

Cut Sheet

FORGED, HIGH-PRESSURE VALVES

Technical Data	
Sizes	¼ - 4"
Pressure Classes	ASME / ANSI Class 900 - 4500
Temperature Range	-50 up 1500°F (-45 up 815°C)
Materials of Construction	Carbon steel (A105) - standard Alloy steel (F22, F91) - standard Stainless steel (316H) - standard Duplex steel Exotic alloys Other materials available upon request
In Compliance	ASME B16.34 PED Nuclear ASME III Class 1, 2 and 3 Nuclear Safety Related - 10CFR50 Appendix B SIL
End Connections	Socketweld - standard Buttweld - standard Other end connections available upon request
Warranty	Four year zero-leakage guarantee*



DESIGN FEATURES

Integral metal seat. With ValvTechnologies' trademarked HVOF RiTech® coating process, the integral seat in ValvTechnologies' rotary operating valves are resistant from the attack of abrasive magnetite or ferrous oxides in the steam flow.

Body seal ring. ValvTechnologies employs a field proven seal ring technology to ensure sealing under all operating conditions up to 1500°F. The body seal ring is loaded at a pressure higher than 20,000 psi. In addition, valves sized 3" and above contain a secondary grafoil seal to further guarantee reliability.

Patented coating process. The sealing surfaces are overlaid with tungsten or chromium carbide using our HVOF RiTech® coating process. These surfaces have a hardness of 68 - 72 Rc to provide uninterrupted operation in the most severe conditions.

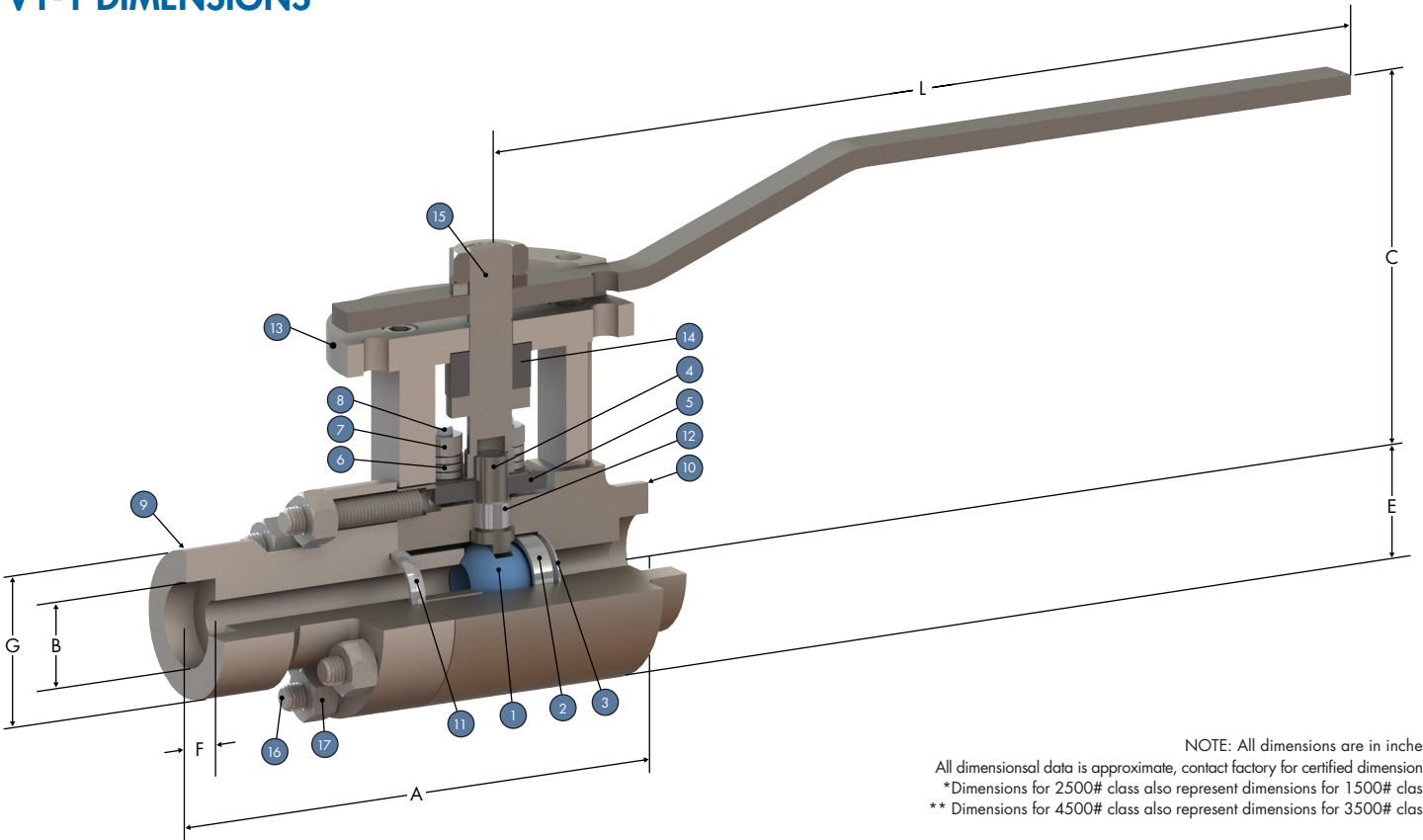
Live-loaded gland area. The V Series' sealing design features a four stud, live-loaded assembly designed for heavy industrial applications. The sealing material is high purity Grafoil® surrounded by stainless steel wire mesh anti-extrusion rings. The six Belleville springs (per stud) provide constant load pressure through extreme thermal shocks and prevent wear leaks in high-cycle service.

