacement of renewable seats for globe, angle and check valves. The wrenches are machined to an accurate finish to fit the drive notches or lugs of the seat and are properly heat treated for strength and toughness.

Disassembly

Small valves of the union bonnet type or of the new screw bonnet type are readily disassembled by unscrewing the union nut or the bonnet. In bolted bonnet valves, the nut should be removed from the bonnet stud bolts or hexagon head cap screws removed from the body. Tight bolt threads may be loosened by applying penetrating oil to the threads or by selectively heating the bolt at the point of the thread engagement. On bonnet joints of the through bolt type, the bolts may be cut between the body and bonnet flanges for removal.

Stems

Tight stems in valves of the O.S. & Y. type are caused by either dry, worn packing or non-lubrication of the yoke nut threads. Applying a few drops of oil to the stem threads and packing and opening and closing the valve a few times, may loosen the stem. At the same time, make sure the packing gland bolting is pulled down evenly so the gland will not bind against the stem. However, care should be taken not to over-compress the packing.

A tight stem in an inside screw valve may also result from worn or over-compressed packing, or the stem bonnet threads may "freeze" from excessive service temperatures or from corrosive fluids in the valve. If the stem turns freely after all packing is removed and if the surface of the stem in contact with the packing is in good condition, a new packing is the remedy. If the stem is still tight, turn the valve to the upright position, fill the stuffing box with penetrating oil and let soak. If the stem remains tight, a new bonnet and stem are required or, if practical, an O.S. & Y type valve could be substituted.

Bonnet Joints

On valves of the union bonnet type, repairs can be made without removing the valve from the line, provided there is enough wrench room for loosening and tightening the bonnet nut. Before loosening the bonnet nut, be sure the valve has been relieved of all pressure. A few hammer taps to the side of the bonnet nut or around the body neck on screw bonnet type valves will loosen the nut or bonnet. Gasket joints require a smooth, clean surface on both the body and the bonnet gasket faces and a new gasket is recommended for reassembly. On bolted bonnet valves in high-temperature service and particularly where severe thermal cycling is involved, it is recommended that bolt torque be checked periodically. This recommendation applies to gland bolting as well.

Packing

Vogt valves have well-proportioned stuffing boxes filled with the best grade packing material available. Before repacking, be sure to have the right grade, type and size of packing.

Repacking under pressure is hazardous and is not recommended. The backseat should be used as a temporary measure to control stem leakage until a shutdown provides safe repacking conditions.

Wipe all parts of the stuffing box, inside and out, before installing the new packing. Vogt uses a split ring type packing. If this type is used for replacement, take care to stagger the ring slits so that they are not in-line. After putting in a few rings, tamp them into place well, using the packing gland as a tamping tool. Then add enough packing to fill the stuffing box. Pressure on the packing is applied by the packing nut or gland flange bolting, depending on valve design, which bears on a gland in the stuffing box. Gland bolting should be tightened evenly to obtain the proper packing compression for leak-free service. Upon reassembling the valve, a few turns of the hand-wheel and a few drops of oil applied on the stem just above the packing will help work-in the packing to the stem.

(See page 133 for Gaskets and Packing Sets and page 134 for Bonnet assemblies)

Care and Maintenance of Vogt Forged Steel Valves

Disc and Seat

Leakage through the seat and disc is not always easy to detect, but when definitely known to exist, immediate repair is recommended since delay may permanently damage the disc, seat or both.

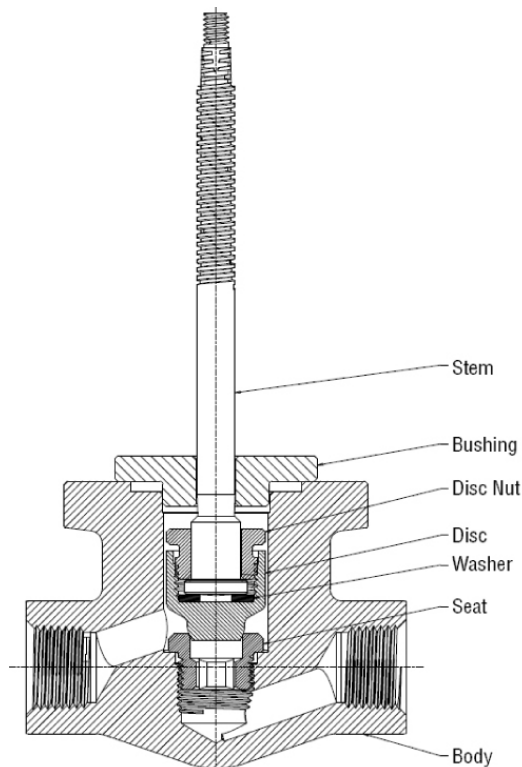
The internal repair of gate valves 2" and smaller is usually found to be uneconomical. However, if a gate valve is disassembled for inspection or cleaning, care should be taken when removing the wedge to note and mark its orientation with respect to the valve body so that when the wedge is reinserted in the valve, it will have precisely the same relationship to the seats that it had in the original assembly.

