A DOVER COMPANY

SURE SEAL INCORPORATED

SURE SEAL HIGH PERFORMANCE BUTTERFLY VALVES

SOFT SEAT • FIRE SAFE • METAL SEAT

Sure Seal, part of the OPW Fluid Transfer Group, offers a comprehensive selection of quality and long term economic solutions with High Performance Butterfly Valves for commercial and industrial applications. Available in a broad range of materials, sizes, and pressures our ISO 9001 Quality Systems insure that each valve Sure Seal supplies exceeds your application expectations.

Sure Seal manufactures patented butterfly valves and actuators used with industrial piping applications such as chemical, food processing, pulp and paper, shipbuilding, e-coat phosphate paint systems, transportation dry bulk market, and pharmaceutical applications. Sure Seal machines and manufactures all parts in house with modern advanced computer controlled machining centers to assure the highest standards in the industry. Every valve manufactured is tested to 110% of it's full pressure rating as standard. We also offer a complete patented line of hopper tee products, pipe couplers and an aeration system for powder bulk storage and pneumatic tank trailer industry.

SURE SEAL INCORPORATED IS PROUD TO BE ISO 9001 certified

Awards and Industry Recognition

ABS - American Bureau of Shipping

API - American Petroleum Institute

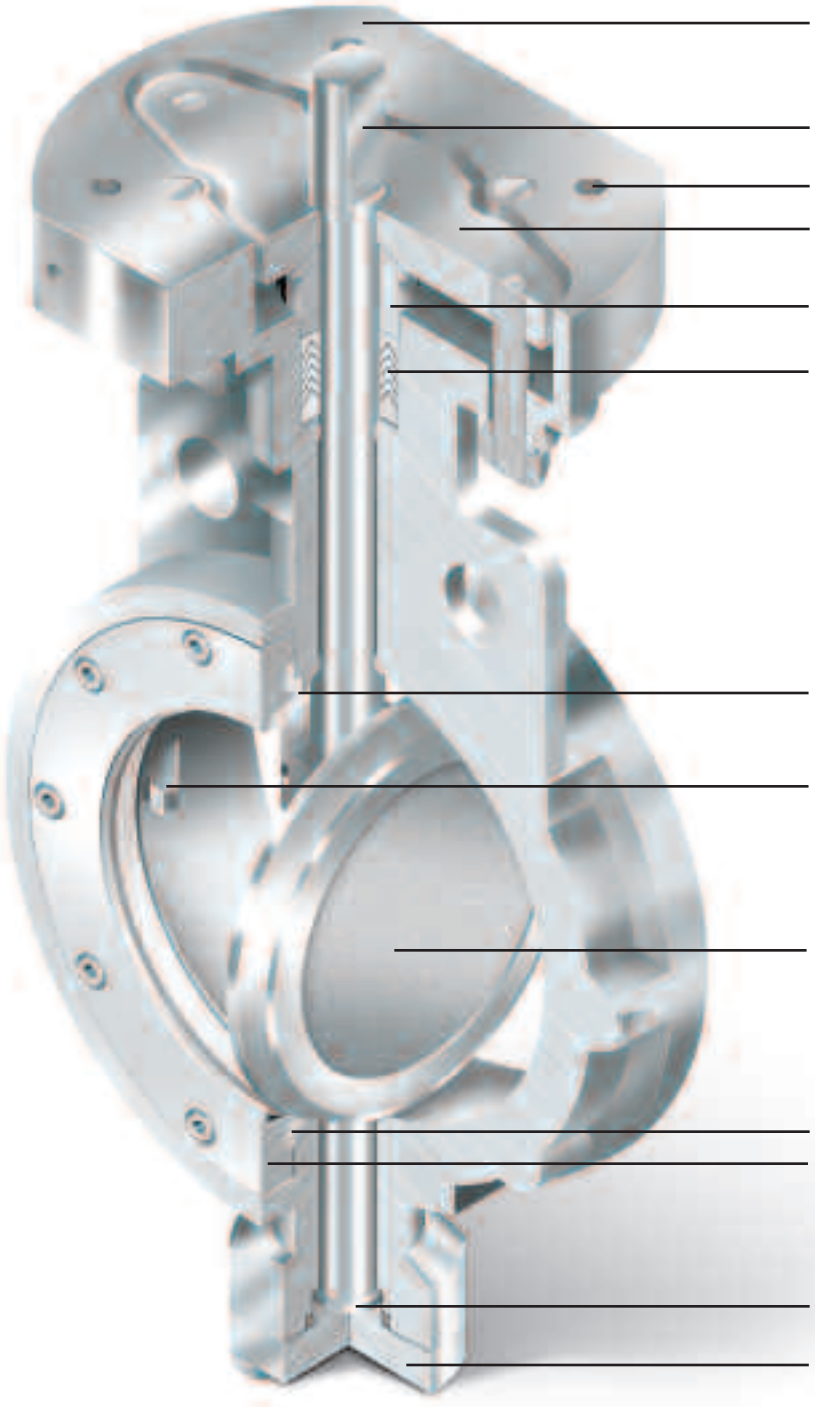
CE - Consultants Europe Certification

CRN - Canadian Registration Number

ISO - International Standards Organization

PED - Pressure Equipment Directive

DIRECT ACTUATOR MOUNTING



Sure Seal High Performance Valves have the features and benefits that are required in quality manufactured High Performance Butterfly Valves.

Direct Mount Actuation

Live Loaded Adjustable Packing

Uninterrupted Gasket Surface

Available in Different Seat Materials to 1200° F.

One Piece Through Shaft.