True blow-out proof stem. ValvTechnologies' design utilizes a one-piece, hard-faced, blow-out proof stem that is inserted through the inside of the body cavity eliminating the possibility of blow-out through the gland area.

Absolute zero-leakage. ValvTechnologies tests every valve according to ANSI procedures, however, we toughen the standard and define zero-leakage as no detectable leakage of gas or a liquid for a period of three minutes or greater. The ValvTechnologies' standard is zero drops and zero bubbles, guaranteed.

Integral Seat • Zero-Leakage • Severe Service • Metal Seated Ball Valves

V1-1 DIMENSIONS



NOTE: All dimensions are in inches
 All dimensional data is approximate, contact factory for certified dimensions
 *Dimensions for 2500# class also represent dimensions for 1500# class
 ** Dimensions for 4500# class also represent dimensions for 3500# class

Class 900-2500																					
NPS	A (SW FP)	A (SW RP)	A (SW STD)	A (BW FP)	A (BW RP)	A (BW STD)	B (SW)	C (FP)	C (STD)	E (FP)	E (RP)	E (STD)	F (SW)	G (SW FP)	G (SW RP)	G (SW STD)	G (BW FP)	G (BW RP)	G (BW STD)	L (FP)	L (STD)
3/8"	5.50		5.50				0.55	4.48	4.48	1.18		1.80	0.40	1.50		1.50				7.13	7.13
1/2"	5.88		5.50	5.88		5.50	0.87	5.86	4.48	1.73		1.18	0.40	1.88		1.88	0.85		0.85	15.00	7.13
3/4"	5.88		5.50	5.88		5.50	1.08	5.86	4.48	1.73		1.18	0.50	1.88		1.88	1.11		1.11	15.00	7.13
1"	8.00	8.00	8.00	8.00	8.00	8.00	1.34	7.72	7.72	1.75	1.75	1.75	0.51	2.30	2.30	2.30	1.40	1.40	1.40	15.00	15.00
1-1/4"	10.00	8.00	8.00	10.00	8.00	8.00	1.69	6.70	6.70	2.13	1.75	1.75	0.50	3.88	3.50	3.50	1.78	1.78	1.78	15.00	15.00
1-1/2"	10.00	8.00	8.00	10.00	8.00	8.00	1.93	6.70	6.70	2.13	1.73	1.73	0.50	3.88	3.16	3.16	2.04	2.04	2.04	15.00	15.00
2"	11.50	10.00	10.00	11.50	10.00	10.00	2.42		6.70	3.50	2.13	2.13	0.64	5.00	3.98	3.98	2.44	2.44	2.44		15.00
2-1/2"	18.00	11.50	11.13	18.00	11.50	10.00	2.92		6.70	4.00	3.44	2.13	0.64	8.00	5.00	3.98	3.04	3.04	3.04		15.00
3"				18.00	11.50	11.50				4.00	3.44	3.44					3.54	3.54	3.54		
4"				18.00	18.00	11.50				5.00	4.00	3.36					4.50	4.50			