The seat threads in angle, globe and check valve bodies should be carefully inspected to make sure they are in usable condition. When installing new seats by using proper seat tools, the seats should be screwed tightly into the valve body, then unscrewed and examined to make sure they are making continuous contact for tight seal.

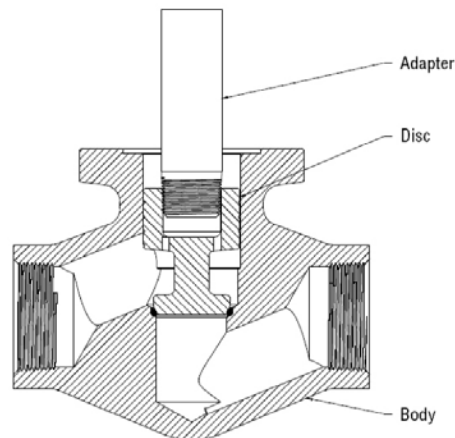
If seating surfaces show galling, slight pitting, grooving or indentations not deeper than 0.010", lapping will usually restore the surfaces sufficiently to permit tight closure. Defects deeper than 0.010" can seldom be corrected by lapping, but seating surfaces can be remachined or new parts installed. For re-lapping the seat and disc of Vogt globe, angle or check valves, use a fine and a coarse grade emery base compound such as Clover Compound A and D. Apply a light coat of fine, or A, compound to the seating surface of the disc or one-piece stem, insert disc or one-piece stem into seat, and lap using an oscillating motion. Lap a few minutes and then wipe seating surfaces clean. This will clearly show the extent of damage. If severe damage is noted, use the coarse, or D, compound and lap until all defects are removed. Then finish with the fine, or A, compound. It is recommended that the face of the disc be "blued" to check for contact between seating surfaces after final lapping.

Globe and angle valves require a lapping guide fixture to maintain alignment during the lapping operation. A fixture as shown in GLOBE Figure may be made or, for O.S. and Y. valves, a valve bonnet with yoke nut removed may be used. For re-lapping loose disc globe valves, place a washer between the disc and head of the stem and retighten the disc nut, as shown in GLOBE Figure.

Vogt piston check valves require an adapter to screw or mate into the piston for lapping the piston seating surface to the seat. The bore of the valve body serves as a guide for lapping, see CHECK Figure. Ball check valves are primarily used for fluids of high viscosity and the rolling action of the ball maintains seating surfaces in good condition until ball size or ball guide is worn and replacement parts are needed.



GLOBE FIGURE



CHECK FIGURE

Weight and Pressure Conversion

Weight Conversion

Pounds to Kilograms

(1 pound = 0.4536 kilograms)

Pounds	0	1	2	3	4	5	6	7	8	9
0	0.00	0.45	0.91	1.36	1.81	2.27	2.72	3.18	3.63	4.08
10	4.54	4.99	5.44	5.90	6.35	6.80	7.26	7.71	8.16	8.62
20	9.07	9.53	9.98	10.43	10.89	11.34	11.79	12.25	12.70	13.15
30	13.61	14.06	14.52	14.97	15.42	15.88	16.33	16.78	17.24	17.69
40	18.14	18.60	19.05	19.50	19.96	20.41	20.87	21.32	21.77	22.23
50	22.68	23.13	23.59	24.04	24.49	24.95	25.40	25.86	26.31	26.76
60	27.22	27.67	28.12	28.58	29.03	29.48	29.94	30.39	30.84	31.30
70	31.75	32.21	32.66	33.11	33.57	34.02	34.47	34.93	35.38	35.83
80	36.29	36.74	37.20	37.65	38.10	38.56	39.01	39.46	39.92	40.37
90	40.82	41.28	41.73	42.18	42.64	43.09	43.55	44.00	44.45	44.91

Kilograms to Pounds

(1 kilograms = 2.2046 pounds)