Welded Disc Pins

Integrally Cast Disc Stop

AVAILABLE SEATS

Soft Seated
High Performance Valve

Seat: PTFE (392°F/200°C)
R-PTFE (482°F/250°C)

Fire Safe
High Performance Valve

Seat: R-PTFE with 316SS (500°F/260°C)

Metal Seated
High Performance Valve

Seat: 316SS (<572°F/300°C)
Inconel/Stellite (<1202°F/650°C)
Inconel/ENP (<662°F/250°C)

PHONE: (800) 382-1604 • (573) 438-5000 • Fax: (573) 438-4853
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SOFT SEAT PARTS LIST

Part #	Designation	Material Description	ASTM #
1	Valve Body	Carbon Steel	A216 Gr WCB
		316 SS	A351 Gr CF8M
2	Insert Ring	Carbon Steel	AISI 1045
		316 SS	A276 Tp 316
3	Disc	316 SS	A351 Gr CF8M
		316/ENP SS	A351 Gr CF8M/ENP Plate
		316/Stellite SS	A351 Gr CF8M/Stellite Weld
4	Disc Pin	316 SS	A276 Tp 316
*5	Soft Seat	Teflon	PTFE
		Reinforced Teflon	RTFE
		Ultra High Molecular Weight Polyethleyne	UHMWPE
		Polyetherether Ketone	PEEK
6	Shaft	630 SS	17-4PH
		316 SS	A276 Tp 316
7	Shaft Bearing	316 SS & Reinforced Teflon	A240 Tp 316 & RTFE
8	Shaft Retainer	316 SS	A276 Tp 316
9	Shaft Spacer	316 SS	A276 Tp 316
10	Gland Flange	316 SS	A351 Gr CF8M
11	Packing Gland	316 SS	A276 Tp 316
*12	Gland Packing	Teflon	PTFE
		Grafoil	Grafoil
13	Packing Retainer	316 SS	A276 Tp 316
14	Bottom Plug	316 SS	A351 Gr CF8M
*15	Bottom Packing	Teflon	PTFE
		Grafoil	Grafoil
16	Stud Bolt	304 SS	A193 Gr B8
17	Hex Nut	304 SS	A194 Gr 8
18	Spring Washer	304 SS	A167 Tp 304
19	Wrench Bolt	304 SS	A193 Gr B8
20	Parallel Key	Carbon Steel	AISI 1045

*Recommended Spare parts.

METAL SEAT PARTS LIST

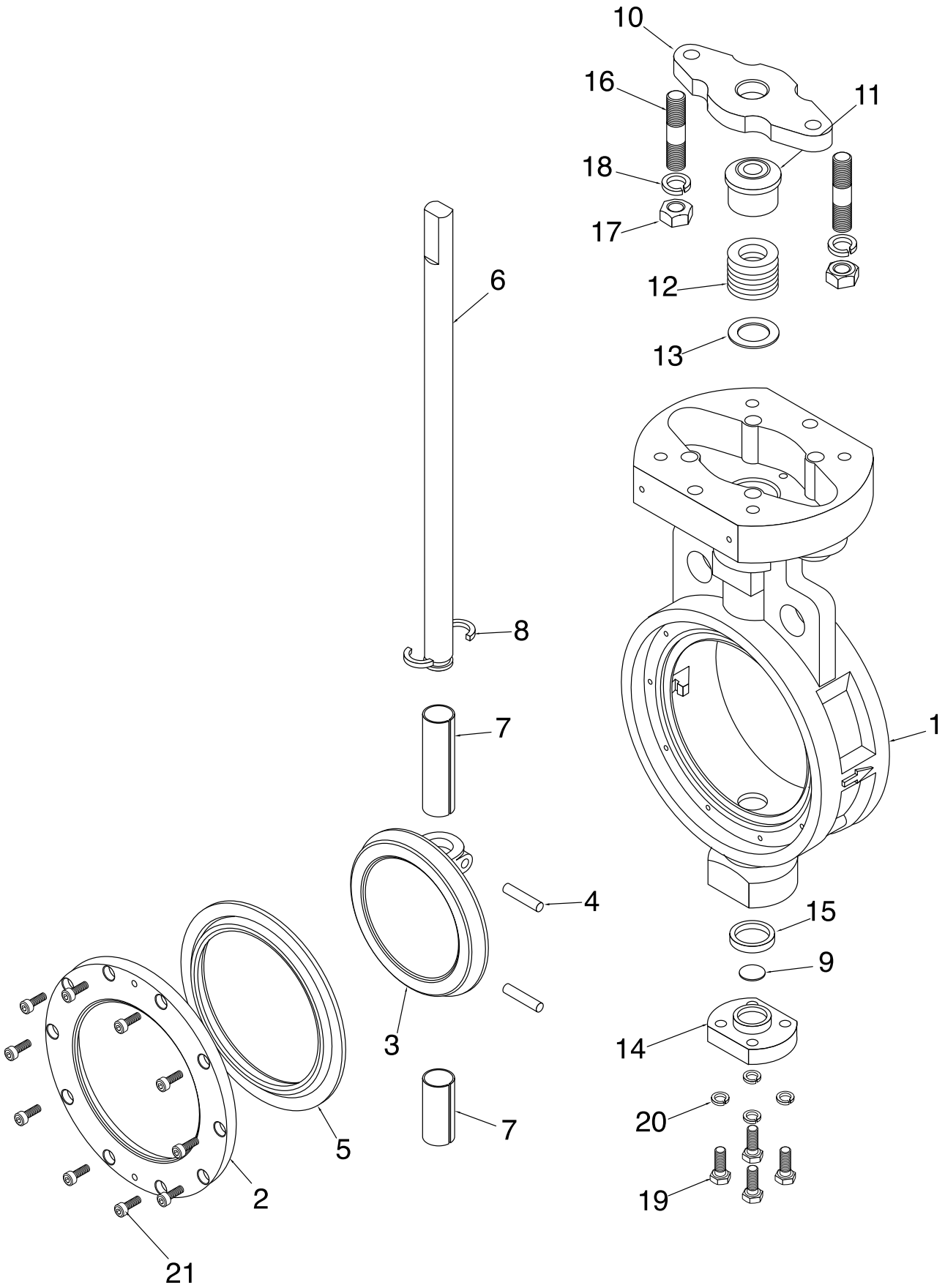
Part #	Designation	Material Description	ASTM #
1	Valve Body	Carbon Steel	A216 Gr WCB
		316 SS	A351 Gr CF8M
2	Insert Ring	Carbon Steel	AISI 1045
		316 SS	A276 Tp 316
3	Disc	316 SS	A351 Gr CF8M
		316/ENP SS	A351 Gr CF8M/ENP Plate
		316/Stellite SS	A351 Gr CF8M/Stellite Weld
4	Disc Pin	316 SS	A276 Tp 316
*5	Metal Seat	316 SS	A240 Tp 316
		Inconel	Inconel
6	Shaft	630 SS	17-4PH
		316 SS	A276 Tp 316
7	Shaft Bearing	316 SS & Reinforced Teflon	A240 Tp 316 & RTFE
8	Shaft Retainer	316 SS	A276 Tp 316
9	Shaft Spacer	316 SS	A276 Tp 316
10	Gland Flange	316 SS	A351 Gr CF8M
11	Packing Gland	316 SS	A276 Tp 316
*12	Gland Packing	Teflon	PTFE
		Grafoil	Grafoil
13	Packing Retainer	316 SS	A276 Tp 316
14	Bottom Plug	316 SS	A351 Gr CF8M
*15	Bottom Packing	Teflon	PTFE
		Grafoil	Grafoil
16	Stud Bolt	304 SS	A193 Gr B8
17	Hex Nut	304 SS	A194 Gr 8
18	Spring Washer	304 SS	A167 Tp 304
19	Wrench Bolt	304 SS	A193 Gr B8
20	Parallel Key	Carbon Steel	AISI 1045