Class 3500-4500																					
NPS	A (SW FP)	A (SW RP)	A (SW STD)	A (BW FP)	A (BW RP)	A (BW STD)	B (SW)	C (FP)	C (STD)	E (FP)	E (RP)	E (STD)	F (SW)	G (SW FP)	G (SW RP)	G (SW STD)	G (BW FP)	G (BW RP)	G (BW STD)	L (FP)	L (STD)
3/8"	6.75		6.75				0.69	4.50	4.50	1.31		1.31	0.38	1.75		1.75				7.13	7.13
1/2"	9.56		6.75	6.75		6.75	0.87	5.88	4.50	2.25		1.31	0.38	2.13		1.80	0.85		0.85	15.00	7.13
3/4"	9.56		6.75	6.75		6.75	1.08	5.88	4.50	2.25		1.31	0.50	2.13		1.88	1.11		1.11	15.00	7.13
1"	9.56	9.56	6.75	9.56	9.56	6.75	1.34	5.88	4.50	2.25	2.25	1.31	0.50	2.59	2.59	2.63	1.40	1.40	1.40	15.00	7.13
1-1/4"	9.56	9.56	9.56	9.56	9.56	9.56	1.69	5.88	5.88	2.25	2.25	2.25	0.50	3.50	3.50	3.50	1.78	1.78	1.78	15.00	15.00
1-1/2"	11.13	9.56	9.56	11.13	9.56	9.56	1.93	6.49	5.88	3.00	2.25	2.25	0.50	4.50	4.50	4.50	2.04	2.04	2.04	16.41	15.00
2"	11.50	9.56	9.56	11.50	11.13	9.56	2.42		5.88	4.00	2.25	2.25	0.62	4.50	6.00	4.50	2.44	2.44	2.44		15.00
2-1/2"	11.50	11.13	11.13	11.50	11.13	11.13	2.92		6.69	4.00	3.00	3.00	0.62	5.35	6.00	6.00	3.04	3.04	3.04		16.41
3"				18.00	11.50	11.13				5.13	4.00	3.00					3.54	3.54	3.54		
4"				18.00	11.50	11.13				5.13	4.00	3.00					4.50	4.50	4.50		

END CONNECTIONS

V1-1 Socket Weld, Class 900-2500																
NPS	A			B	C		E			F		G			L	
	FP	RP	STD		FP	STD	FP	RP	STD	FP	RP	STD	FP	STD		
1/4"	5.50		5.50	0.57	4.51	4.51	1.19		1.19	0.40	1.50		1.50	1.50	7.12	
3/8"	5.50		5.50	0.55	4.48	4.48	1.18		1.80	0.40	1.50		1.50	7.13	7.13	
1/2"	5.88		5.50	0.87	5.86	4.48	1.73		1.18	0.40	1.88		1.88	15	7.13	
3/4"	5.88		5.50	1.08	5.86	4.48	1.73		1.18	0.50	1.88		1.88	15	7.13	
1"	8.00	8.00	8.00	1.34	7.72	7.72	1.75	1.75	1.75	0.51	2.30	2.30	2.30	15.00	15.00	
1-1/4"	10.00	8.00	8.00	1.69	6.70	6.70	2.13	1.75	1.75	0.50	3.88	3.50	3.50	15.00	15.00	
1-1/2"	10.00	8.00	8.00	1.93	6.70	6.70	2.13	1.73	1.73	0.50	3.88	3.16	3.16	15.00	15.00	
2"	11.50	10.00	10.00	2.42		6.70	3.50	2.13	2.13	0.64	5.00	3.98	3.98		15.00	
2-1/2"	18.00	11.50	11.13	2.92		6.70	4.00	3.44	2.13	0.64	8.00	5.00	3.98		15.00	