Kilograms	0	1	2	3	4	5	6	7	8	9
0	0.00	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	52.91	55.12	57.32	59.52	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.77	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.43	114.64	116.84	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.09	143.30	145.50	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.75	171.96	174.16
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.41	200.62	202.82	205.03	207.23	209.44	211.64	213.85	216.05	218.26
90	40.82	41.28	41.73	42.18	42.64	43.09	43.55	44.00	44.45	44.91

Pressure Conversion

Bar to Pounds per Square Inch (psi)

(1 Bar = 105 Pa = 14.5 psi)

1 to 20		21 to 40		41 to 60		61 to 80		81 to 100	
Bar	psi	Bar	psi	Bar	psi	Bar	psi	Bar	psi
1	14.5	21	304.6	41	594.7	61	884.7	81	1174.8
2	29.0	22	319.1	42	609.2	62	899.2	82	1189.3
3	43.5	23	333.6	43	623.7	63	913.7	83	1203.8
4	58.0	24	348.1	44	638.2	64	928.2	84	1218.3
5	72.5	25	362.6	45	652.7	65	942.7	85	1232.8
6	87.0	26	377.1	46	667.2	66	957.2	86	1247.3
7	101.5	27	391.6	47	681.7	67	971.8	87	1261.8
8	116.0	28	406.1	48	696.2	68	986.3	88	1276.3
9	130.5	29	420.6	49	710.7	69	1000.8	89	1290.8
10	145.0	30	435.1	50	725.2	70	1015.3	90	1305.3
11	159.5	31	449.6	51	739.7	71	1029.8	91	1319.8
12	174.0	32	464.1	52	754.2	72	1044.3	92	1334.3
13	188.5	33	478.6	53	768.7	73	1058.8	93	1348.9
14	203.1	34	493.1	54	783.2	74	1073.3	94	1363.4
15	217.6	35	507.6	55	797.7	75	1087.8	95	1377.9
16	232.1	36	522.1	56	812.2	76	1102.3	96	1392.4
17	246.6	37	536.6	57	826.7	77	1116.8	97	1406.9
18	261.1	38	551.1	58	841.2	78	1131.3	98	1421.4
19	275.6	39	565.6	59	855.7	79	1145.8	99	1435.9
20	290.1	40	580.2	60	870.2	80	1160.3	100	1450.4

Temperature Conversion

Celsius (C) to Fahrenheit (F) - Fahrenheit (F) to Celsius (C)