*Recommended Spare parts.

FIRE SAFE SEAT PARTS LIST

Part #	Designation	Material Description	ASTM #
1	Valve Body	Carbon Steel	A216 Gr WCB
		316 Stainless Steel	A351 Gr CF8M
2	Insert Ring	Carbon Steel	AISI 1045
		316 SS	A276 Tp 316
3	Disc	316 SS	A351 Gr CF8M
		316/ENP SS	A351 Gr CF8M/ENP Plate
		316/Stellite SS	A351 Gr CF8M/Stellite Weld
4	Disc Pin	316 SS	A276 Tp 316
*5	Fire Seat	316 SS & Teflon	A240 Tp 316 & PTFE
		316 SS & Reinforced Teflon	A240 Tp 316 & RTFE
		Inconel & Teflon	Inconel & PTFE
		Inconel & Reinforced Teflon	Inconel & RTFE
6	Shaft	630 SS	17-4PH
		316 SS	A276 Tp 316
7	Shaft Bearing	316 SS & Reinforced Teflon	A240 Tp 316 & RTFE
8	Shaft Retainer	316 SS	A276 Tp 316
9	Shaft Spacer	316 SS	A276 Tp 316
10	Gland Flange	316 SS	A351 Gr CF8M
11	Packing Gland	316 SS	A276 Tp 316
*12	Gland Packing	Teflon	PTFE
		Grafoil	Grafoil
13	Packing Retainer	316 SS	A276 Tp 316
14	Bottom Plug	316 SS	A351 Gr CF8M
*15	Bottom Packing	Teflon	PTFE
		Grafoil	Grafoil
16	Stud Bolt	304 SS	A193 Gr B8
17	Hex Nut	304 SS	A194 Gr 8
18	Spring Washer	304 SS	A167 Tp 304
19	Wrench Bolt	304 SS	A193 Gr B8
20	Parallel Key	Carbon Steel	AISI 1045

*Recommended Spare parts.



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ANSI Class 150

Valve Size inch	mm	Unit	Cv Relating to the Angle of Disc Opening 10°	20°	30°	40°	50°	60°	70°	80°	90°
2	50	Cv	2.1	6.4	12.9	20.2	30.4	43.2	72	81	92
2.5	65	Cv	3	10.5	21	33	49.5	71	117	132	150
3	80	Cv	5.2	18.2	36.4	57.2	86	122	203	230	260
4	100	Cv	9.2	32.2	64.4	101	152	216	360	405	460
5	125	Cv	15.2	53.2	106	167	251	357	595	670	760
6	150	Cv	23	81	161	253	380	540	897	1015	1150
8	200	Cv	42	147	295	462	695	987	1640	1850	2100
10	250	Cv	64	225	450	705	1056	1505	2496	2816	3200
12	300	Cv	94	330	660	1035	1551	2210	3666	4136	4700
14	350	Cv	116	406	815	1276	1915	2726	4525	5105	5800
16	400	Cv	160	560	1120	1760	2640	3760	6240	7040	8000
18	450	Cv	210	735	1470	2310	3465	4935	8190	9240	10500
20	500	Cv	280	980	1960	3080	4620	6580	10920	12320	14000
24	600	Cv	420	1470	2940	4620	6930	9870	16380	18480	21000

*All values represented in US gallon per minute (GPM).