V1-1 Socket Weld, Class 3500-4500																
NPS	A			B	C		E			F		G			L	
	FP	RP	STD		FP	STD	FP	RP	STD	FP	RP	STD	FP	STD		
1/4"	6.75		6.75	0.57	4.51	4.51	1.31		1.31		0.40		2.63	2.63	7.12	
3/8"	6.75		6.75	0.69	4.50	4.50	1.31		1.31	0.38	1.75		1.75	7.13	7.13	
1/2"	9.56		6.75	0.87	5.88	4.50	2.25		1.31	0.38	2.13		1.80	15.00	7.13	
3/4"	9.56		6.75	1.08	5.88	4.50	2.25		1.31	0.50	2.13		1.88	15.00	7.13	
1"	9.56	9.56	6.75	1.34	5.88	4.50	2.25	2.25	1.31	0.50	2.59	2.59	2.63	15.00	7.13	
1-1/4"	9.56	9.56	9.56	1.69	5.88	5.88	2.25	2.25	2.25	0.50	3.50	3.50	3.50	15.00	15.00	
1-1/2"	11.13	9.56	9.56	1.93	6.49	5.88	3.00	2.25	2.25	0.50	4.50	4.50	4.50	16.41	15.00	
2"	11.5	9.56	9.56	2.42		5.88	4.00	2.25	2.25	0.62	4.50	6.00	4.50		15.00	
2-1/2"	11.5	11.13	11.13	2.92		6.69	4.00	3.00	3.00	0.62	5.35	6.00	6.00		16.41	

V1-1 Butt Weld, Class 900-2500													
NPS	A			C		E			G			L	
	FP	RP	STD	FP	STD	FP	RP	STD	FP	RP	STD	FP	STD
1/2"	5.88		5.50	5.86	4.48	1.73		1.18	0.85		0.85	15.00	7.13
3/4"	5.88		5.50	5.86	4.48	1.73		1.18	1.11		1.11	15.00	7.13
1"	8.00	8.00	8.00	7.72	7.72	1.75	1.75	1.75	1.40	1.40	1.40	15.00	15.00
1-1/4"	10.00	8.00	8.00	6.70	6.70	2.13	1.75	1.75	1.78	1.78	1.78	15.00	15.00
1-1/2"	10.00	8.00	8.00	6.70	6.70	2.13	1.73	1.73	2.04	2.04	2.04	15.00	15.00
2"	11.50	10.00	10.00		6.70	3.50	2.13	2.13	2.44	2.44	2.44		15.00
2-1/2"	18.00	11.50	10.00		6.70	4.00	3.44	2.13	3.04	3.04	3.04		15.00
3"	18.00	11.50	11.50			4.00	3.44	3.44	3.54	3.54	3.54		
4"	18.00	18.00	11.50			5.00	4.00	3.36	4.50	4.50	4.50		

V1-1 Butt Weld, Class 3500-4500													
NPS	A			C		E			G			L	
	FP	RP	STD	FP	STD	FP	RP	STD	FP	RP	STD	FP	STD
1/2"	6.75		6.75	5.88	4.50	2.25		1.31	0.85		0.85	15.00	7.13
3/4"	6.75		6.75	5.88	4.50	2.25		1.31	1.11		1.11	15.00	7.13
1"	9.56	9.56	6.75	5.88	4.50	2.25	2.25	1.31	1.40	1.40	1.40	15.00	7.13
1-1/4"	9.56	9.56	9.56	5.88	5.88	2.25	2.25	2.25	1.78	1.78	1.78	15.00	15.00
1-1/2"	11.13	9.56	9.56	6.49	5.88	3.00	2.25	2.25	2.04	2.04	2.04	16.41	15.00
2"	11.50	11.13	9.56		5.88	4.00	2.25	2.25	2.44	2.44	2.44		15.00
2-1/2"	11.50	11.13	11.13		6.69	4.00	3.00	3.00	3.04	3.04	3.04		16.41
3"	18.00	11.50	11.13			5.13	4.00	3.00	3.54	3.54	3.54		
4"	18.00	11.50	11.13			5.13	4.00	3.00	4.5	4.50	4.50		