-459.4° to 0°			1° to 60°			61° to 290°			300° to 890°			900° to 3000°		
C	Cel. or Fah.	F	C	Cel. or Fah.	F	C	Cel. or Fah.	F	C	Cel. or Fah.	F	C	Cel. or Fah.	F
-273	-459.4		-17.2	1	33.8	16.1	61	141.8	149	300	572	482	900	1652
-268	-450		-16.7	2	35.6	16.7	62	143.6	154	310	590	488	910	1670
-262	-440		-16.1	3	37.4	17.2	63	145.4	160	320	608	493	920	1688
-257	-430		-15.6	4	39.2	17.8	64	147.2	166	330	626	499	930	1706
-251	-420		-15.0	5	41.0	18.3	65	149.0	171	340	644	504	940	1724
-246	-410		-14.4	6	42.8	18.9	66	150.8	177	350	662	510	950	1742
-240	-400		-13.9	7	44.6	19.4	67	152.6	182	360	680	516	960	1760
-234	-390		-13.3	8	46.4	20.0	68	154.4	188	370	698	521	970	1778
-229	-380		-12.8	9	48.2	20.6	69	156.2	193	380	716	527	980	1796
-223	-370		-12.2	10	50.0	21.1	70	158.0	199	390	734	532	990	1814
-218	-360		-11.7	11	51.8	21.7	71	159.8	204	400	752	538	1000	1832
-212	-350		-11.1	12	53.6	22.2	72	161.6	210	410	770	549	1020	1868
-207	-340		-10.6	13	55.4	22.8	73	163.4	216	420	788	560	1040	1904
-201	-330		-10.0	14	57.2	23.3	74	165.2	221	430	806	571	1060	1940
-196	-320		-9.4	15	59.0	23.9	75	167.0	227	440	824	582	1080	1976
-190	-310		-8.9	16	60.8	24.4	76	168.8	232	450	842	593	1100	2012
-184	-300		-8.3	17	62.6	25.0	77	170.6	238	460	860	604	1120	2048
-179	-290		-7.8	18	64.4	25.6	78	172.4	243	470	878	616	1140	2084
-173	-280		-7.2	19	66.2	26.1	79	174.2	249	480	896	627	1160	2120
-169	-273	-459.4	-6.7	20	68.0	26.7	80	176.0	254	490	914	638	1180	2156
-168	-270	-454	-6.1	21	69.8	27.2	81	177.8	260	500	932	649	1200	2192
-162	-260	-436	-5.6	22	71.6	27.8	82	179.6	266	510	950	660	1220	2228
-157	-250	-418	-5.0	23	73.4	28.3	83	181.4	271	520	968	671	1240	2264
-151	-240	-400	-4.4	24	75.2	28.9	84	183.2	277	530	986	682	1260	2300
-146	-230	-382	-3.9	25	77.0	29.4	85	185.0	282	540	1004	693	1280	2336
-140	-220	-364	-3.3	26	78.8	30.0	86	186.8	288	550	1022	704	1300	2372
-134	-210	-346	-2.8	27	80.6	30.6	87	188.6	293	560	1040	732	1350	2462
-129	-200	-328	-2.2	28	82.4	31.1	88	190.4	299	570	1058	760	1400	2552
-123	-190	-310	-1.7	29	84.2	31.7	89	192.2	304	580	1076	788	1450	2642
-118	-180	-292	-1.1	30	86.0	32.2	90	194.0	310	590	1094	816	1500	2732
-112	-170	-274	-0.6	31	87.8	32.8	91	195.8	316	600	1112	843	1550	2822
-107	-160	-256	0.0	32	89.6	33.3	92	197.6	321	610	1130	871	1600	2912
-101	-150	-238	0.6	33	91.4	33.9	93	199.4	327	620	1148	899	1650	3002
-96	-140	-220	1.1	34	93.2	34.4	94	201.2	332	630	1166	927	1700	3092
-90	-130	-202	1.7	35	95.0	35.0	95	203.0	338	640	1184	954	1750	3182
-84	-120	-184	2.2	36	96.8	35.6	96	204.8	343	650	1202	982	1800	3272
-79	-110	-166	2.8	37	98.6	36.1	97	206.6	349	660	1220	1010	1850	3362
-73	-100	-148	3.3	38	100.4	36.7	98	208.4	354	670	1238	1038	1900	3452
-68	-90	-130	3.9	39	102.2	37.2	99	210.2	360	680	1256	1066	1950	3542
-62	-80	-112	4.4	40	104.0	37.8	100	212.0	366	690	1274	1093	2000	3632
-57	-70	-94	5.0	41	105.8	43	110	230	371	700	1292	1121	2050	3722
-51	-60	-76	5.6	42	107.6	49	120	248	377	710	1310	1149	2100	3812
-46	-50	-58	6.1	43	109.4	54	130	266	382	720	1328	1177	2150	3902
-40	-40	-40	6.7	44	111.2	60	140	284	388	730	1346	1204	2200	3992
-34	-30	-22	7.2	45	113.0	66	150	302	393	740	1364	1232	2250	4082
-29	-20	-4	7.8	46	114.8	71	160	320	399	750	1382	1260	2300	4172
-23	-10	14	8.3	47	116.6	77	170	338	404	760	1400	1288	2350	4262
-18	0	32	8.9	48	118.4	82	180	356	410	770	1418	1316	2400	4352
			9.4	49	120.2	88	190	374	416	780	1436	1343	2450	4442
			10.0	50	122.0	93	200	392	421	790	1454	1371	2500	4532
Conversion Formulas $C = \frac{5}{9}(F - 32)$ $F = \frac{9}{5}C + 32$			10.6	51	123.8	99	210	410	427	800	1472	1399	2550	4622
			11.1	52	125.6	104	220	428	432	810	1490	1427	2600	4712
			11.7	53	127.4	110	230	446	438	820	1508	1454	2650	4802
			12.2	54	129.2	116	240	464	443	830	1526	1482	2700	4892
			12.8	55	131.0	121	250	482	449	840	1544	1510	2750	4982
			13.3	56	132.8	127	260	500	454	850	1562	1538	2800	5072
			13.9	57	134.6	132	270	518	460	860	1580	1566	2850	5162
			14.4	58	136.4	138	280	536	466	870	1598	1593	2900	5252
			15.0	59	138.2	143	290	554	471	880	1616	1621	2950	5342
			15.6	60	140.0	149	300	572	477	890	1634	1649	3000	5432