ANSI Class 300

Valve Size inch	mm	Unit	Cv Relating to the Angle of Disc Opening 10°	20°	30°	40°	50°	60°	70°	80°	90°
2	50	Cv	1.8	6.4	12.9	20.2	30.4	43.2	72	81	92
2.5	65	Cv	3	10.5	21	33	49.5	71	117	132	150
3	80	Cv	5.2	18.2	36.5	57.2	86	122	203	230	260
4	100	Cv	9.2	32.2	64.5	101	152	216	360	405	460
5	125	Cv	15.2	53.2	106	167	251	357	595	670	760
6	150	Cv	23	81	161	253	380	540	987	1015	1150
8	200	Cv	38	133	266	418	627	895	1485	1675	1900
10	250	Cv	56	196	392	616	925	1316	2185	2465	2800
12	300	Cv	82	287	575	905	1355	1930	3200	3610	4100
14	350	Cv	110	385	770	1210	1815	2585	4290	4840	5500
16	400	Cv	152	532	1065	1675	2510	3575	5930	6690	7600
18	450	Cv	198	695	1390	2180	3270	4655	7725	8715	9900
20	500	Cv	260	910	1820	2860	4290	6110	10140	11440	13000
24	600	Cv	390	1365	2730	4290	6435	9165	15210	17160	19500

*All values represented in US gallon per minute (GPM).

Basic Formulas for Cv Value

Fluids	Pressure Condition	Cv Value
Liquid	n/a	$Cv = 1.17Q\sqrt{\frac{G_s}{\Delta P}}$
Gas	$\Delta P < 0.5P_1$	$Cv = \frac{Q}{272}\frac{\sqrt{G_s(T+273)}}{\sqrt{\Delta P(P_1+P_2)}}$
	$\Delta P \geq 0.5P_1$	$Cv = \frac{Q\sqrt{G_s(T+273)}}{236P_1}$
Steam	$\Delta P < 0.5P_1$	$Cv = \frac{WK}{13.5\sqrt{\Delta P(P_1+P_2)}}$
	$\Delta P \geq 0.5P_1$	$Cv = \frac{WK}{11.9P_1}$

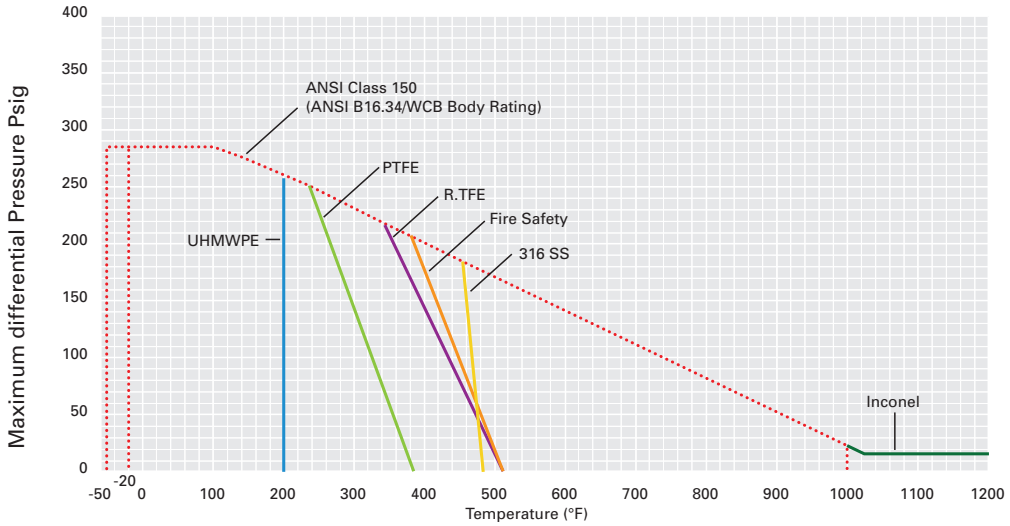
Legend

- Q : volume rate of flow (liquid m^3/h, gas Nm^3/h)
- W : volume rate of flow (steam kg/h)
- P_1 : inlet pressure (liquid kgf/cm^2, gas/steam kgf/cm^2 abs.)
- P_2 : outlet pressure (liquid kgf/cm^2, gas/steam kgf/cm^2 abs.)
- ΔP : pressure drop P_1-P_2
- G_s : specific gravity of fluid
- T : temperature of fluid (°C)
- K : correction coefficient to superheat 1 + 0.0013 x deg. °C of superheat

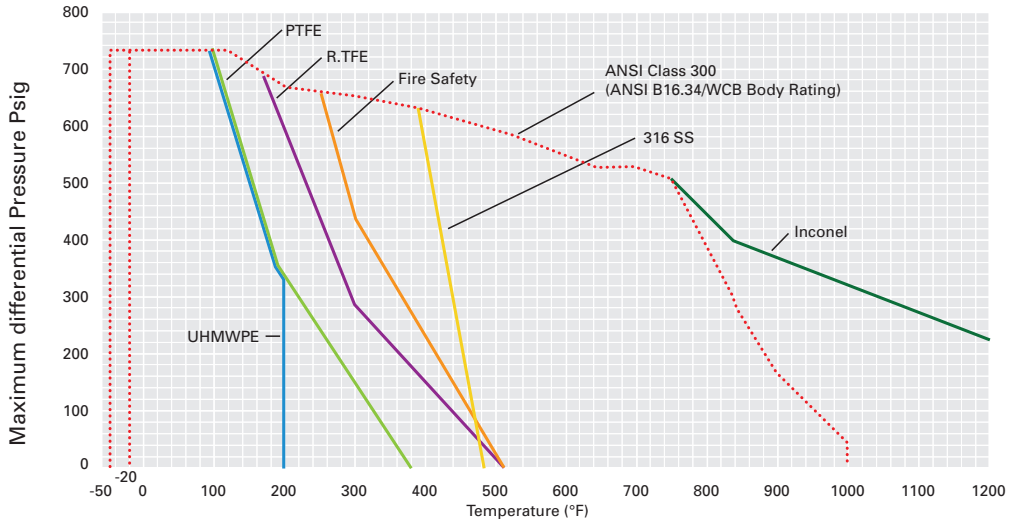
* When $P_2 < 0.5P_1$, use $0.5P_1$ instead of ΔP