BILL OF MATERIALS

Item	Description	Material			
		A182-F22	A105	A182-F316	A182-F91
1	Ball	SA-182 F6a / RiTech®31	SA-182 F6a / RiTech®31	SA-182 F6a / RiTech®31	SB-637 N07718 / RiTech®31
2	Upstream seat	SA-182 F22 / QPQ	SA-182 F22 / QPQ	SA-182 316 / QPQ	SA-182 F22 / QPQ
3	Belleville® spring	SB-637 N07718	SB-637 N07718	SB-637 N07718	SB-637 N07718
4	Stem	SA-638 660 / QPQ	SA-638 660 / QPQ	SA-638 660 / QPQ	SA-638 660 / QPQ
5	Gland	SA-182 316 / QPQ	SA-182 316 / QPQ	SA-182 316 / QPQ	SA-182 316 / QPQ
6	Gland spring	AISI 302	AISI 302	AISI 302	AISI 302
7	Gland nut	SA-194 8M	SA-194 8M	SA-194 8M	SA-194 8M
8	Gland stud	SA-193 B8M	SA-193 B8M	SA-193 B8M	SA-193 B8M
9	End cap	SA-182 F22 / RiTech®31	A105 / RiTech®31	SA-182 316H / RiTech®31	SA-182 F91 / RiTech®31
10	Body	SA-182 F22	A105	SA-182 316H	SA-182 F91
11	Body seal	SA-564 H1150D / PT24	SA-564 H1150D / PT24	SA-564 H1150D / PT24	SB-637 UNS N07718
12	Gland packing	316 / Grafoil	316 / Grafoil	316 / Grafoil	316 / Grafoil
13	Stop plate	SA-216 WCB	SA-216 WCB	SA-216 WCB	SA-216 WCB
14	Thrust bearing	Carbon steel / QPQ	Carbon steel / QPQ	Carbon steel / QPQ	Carbon steel / QPQ
15	Drive sleeve	SA-29 4130	SA-29 4130	SA-29 4130	SA-29 4130
16	Body stud	SA-193 B8M	SA-193 B8M	SA-193 B8M	SA-193 B8M
17	Body nut	SA-194 8M	SA-194 8M	SA-194 8M	SA-194 8M
18	Lever	SA-29 1018 / PVC	SA-29 1018 / PVC	SA-29 1018 / PVC	SA-29 1018 / PVC

CV'S

NPS	Class	Bore		SW	BW sch 160
0.25	900-2500	0.38	FP	6	No BW
	3500-4500	0.38		6	
0.38	900-2500	0.38		6	
	3500-4500	0.38		6	
0.5	900-2500	0.38	STw	6	6
	3500-4500			6	6
0.75	900-2500			6	5
	3500-4500			6	5
1	3500-4500			5	4
	900-2500	0.63	FP	23	23
0.5	3500-4500			18	18
	900-2500			23	23
0.75	3500-4500			18	18
	900-2500			20	17
1	3500-4500			18	14
	900-2500			16	14
1.5	3500-4500		RP	15	11
	3500-4500		STD	13	12

NPS	Class	Bore		SW	BW sch 160
1.5	900-2500	1.06	FP	72	60
	3500-4500			72	59
2	900-2500	1.06	FP	59	47
	3500-4500			51	46
2.5	900-2500	1.06	STD	43	36
	3500-4500			44	35
3	3500-4500	1.06	STD	NO SW	31
	3500-4500			NO SW	30
2	900-2500	1.50	FP	166	92
	3500-4500			166	92
2.5	900-2500	1.50	RP	166	135
	3500-4500			166	135
3	900-2500	1.50	RP	94	94
	3500-4500			NO SW	94
4	900-2500	1.50	STD	66	66
	3500-4500			RP	66
2.5	900-2500	2.13	FP	330	330
	3500-4500			226	226
3	3500-4500	2.13	No SW	226	226
	900-2500			166	166
4	3500-4500	2.13	RP	166	166
	3500-4500			166	166

Since the pipe I.D. and corresponding transition from valve I.D. to pipe I.D. has a critical impact on the Cv of the valve, we have devised the above table. This table gives the Cv based on industry standard pipe and also the maximum Cv of the valve only. Notes: 1. For Cv with other pipe I.D. consult factory. 2. For Cv with other valve bore consult factory. 3. Cv values are approximate contact factory for exact Cv values.