Dimensional Data for Standard & Schedule Pipe

Carbon Steel Pipe

NPS-Black numbers are inches and pounds DN-Blue numbers are millimeter and kilograms

PIPE	NPS DN	1/8 8	1/4 8	3/8 10	1/2 15	3/4 20	1 25	1 1/4 32	1 1/2 40	2 50	2 1/2 65	3 80	3 1/2 95	4 100	5 125	6 150	8 200	10 250	12 300
	Outside Dia.	0.405 10.3	0.540 13.7	0.675 17.1	0.840 21.3	1.050 26.7	1.315 33.4	1.660 42.2	1.900 48.3	2.375 60.3	2.875 73.0	3.500 88.9	4.000 101.6	4.500 114.3	5.563 141.3	6.625 168.3	8.625 219.1	10.750 273.0	12.750 323.8
Standard	Inside Dia.	0.269 6.8	0.364 9.2	0.493 12.5	0.622 15.8	0.824 20.9	1.049 25.6	1.380 35.1	1.610 40.9	2.067 52.5	2.469 62.7	3.068 77.9	3.548 90.1	4.026 102	5.047 128	6.065 154	7.981 203	10.020 255	12.000 305
	Wall Thick.	0.068 1.73	0.088 2.24	0.091 2.31	0.109 2.77	0.113 2.87	0.133 3.38	0.140 3.56	0.145 3.68	0.154 3.91	0.203 5.16	0.216 5.49	0.226 5.74	0.237 6.02	0.258 6.55	0.280 7.11	0.322 8.18	0.365 9.27	0.375 9.53
	Wt. Per Ft.	0.24 0.37	0.42 0.63	0.57 0.84	0.85 1.27	1.13 1.69	1.68 2.50	2.27 3.39	2.72 4.05	3.65 5.44	5.79 8.63	7.58 11.29	9.11 13.57	10.79 16.07	14.62 21.77	18.97 28.26	28.55 42.55	40.48 60.31	49.56 73.88
Extra Heavy	Inside Dia.	0.215 5.4	0.302 7.7	0.423 10.7	0.546 13.9	0.742 18.8	0.957 24.3	1.278 32.5	1.50 38.1	1.939 49.2	2.323 59.0	2.900 73.7	3.364 85.4	3.826 97.2	4.813 122	5.761 146	7.625 194	9.750 248	11.750 298
	Wall Thick.	0.095 2.41	0.119 3.02	0.126 3.20	0.147 3.73	0.154 3.91	0.179 4.55	0.191 4.85	0.200 5.08	0.218 5.54	0.276 7.01	0.300 7.62	0.318 8.08	0.337 8.56	0.375 9.53	0.432 10.97	0.500 12.70	0.600 12.70	0.600 12.70
	Wt. Per Ft.	0.31 0.47	0.54 0.80	0.74 1.10	1.09 1.62	1.47 2.20	2.17 3.24	3.00 4.47	3.63 5.41	5.02 7.48	7.66 11.41	10.25 15.27	12.50 18.63	14.98 22.32	19.78 30.97	28.57 42.56	43.39 64.64	54.74 81.55	65.42 97.46
Double Extra Heavy	Inside Dia.				0.252 6.4	0.434 11.0	0.599 15.2	8.96 22.6	1.100 27.9	1.503 36.2	1.771 5.0	2.300 58.4		3.152 80.1	4.063 103	4.897 124	6.875 175		
	Wall Thick.				0.294 7.47	0.308 7.82	0.358 9.09	0.382 9.70	0.400 10.15	0.436 11.07	0.552 0.552	0.600 15.24		0.674 17.12	0.750 19.05	0.864 21.95	0.875 22.23		
	Wt. Per Ft.				1.71 2.55	2.44 3.64	3.66 5.45	5.21 7.77	6.41 9.56	9.03 13.44	13.69 20.39	18.58 27.68		27.54 41.03	38.55 57.43	53.16 79.22	72.4 107.92		
Schedule 10	Inside Dia.																		
	Wall Thick.																		
	Wt. Per Ft.																		
Schedule 20	Inside Dia.																6.125 206	10.250 260	12.250 311
	Wall Thick.																0.250 6.35	0.250 6.35	0.250 6.35
	Wt. Per Ft.																22.36 33.31	28.04 41.77	33.38 49.73
Schedule 30	Inside Dia.																8.071 205	10.136 257	12.090 307
	Wall Thick.																0.277 7.04	0.307 7.80	*0.330 8.38
	Wt. Per Ft.																24.70 36.81	34.24 51.03	43.77 65.20