Seat Rating

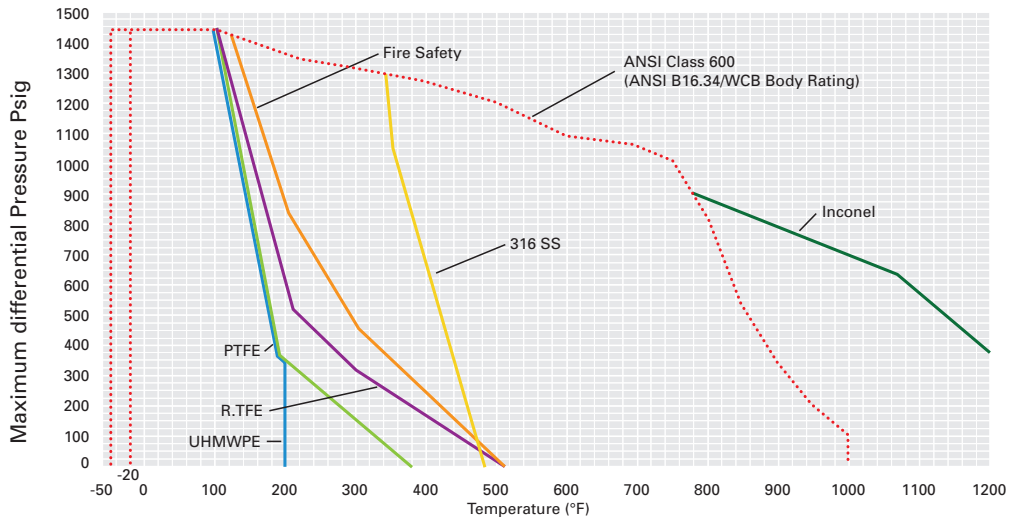
ANSI Class 150



ANSI Class 300



ANSI Class 600



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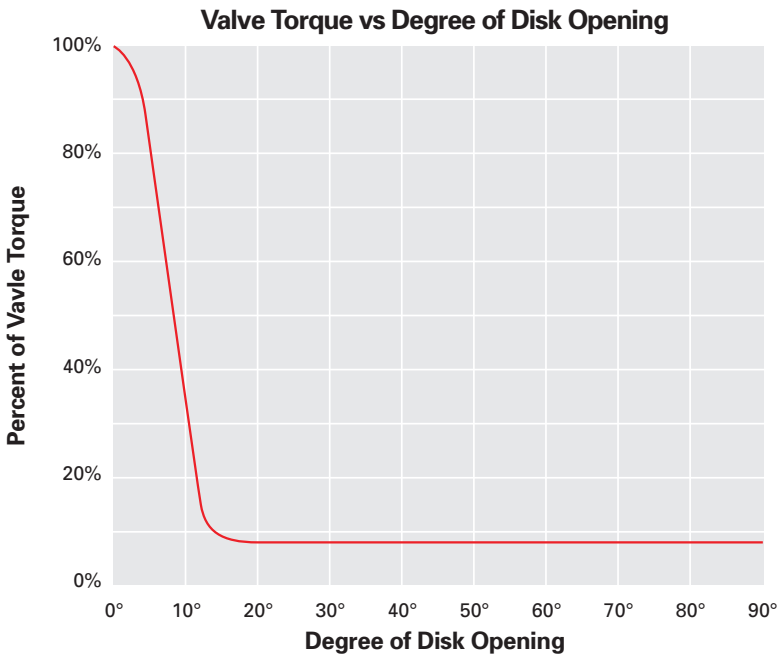
VALVE TORQUE TABLES - ANSI CLASS 150

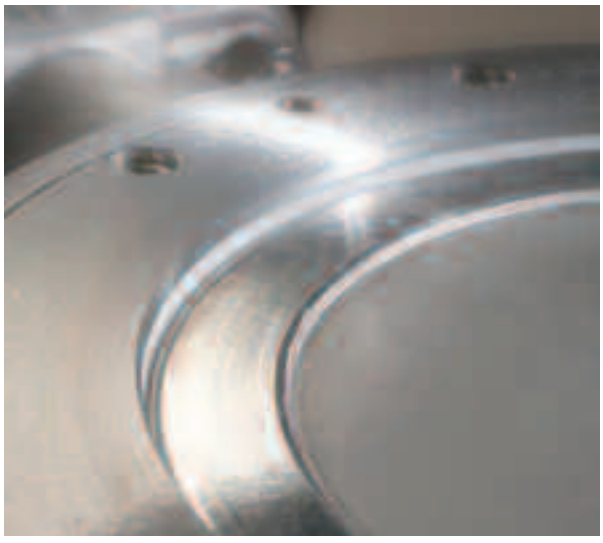
Size		Soft Seated					Fire Safe				Metal Seated			
in	mm	0 Psi	75 Psi	150 Psi	225 Psi	285 Psi	75 Psi	150 Psi	225 Psi	285 Psi	75 Psi	150 Psi	225 Psi	285 Psi
2"	50	200	225	250	266	276	350	380	389	399	446	483	496	508
2.5"	65	210	235	265	275	305	370	395	410	420	474	505	520	535
3"	80	222	249	276	292	334	394	414	428	438	501	527	545	558
4"	100	265	313	361	414	489	535	584	608	633	682	744	774	805
5"	130	377	430	483	531	690	633	730	755	803	805	929	960	1022
6"	150	401	517	633	743	805	779	828	876	949	991	1053	1115	1208
8"	200	477	796	1115	1177	1363	1193	1314	1460	1606	1518	1673	1859	2045
10"	250	960	1301	1642	1982	2292	1752	2045	2410	2677	2230	2602	3067	3408
12"	300	1238	1796	2354	2911	3470	2191	2823	3456	4138	2788	3594	4399	5266
14"	350	1899	2704	3509	4487	5700	3894	5112	6328	7545	4957	6505	8054	9603
16"	400	2359	3682	5005	6372	8364	4868	6815	8032	9493	6196	8674	10233	12082
18"	450	3345	5080	6815	8342	10842	6815	8762	10710	13144	8674	11152	13631	16728
20"	500	5620	6505	10267	11152	15578	7789	10223	13144	16065	11329	14870	19118	23367
24"	600	7080	11329	15578	19472	23367	14095	18410	22725	27615	17348	22659	27969	33988