PRESSURE / TEMPERATURE RATINGS

A105 (Carbon Steel)**														
ANSI Rating	Temperature (°F)													
	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000
900 (1)	2250 psi	20125	1970	1900	1795	1640	1610	1600	1510	1235	805	515	310	155
1500 2250 (2)	5625 psi	5063	4923	4753	4491	4104	4028	3996	3780	3088	2008	1288	774	388
2500 3100 (2)	7750 psi	6974	6783	6548	6187	5655	5549	5505	5208	4252	2764	1772	1066	532
3500 4000 (2)	10000 psi	8996	8751	8449	7983	7298	7160	7103	6720	5485	3565	2285	1374	685
4500 (1)	11250 psi	10120	9845	9505	8980	8210	8055	7990	7560	6170	4010	2570	1545	770

** per ASME/ANSI B16.34 permissible but not recommended for prolonged usage above 800°F.

A182-F316 (316 Stainless Steel)																		
ANSI Rating	Temperature (°F)																	
	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
900 (1)	1330 psi	1305	1280	1265	1255	1245	1160	1050	1030	915	710	555	440	350	290	225	175	125
1500 2250 (2)	3330 psi	3258	3204	3168	3133	3114	2898	2624	2579	2290	1174	1390	1106	874	720	568	436	310
2500 3100 (2)	4588 psi	4489	4415	4365	4316	4291	3993	3614	3552	3154	2444	1914	1524	1204	992	780	602	428
3500 4000 (2)	5920 psi	5791	5698	5631	5569	5538	5151	4663	4583	4068	3155	2468	1965	1555	1280	1005	778	551
4500 (1)	6660 psi	6515	6410	6335	6265	6230	5795	5245	5155	4575	3550	2775	2210	1750	1440	1130	875	620

A182-F22 (2 1/4 Cr - 1 mo.)																		
ANSI Rating	Temperature (°F)																	
	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
900 (1)	2250 psi	2150	2030	1945	1920	1815	1765	1705	1595	1525	1460	1350	1130	780	525	330	205	125
1500 2250 (2)	5625 psi	5369	5076	4860	4798	4536	4414	4258	3988	3808	3654	3370	2830	1954	1310	824	514	310
2500 3100 (2)	7750 psi	7551	7226	6956	6721	6249	6081	5866	5492	5244	5034	4644	3901	2692	1806	1134	708	426
3500 4000 (2)	10000 psi	9929	9604	9289	8806	8063	7845	7569	7085	6765	6494	5991	5035	3475	2333	1463	915	548
4500 (1)	11250 psi	11250	10925	10585	9965	9070	8825	8515	7970	7610	7305	6740	5665	3910	2625	1645	1030	615

A182-F91 (9Cr - 1 Mo.)																		
ANSI Rating	Temperature (°F)																	
	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
900 (1)	2250 psi	2250	2185	2115	1995	1815	1765	1705	1595	1525	1460	1350	1109	1090	1080	965	718	448
1500 2250 (2)	5625 psi	5625	5463	5298	4986	4536	4414	4258	3988	3808	2904	3370	2898	2728	2700	2416	1800	1105
2500 3100 (2)	7750 psi	7750	7527	7292	6868	6249	6081	5866	5492	5244	4334	4644	3993	3756	3720	3330	2480	1523
3500 4000 (2)	10000 psi	10000	9711	9409	8859	8063	7845	7569	7085	6765	6244	5991	5151	4845	4800	4298	3200	1965
4500 (1)	11250 psi	11250	10925	10585	9965	9070	8825	8515	7970	7610	7305	6740	5795	5450	5400	4835	3600	2211

(1) Standard rating

(2) Interpolated rating

NOTE: Working pressures are in accordance with ASME/ANSI B16.34-1996; Standard Class Interpolated Ratings. F-22 Limited Class 2250, 3100 & 4000 are available upon request.

Pressure-temperature ratings are in accordance with ASME/ANSI B16.34 - 2013

SPECIFICATIONS

Valve sizes: 3/8", 5/8", 3/4", 1", 1-1/2", 2", 2-1/2", 3", 3-1/2", 4"

Body: Split body, in line repairable

Seats:

- Main (preferred) sealing seat is integral to the end cap with HVOF overlay RiTech® 31 or equivalent
- Rc hardness a minimum of 68, at service temperature

Ball:

- 410ss with HVOF overlay RiTech® 31 or equivalent
- Ball shall be mate-lapped to the integral seat, as a matched pair

Stem:

- True blow-out proof with integral internally retained shoulder
- Material A638 Gr 660 or equivalent, with hard facing a minimum of 66 Rc

Bolting: Conforms to B16.34 2013 & ASME Section VIII stress values

Packing:

- True live-loaded design, with a minimum of four studs and a minimum of six Belleville® washers on each stud
- The loading applied is at least twice the loading required to seal the gland
- The gland packing to be a die formed three-ring design. The top and bottom rings are woven 316 stainless steel wire mesh
- The center ring is Grafoil® or equal, with a minimum density of 90#/ft³

Leakage:

- Shutoff is absolute zero-leakage, exceeding the requirements of ANSI/FCI 70-2, ANSI B16.34 and API 598.
- Valve seat, gland, body seals and studs are all be tested to zero bubbles and zero drops of leakage for a minimum of three min with: 50 psig air & 1000 psig nitrogen and water at the 1.1 times the CWP ANSI/API pressure class. Confirming test certificates shall be provided.

Backpressure protected: Standard with the V1-1 valve, the design prevents the upstream spring from collapsing in a reverse flow condition, protecting the internals from damage and guaranteeing shutoff in the reverse direction.

OPTIONS

Insulating jackets:

For further protection valves can be fitted with removable and reusable valve insulation blanket jackets.

Mounting hardware:

ValvTechnologies' external stop mounting hardware minimizes or eliminates stem and sealing performance problems caused by a faulty reinstallation of an operator on an automated valve.

Other options:

- Bi-directional shutoff
- Special end connections available
- Class V sealing in the reverse direction
- Tandem arrangements
- Complete automation packages available
- Characterized trim
- Oval hand wheel
- Actuator mounting

VALVE TESTING STANDARDS

MSS-SP-61

Seat leakage. The maximum allowable leakage of each seat closure shall be 10/ml/hr of liquid or 0.1 standard cu ft/hr of gas per unit of NPS (0.4 ml/hr of liquid or 120 standard ml/hr of gas per unit of DN) under specified test conditions.

Seat leakage test times:

2" and smaller = 15 seconds

2-1/2"-8" = 30 seconds

10" - 18" = 60 seconds

20" and larger = 120 seconds

ANSI FCI 70/2

Class V. 1.1 times cold working pressure allowable leakage, .0005 ml/min of water per inch of port diameter per psi differential

Class VI. 50 psi air or nitrogen, allowable leakage: 2" - 3 bpm*, 6" - 27 bpm*, 8" - 45 bpm*

Allow sufficient time for leakage flow to stabilize and use a suitable measuring device.

API 598

Allowable leakage shall be in accordance with this table:

Allowable Leakage			
Valve Size (NPS)	Liquid Test (dpm) ^a	Gas Test (bpm)	Min Test Duration (sec)
≤ 2"	0 ^b	0 ^b	15
2 1/2 - 6"	12	24	60
8 - 12"	20	40	120
≥ 14"	2 per inch NPS	4 per inch NPS	120

NOTES:

For liquid test, 1 millimeter is considered equivalent to 16 drops

There shall be no leakage for the specified test duration. For liquid test, 0 drops means no visible leakage per specified test duration. For gas test, 0 bubbles means less than one (1) bubble per specified test duration.

*bpm = bubbles per minute **dpm = drops per minute

ValvTechnologies' Testing Standard

There is not a single test specification that exceeds the ValvTechnologies' testing standard.

- Hydrostatic shell test 1.5 times cold working pressure for three minutes equals ZERO-leakage
- Hydrostatic seat test 1.1 times cold working pressure for three minutes equals ZERO-leakage
- Low pressure air seat, 50 psig for three minutes equals ZERO-leakage
- ASME/ANSI class 900 and higher nitrogen seat test at 1000 psig for three minutes equals ZERO-leakage
- ASME/ANSI class 3500 and higher nitrogen shell test at 4000 psig for three minutes equals ZERO-leakage
- 100% of ValvTechnologies valves built and shipped go through stringent testing to ensure absolute ZERO-leakage

STANDARD WARRANTY

Seller warrants the equipment of its own manufacture to be free of defects in material and workmanship, under normal use and proper operation, for a period of one year from date of shipment from Seller's plant. Seller's obligation under this warranty shall be strictly limited, at Seller's option, to : (i) furnishing replacement parts for, or repairing without charge to Purchaser, F.O.B. Houston, Texas; or (ii) repair, without charge to Purchaser, at costs comparable to Seller's normal manufacturing costs, those parts proven defective; or (iii) in discharge of Seller's maximum liability herewith, refunding all monies paid by Purchaser to Seller for the product and, at discretion of Seller, having the product transportation charges relative to corrective work, defective parts or replacement parts shall be borne by Purchaser. Purchaser shall give Seller immediate notice upon discovery of any defect. The undertaking of repairs or replacement by Purchaser or its agents without Seller's written consent shall relieve Seller of all responsibility herewith.