Schedule 40	Inside Dia.	0.269 6.8	0.364 9.2	0.493 12.5	0.622 15.8	0.824 20.9	1.049 26.6	1.380 35.1	1.610 40.9	2.067 52.5	2.469 62.7	3.068 77.9	3.548 90.1	4.026 102	5.047 128	6.065 154	7.981 203	10.020 255	11.938 303
	Wall Thick.	0.068 1.73	0.088 2.24	0.091 2.31	0.109 2.77	0.113 2.87	0.133 3.38	0.140 3.56	0.145 3.68	0.154 3.91	0.203 5.16	0.216 5.49	0.226 5.74	0.237 6.02	0.258 6.55	0.280 7.11	0.322 8.18	0.365 9.27	0.406 10.32
	Wt. Per Ft.	0.24 0.32	0.42 0.63	0.57 0.84	0.85 1.27	1.13 1.69	1.66 2.50	2.27 3.39	2.72 4.05	3.65 5.44	5.79 8.63	7.58 11.29	9.11 13.57	10.79 16.07	14.62 21.77	18.97 28.26	28.55 42.55	40.48 60.31	53.52 79.73
Schedule 60	Inside Dia.																7.813 198	9.750 248	11.626 295
	Wall Thick.																0.406 10.31	+0.500 12.70	0.562 14.27
	Wt. Per Ft.																35.64 53.08	54.74 81.55	73.15 108.96
Schedule 80	Inside Dia.	0.215 5.5	0.302 7.7	0.423 10.7	0.546 13.9	0.742 18.8	0.957 24.3	1.278 32.5	1.50 38.1	1.939 49.2	2.323 59.0	2.900 73.7	3.364 85.4	3.826 97.2	4.813 122	5.761 145	7.625 194	9.564 243	11.376 289
	Wall Thick.	0.095 2.41	0.119 3.02	0.126 3.20	0.147 3.73	0.154 3.91	0.179 4.55	0.191 4.85	0.200 5.08	0.218 5.54	0.276 7.01	0.300 7.62	0.318 8.08	0.337 8.56	0.375 9.53	0.432 10.97	0.500 12.70	0.594 15.02	0.688 17.48
	Wt. Per Ft.	0.31 0.47	0.54 0.80	0.74 1.10	1.09 1.62	1.47 2.20	2.17 3.24	3.00 4.47	3.63 5.41	5.02 7.48	7.66 11.41	10.25 15.27	12.51 18.63	14.98 22.32	20.78 30.97	28.57 42.56	43.39 64.64	64.43 96.01	88.63 132.08
Schedule 100	Inside Dia.																7.439 189	9.314 237	11.084 281
	Wall Thick.																0.594 15.09	0.719 18.26	0.844 21.44
	Wt. Per Ft.																50.95 75.92	77.03 114.75	107.32 159.91
Schedule 120	Inside Dia.													3.624 92.0	4.563 116	5.501 140	7.189 183	9.064 230	10.75 273
	Wall Thick.													0.438 11.13	0.500 12.70	0.562 14.27	0.719 18.26	0.844 21.44	1.000 25.40
	Wt. Per Ft.													19.00 26.32	27.04 40.28	36.39 54.20	60.71 90.44	89.24 133.06	125.49 186.97
Schedule 140	Inside Dia.																7.001 179	8.750 222	10.50 267
	Wall Thick.																0.812 20.62	1.000 25.40	1.125 28.58
	Wt. Per Ft.																67.76 100.92	104.13 155.15	139.67 208.14
Schedule 160	Inside Dia.				0.466 11.8	0.614 15.6	0.815 20.7	1.160 29.5	1.338 34.0	1.689 42.9	2.125 54.0	2.624 66.6		3.438 87.3	4.313 110	5.189 132	6.813 173	8.500 216	10.126 257
	Wall Thick.				0.188 4.78	0.219 5.56	0.250 6.35	0.250 6.35	0.281 7.14	0.344 8.74	0.375 9.53	0.438 11.13		0.531 13.49	0.625 15.88	0.719 23.01	0.906 23.01	1.125 28.58	1.312 33.32
	Wt. Per Ft.				1.31 1.95	1.94 2.90	2.84 4.24	3.76 5.61	4.86 7.25	7.46 11.11	10.01 14.92	14.32 21.35		22.51 33.54	32.96 49.11	45.35 67.56	74.69 111.27	115.64 177.33	160.27 238.76