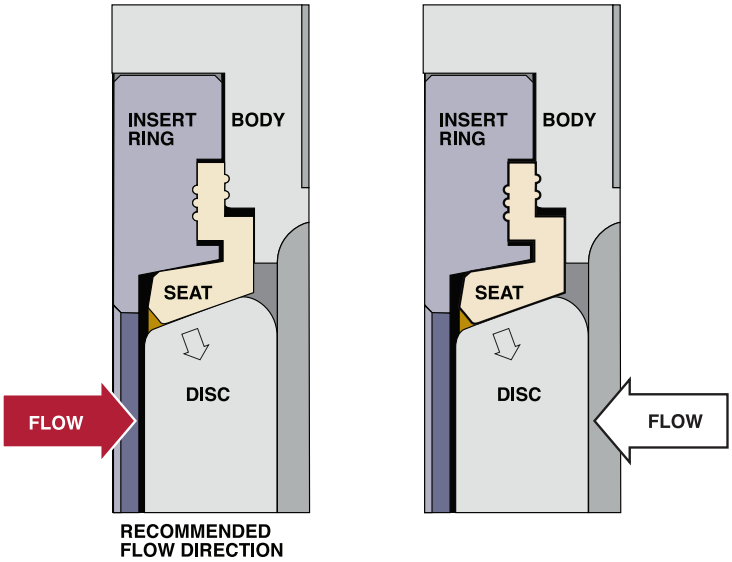
VALVE TORQUE TABLES - ANSI CLASS 300

Size		Soft Seated						Fire Safe						Metal Seated					
in	mm	150 Psi	285 Psi	400 Psi	500 Psi	600 Psi	700 Psi	150 Psi	285 Psi	400 Psi	500 Psi	600 Psi	700 Psi	150 Psi	285 Psi	400 Psi	500 Psi	600 Psi	700 Psi
2"	50	270	299	341	359	366	372	414	435	451	467	478	489	518	544	564	584	597	611
2.5"	65	282	315	360	381	390	403	433	457	478	494	505	537						
3"	80	299	334	378	403	415	434	451	478	505	520	531	584	564	597	631	651	664	730
4"	100	391	489	564	595	620	682	637	690	743	797	876	929	797	863	929	996	1095	1162
5"	130	524	690	744	805	867	960	797	876	956	1009	1089	1168	996	1095	1195	1261	1361	1460
6"	150	682	748	960	1053	1115	1177	903	1036	1168	1248	1328	1434	1129	1294	1460	1560	1660	1792
8"	200	1115	1363	1518	1642	1735	1921	1434	1752	1965	2124	2284	2390	1792	2191	2456	2655	2854	2987
10"	250	1759	2456	2726	3036	3222	3594	2230	2921	3399	3664	3877	4142	2788	3651	4248	4580	4846	5178
12"	300	2523	3717	4213	4709	5080	5452	3080	4514	6372	6904	7700	9028	3850	5643	7966	8630	9625	11285
14"	350	4049	6107	7966	9625	9957	10953	6041	8917	10356	11506	13232	14383	6970	10289	11949	13277	15268	16596
16"	400	5775	8962	10953	11949	13277	14604	8064	11219	14383	16684	18985	20136	9294	12945	16596	19251	21906	23234
18"	450	7302	11617	14604	15932	17259	18587	10356	15534	19561	22725	25889	28478	11949	19723	22570	26221	29872	32859
20"	500	10909	16551	19472	20888	23013	24783	13011	20446	26022	30979	35315	38413	15799	24827	31598	37617	42883	46645
24"	600	16551	24827	28323	31864	35050	37528	19826	29739	37174	44609	50185	55761	24075	36112	45140	54168	60939	67710



NOTE: All torques are in inch pounds.