Finished materials and accessories purchased from other manufacturers are warranted only to the extent of manufacturer's warranty to Seller. Any alteration in material or design of Seller's product or components parts thereof by Purchaser, or other without written authorization by Seller, voids all obligations of Seller regarding the product and any associated warranty herein stated or implied.

Warranty responsibility for the entire valve/actuator assembly shall be assumed by the company selecting and/or mounting an operating device on a bare stem valve. Seller has the sole discretion to determine if an automated bare stem valve shall be within Seller's warranty obligation.

Seller's sole liability shall be exclusively as set forth herein, and Seller shall not be liable for any incidental or consequential damages due to its breach of any warranty herein contained, or otherwise. Without limitation to the foregoing, in no event shall Seller be liable for the loss of use of the product, or for the loss of use of any other product, process, plant, equipment, or facilities of the Purchaser or the end-user whether partially or wholly due to defects in material and/or design of Seller's product; and in no event shall Seller be liable for removal of appurtenances or incidentals such as connections, pipe work and similar items of obstruction or for any cost brought about by the necessity of removing the product from its point of installation.

Seller makes no warranty of any kind whatsoever, express or implied, other than as specifically stated herein; and there are no warranties of merchantability and/or fitness for a particular purpose which exceed the obligations and warranties specifically stated herein.

Parts furnished without charge as replacements for original parts under warranty are warranted for that period of time during which the original parts warranty is effective.

*Four-year, zero-leakage guarantee for steam and water applications

HVOF RITECH® COATINGS

Grade Designation	Composition % by Weight	Hardness DHP V300 Rockwell C	Metallographic Porosity % by Volume	Comparative Attributes Max Temperature
1	88 WC, 12 Co	1050-1250, 70-72	1 max	Outstanding for rubber wear. Good impact and thermal shock resistance.
10	83 WC, 17 Co	950-1150, 68-71	1/2 max	Excellent resistance to severe impact of sliding wear
21	86 WC, 10 Co / 4 Cr	1050-1250, 70-72	1 max	Outstanding for abrasive wear Superior acidic corrosion resistance
25	73 WC, 20 Ni / 7 Cr	950-1150, 68 - 72	1 max	Excellent corrosion and oxidation resistance Superior wear resistance
26	83 WC, 17 Ni	950-1150, 68-71	1 max	Outstanding sliding resistance Superior corrosion resistance
28	88 WC + 12 HAST C	1000-1200, 70-72	1 max	Outstanding corrosion resistance Excellent sliding wear resistance
31	80 Cr ₃ C ₂ , 20 Ni-Cr	850-1000, 66-69	1 max	Outstanding oxidation resistance Excellent sliding wear resistance
40	60 Co, 28 Mo, 9 Cr, 3 Si	500-600, 50-55	2	Good rubbing wear resistance Good corrosion and anti-galling properties
44	51 Co, 28 Mo, 18 Cr, 3 Si	500-600, 50-55	2	Good rubbing wear resistance Good corrosion and anti-galling properties
49	65 Co + 28 Cr + 4 1/2 W	600-700, 52-55	1 max	Good corrosion, medium wear resistance
50	16% Cr, 10Ni, 2 Mo, Bal Fe	343, 35	1 max	Superior corrosion resistance
60	57 Ni, 17 Mo, 16 Cr, 6 Fe, 4 W	353, 36	1	Outstanding corrosion resistance
62	71 Ni, 20 Cr, 8 Mo, .5 Fe, .4 Mn	301, 30	1	Outstanding corrosion resistance
65	100 Ni	200, 19	1 max	Excellent corrosion resistance
66	79 Ni, 11 Cr, 3 Fe, 4 Si, 2B, .4C	485 45-50	2	Outstanding corrosion resistance Good wear resistance
67	57 ni, 15 Cr, 17 W, 4 Si, 3B, 4 Fe, 8 C	700 58-63	2	Outstanding corrosion resistance Good wear resistance

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