Dimensional Data for Standard & Schedule Pipe

Stainless Steel Pipe

NPS-Black numbers are inches and pounds DN-Blue numbers are millimeter and kilograms

PIPE	NPS DN	1/8 6	1/4 8	3/8 10	1/2 15	3/4 20	1 25	1 1/4 32	1 1/2 40	2 50	2 1/2 63	3 80	3 1/2 95	4 100	5 125	6 150	8 200	10 250	12 300
	Outside Dia.	0.405 10.3	0.540 13.7	0.675 17.1	0.840 21.3	1.050 26.7	1.315 33.4	1.660 42.2	1.900 48.3	2.375 60.3	2.875 73.0	3.500 88.9	4.000 101.6	4.500 114.3	5.563 141.3	6.625 168.3	8.625 219.1	10.750 273.1	12.750 323.9
Schedule 5S (a)	Inside Dia.				0.710 18.0	0.920 23.4	1.185 30.1	1.530 38.9	1.770 45.0	2.245 57.0	2.709 68.8	3.334 84.7	3.834 97	4.334 110	5.345 136	6.407 163	8.407 214	10.842 275	12.438 316
	Wall Thick.				0.065 1.65	0.065 1.65	0.065 1.65	0.065 1.65	0.065 1.65	0.065 1.65	0.083 2.11	0.083 2.11	0.083 2.11	0.083 2.11	0.109 2.77	0.109 2.77	0.109 2.77	0.134 3.40	0.156 3.96
	Wt. Per Ft.				0.54 0.80	0.69 1.03	0.87 1.29	1.11 1.65	1.28 1.90	1.61 2.40	2.48 3.69	3.03 4.51	3.48 5.18	3.92 5.83	6.36 9.46	7.60 11.31	9.93 14.78	15.19 22.61	20.98 31.22
Schedule 10S (a)	Inside Dia.	0.307 7.8	0.410 10.4	0.545 13.8	0.674 17.1	0.884 22.5	1.097 27.9	1.442 36.6	1.682 42.7	2.157 54.8	2.635 66.9	3.260 82.8	3.760 96	4.260 108	5.295 134	6.357 161	8.329 212	10.420 265	12.390 315
	Wall Thick.	0.049 1.24	0.065 1.65	0.065 1.65	0.083 2.11	0.083 2.11	0.109 2.77	0.109 2.77	0.109 2.77	0.109 2.77	0.120 3.05	0.120 3.05	0.120 3.05	0.120 3.05	0.134 3.40	0.134 3.40	0.148 3.76	0.165 4.19	0.180 4.57
	Wt. Per Ft.	0.19 0.28	0.33 0.49	0.42 0.63	0.67 1.00	0.86 1.28	1.40 2.08	1.81 2.69	2.09 3.11	2.64 3.93	3.53 5.25	4.33 6.44	4.97 7.40	5.61 8.35	7.77 11.56	9.29 13.83	13.40 19.94	18.65 27.75	24.17 36.0
Schedule 40S	Inside Dia.	0.269 6.8	0.364 9.2	0.493 12.5	0.622 15.8	0.824 20.9	1.049 26.6	1.380 35.1	1.610 40.9	2.067 52.5	2.469 62.7	3.068 77.9	3.548 90	4.026 102	5.047 128	6.065 154	7.981 203	10.020 255	11.938 303
	Wall Thick.	0.068 1.73	0.088 2.24	0.091 2.31	0.109 2.77	0.113 2.87	0.133 3.38	0.140 3.56	0.145 3.68	0.154 3.91	0.203 5.16	0.216 5.49	0.226 5.74	0.237 6.02	0.258 6.55	0.280 7.11	0.322 8.18	0.365 9.27	0.375 9.53
	Wt. Per Ft.	0.24 0.36	0.42 0.63	0.57 0.85	0.85 1.26	1.13 1.68	1.68 2.50	2.27 3.38	2.72 4.05	3.65 5.43	5.79 8.62	7.68 11.43	9.11 13.56	10.79 16.06	14.62 21.76	18.97 28.23	28.55 42.49	40.48 60.24	49.56 73.75
Schedule 80S	Inside Dia.	0.215 5.5	0.302 7.7	0.423 10.7	0.546 13.9	0.742 18.8	0.957 24.3	1.278 32.5	1.500 38.1	1.999 50.8	2.323 59.0	2.900 73.7	3.354 85	3.828 97	4.813 122	5.761 146	7.625 194	9.75 248	11.75 298
	Wall Thick.	0.095 2.41	0.119 3.02	0.128 3.25	0.147 3.73	0.154 3.91	0.179 4.55	0.191 4.85	0.200 5.08	0.218 5.54	0.276 7.01	0.300 7.62	0.318 8.08	0.337 8.56	0.375 9.53	0.432 10.97	0.500 12.70	0.500 12.70	0.500 12.70
	Wt. Per Ft.	0.31 0.46	0.54 0.80	0.74 1.10	1.09 1.62	1.47 2.19	2.17 3.23	3.00 4.46	3.53 5.25	5.02 7.47	7.66 11.40	10.25 15.25	12.50 18.60	14.98 22.29	20.78 30.92	28.57 42.52	43.39 64.57	54.74 81.46	65.42 97.36