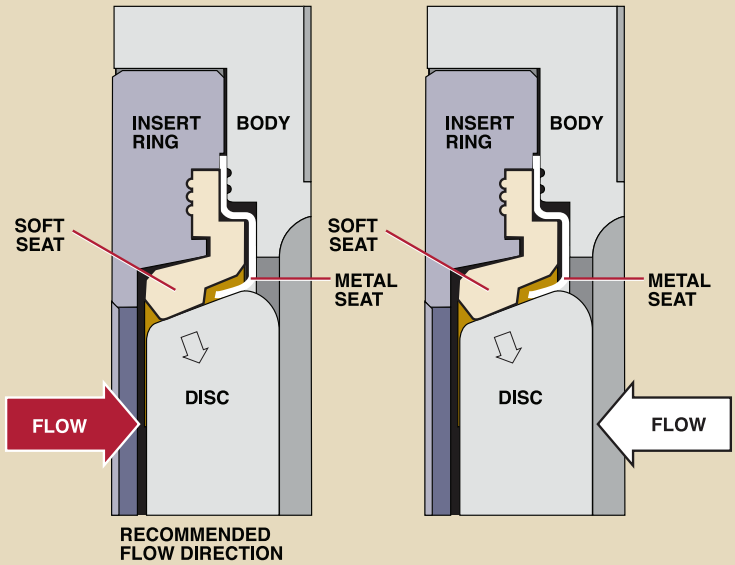




Soft Seated

High Performance Valve

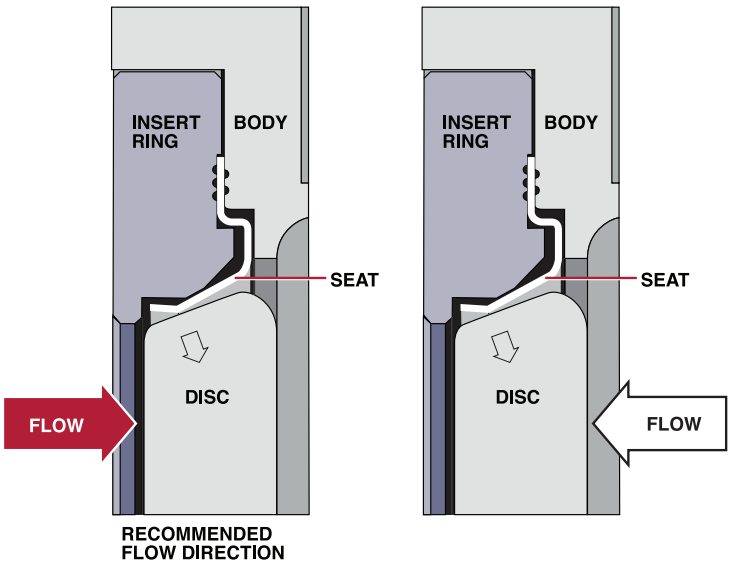
Elasticity of the seat and fluid pressure assures perfect "bubble-tight" sealing.



Fire Safe

High Performance Valve

After a fire when the R-PTFE seat has burned away, the supplementary metal sealing seat activates automatically and prevents excessive flow.



Metal Seated

High Performance Valve

This version offers very high sealing capability with an unusually low leakage rate.

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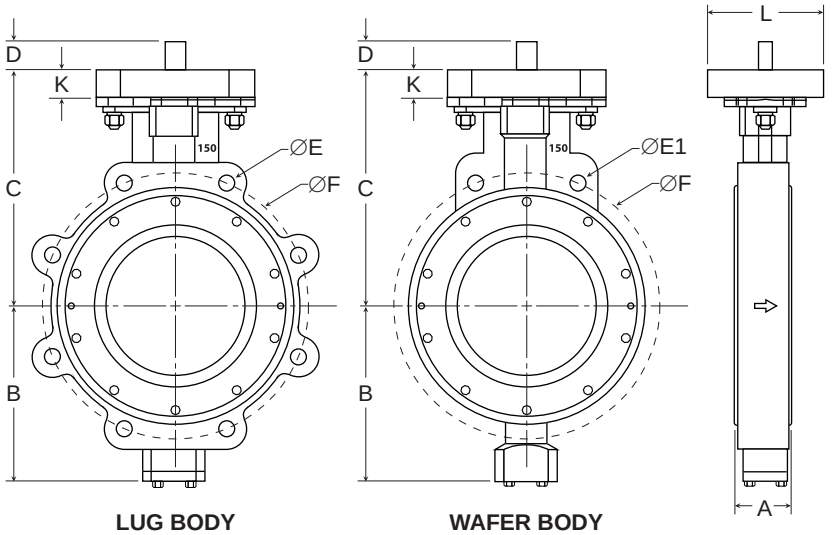

ANSI 150 HIGH PERFORMANCE VALVES

in	mm	A	B	C	D	E	E1	F	G	H	I	J	K	L
2"	50	1.69	3.94	5.78	1.25	4 X 5/8 – 11	2 X 3/4	4.75	2.76	.37	.500	.375	1.25	4.15
2.5	65	1.81	4.06	6.49	1.25	4 X 5/8 – 11	2 X 3/4	5.00	2.76	.37	.625	.438	1.25	4.15
3"	80	1.88	4.37	6.77	1.25	4 X 5/8 – 11	2 X 3/4	6.00	2.76	.37	.625	.438	1.25	4.15
4"	100	2.12	4.80	6.98	1.25	8 X 5/8 – 11	2 X 3/4	7.50	2.76	.37	.625	.438	1.25	4.15
5"	125	2.25	6.38	8.39	1.25	8 X 3/4 – 10	2 X 7/8	8.50	2.76	.37	.750	.500	1.25	4.15
6"	150	2.25	5.97	8.71	1.25	8 X 3/4 – 10	2 X 7/8	9.50	2.76	.37	.750	.500	1.25	4.15
8"	200	2.50	7.76	10.43	1.25	8 X 3/4 – 10	2 X 7/8	11.75	4.02	.44	.875	.625	1.60	5.12
10"	250	2.83	8.61	11.81	2.00	12 X 7/8 – 9	2 X 1	14.25	4.92	.56	1.125	1/4 X 1/4	1.00	5.25
12"	300	3.19	10.63	12.80	2.00	12 X 7/8 – 9	2 X 1	17.00	4.92	.56	1.125	1/4 X 1/4	1.00	5.25
14"	350	3.62	11.68	16.03	2.25	12 X 1 – 8	2 X 1⅛	18.75	4.92	.56	1.375	5/16 X 5/16	1.00	5.25
16"	400	4.00	13.78	16.73	3.00	16 X 1 – 8	2 X 1⅛	21.25	6.50	.81	1.875	3/8 X 1/2	1.88	6.50
18"	450	4.50	14.76	17.72	3.00	16 X 1⅛ – 8	4 X 1⅛ – 8	22.75	6.50	.81	1.875	3/8 X 1/2	1.88	6.50
20"	500	5.00	16.43	18.94	3.00	20 X 1⅛ – 8	4 X 1⅛ – 8	25.00	6.50	.81	2.125	1/2 X 1/2	2.00	6.50
24"	600	6.06	19.37	23.23	4.00	20 X 1¼ – 8	4 X 1¼ – 8	29.50	6.50	.81	2.555	3/4 X 1/2	2.50	11.02