(A) Wall thickness of schedule 5S and 10S does NOT permit threading in accordance with USA Standard Pipe Threads (ASME B1.20.1)

CARBON STEEL PIPE DATA: Extracted from ASME B36.10M-1985 Standards (except inside diameter and on size notation)

STAINLESS STEEL PIPE DATA: Extracted from ASME B36.19M-1985 Standards (except inside diameter and on size notation)

Limited Warranty

Seller warrants that the Goods shall be free from defects in materials manufactured by Seller and in Seller's workmanship for a period of one (1) year following shipment (the "Warranty Period"). This limited warranty shall apply only in favor of Buyer, shall expire on the last day of such one (1) year period and shall be subject to the following:

- a. This warranty shall not apply to Goods that have been (i) repaired or altered by any Person other than the Seller, (ii) subjected to unreasonable or improper use or use beyond rated conditions, improper storage, negligence or accident, (iii) damaged because of use of the Goods or incorporation of the Goods into use of any Goods with other materials or equipment, after Buyer (or any other person using the Goods) has, or reasonably should have, knowledge of any defect; (iv) manufactured, fabricated or assembled by any person other than Seller (Seller shall assign to Buyer, to the extent same is assignable, any warranty Seller has received from the manufacture of such Goods); or (v) improperly installed by any person (including Buyer) other than Seller.
- b. This warranty shall not be effective unless Seller receives a written claim within thirty (30) days after discovery of any defect with respect to which a claim is made.
- c. Seller shall have the right (but not the obligation) to verify, with its own representatives, the nature and extent of any claimed defect prior to return of Goods to Seller. Upon request by Seller, Buyer shall, at its own risk and expense, promptly return the Goods in question to Seller's Plant.
- d. Buyer covenants to inform all subsequent buyers to the Goods of the limitations on and exclusion of the warranties provided herein. Buyer hereby indemnifies and agrees to hold Seller harmless from and against all losses, costs and expenses, including reasonable attorney's fees incurred by Seller as a result of any third-party claim relating to the purchase, sale or use of, otherwise relating to, the Goods covered by this agreement.
- e. Seller's liability for any breach of warranty shall be limited either to (i) repair or replacement (whichever Seller shall elect) at Seller's Plant of any Goods determined by Seller to be defective, or (ii) payment of an amount equal to the invoiced cost to the Buyer of the part or material that is defective, as Seller may elect. In no event shall Seller be required to repair, replace or reimburse Buyer for more than the part or material that is found to be defective and Seller's liability shall in no event be greater than the invoiced price of the item and shall not include labor, shipping or other costs incurred in connection with the reshipment of defective Goods to Seller or the reinstallation of such Goods after any repair or replacement. The Goods, as a whole, shall not be construed to be a "part" or "material" for the purpose of the immediately preceding sentence. Any Goods that are repaired or replaced by Seller shall be re-delivered to Buyer F.O.B. Seller's Plant and shall be warranted for the remaining term of the original Warranty Period for such Goods. THE REMEDY SET FORTH IN THIS LIMITED WARRANTY IS EXPRESSLY AGREED TO BE SOLE AND EXCLUSIVE REMEDY FOR ANY SUCH BREACH OF WARRANTY.
- f. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES (EXCEPT OF TITLE), EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY IMPLIED OR EXPRESS WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND CONFORMITY TO MODELS OR SAMPLES. ALL OTHER LIABILITY WHETHER IN CONTRACT OR TORT, STRICT LIABILITY, NEGLIGENCE OR OTHERWISE, IS HEREBY EXCLUDED.