ANSI 300 HIGH PERFORMANCE VALVES

in	mm	A	B	C	D	E	E1	F	G	H	I	J	K	L
2"	50	1.69	3.94	5.78	1.25	8 X 5/8 – 11	8 X .67	5.00	2.76	.37	.500	.375	1.25	4.15
2.5	65	1.81	4.06	6.49	1.25	4 X 5/8 – 11	2 X 3/4	5.00	2.76	.37	.625	.438	1.25	4.15
3"	80	1.88	4.37	6.77	1.25	8 X 3/4 – 10	2 X 7/8	6.62	2.76	.37	.625	.438	1.25	4.15
4"	100	2.12	4.80	6.98	1.25	8 X 3/4 – 10	2 X 7/8	7.88	2.76	.37	.625	.438	1.25	4.15
5"	125	2.25	6.38	8.37	1.25	8 X 3/4 – 10	2 X 7/8	9.25	2.76	.37	.750	.500	1.25	4.15
6"	150	2.31	7.75	9.53	1.25	12 X 3/4 – 10	4 X 1 – 8	10.62	2.76	.37	.750	.500	1.25	4.15
8"	200	2.88	8.91	11.42	2.00	12 X 7/8 – 9	2 X 1	13.00	4.02	.44	1.125	1/4 X 1/4	2.00	5.12
10"	250	3.25	9.88	12.32	2.00	16 X 1 – 8	4 X 1 – 8	15.25	4.92	.56	1.125	1/4 X 1/4	1.00	5.25
12"	300	3.62	11.00	13.90	3.00	16 X 1⅛ – 8	4 X 1⅛ – 8	17.75	4.92	.56	1.625	3/8 X 3/8	1.00	5.25
14"	350	4.62	12.60	15.95	3.00	20 X 1⅛ – 8	4 X 1⅛ – 8	20.25	6.50	.83	1.875	3/8 X 1/2	2.00	6.50
16"	400	5.25	15.83	18.31	3.00	20 X 1¼ – 8	4 X 1¼ – 8	22.50	6.50	.83	1.875	3/8 X 1/2	2.00	6.50
18"	450	5.88	16.81	19.29	4.00	24 X 1¼ – 8	4 X 1¼ – 8	24.75	10.00	.75	2.555	3/4 X 1/2	2.25	11.02
20"	500	6.25	18.70	22.44	4.00	24 X 1¼ – 8	4 X 1¼ – 8	27.00	10.00	.75	2.555	3/4 X 1/2	2.25	11.02
24"	600	7.12	21.65	24.92	4.00	24 X 1½ – 8	4 X 1½ – 8	32.00	10.00	.75	2.555	3/4 X 1/2	2.25	11.02

WEIGHT (CL. 150) UNIT: POUNDS (LBS.)

Valve Size Inch	mm	WAFER (Bare Shaft) WCB	CF8(M)	LUG (Bare Shaft) WCB	CF8(M)	Manual Actuator Lever	Worm Gear
2"	50	10	12	12	12.5	3.5	18.8 (24:1)
2.5"	65	12	13	15	16		
3"	80	14	15	18	18		
4"	100	17	18	29	31		
5"	125	23	25	36	38	4.9	
6"	150	29	31	42	44		
8"	200	44	46	66	68	-	38 (30:1)
10"	250	71	73	102	104		
12"	300	93	97	146	148		
14"	350	128	143	199	201	-	
16"	400	187	203	300	309		92 (50:1)
18"	450	218	240	335	346		
20"	500	333	344	408	426		
24"	600	545	554	650	675		149(64:1)

*Flange up to 24 inch according to ANSI B16.5 class 150.
from 26 inch according to MSS SP-44 class 150.

WEIGHT (CL. 300) UNIT: POUNDS (LBS.)

Valve Size Inch	mm	WAFER (Bare Shaft) WCB	CF8(M)	LUG (Bare Shaft) WCB	CF8(M)	Manual Actuator Lever	Worm Gear
2"	50	13	13.5	13.5	14	3.5	18.8 (24:1)
2.5"	65	13.5	14	20	21		
3"	80	14	15	26	27		
4"	100	16	18	48	49		
5"	125	25	27	54	60	4.9	38 (30:1)
6"	150	34	35	60	71		
8"	200	66	71	117	121	-	
10"	250	108	112	141	143		
12"	300	146	150	216	216		
14"	350	247	260	362	364		92 (50:1)
16"	400	364	388	595	600		
18"	450	445	474	717	666		149 (64:1)
20"	500	569	595	926	959		
24"	600	895	926	1455	1506		212 (78:1)

*Flange up to 24 inch according to ANSI B16.5 class 300.
from 26 inch according to MSS SP-44 class 300.

SURE SEAL VALVE STANDARDS

STANDARDS

ASME B16.10	Valves - face to face dimensions
ASME B16.34	Valves - flanged and butt-welding ends
ASME B16.5	Pipe flanges and flanged fittings
ASME/FCI 70-2	American National standard for control valve seat leakage
MSS SP68	High Pressure - offset seat butterfly valves
ISO 5752	Metal valves for use in flanged pipe systems - face-to-face & center-to-face dimensions
API 609	"Butterfly valves, lug-type and wafer-type"
MSS SP61	Pressure testing
NACE MR-01-75	
P.E.D. 97/23/EC	European pressure equipment directive.
ISO 9001 Cert.	
ANSI B16.104	Leakage rate for metal seated valves.
ISO 5211	Top plate mounting dimensions
API 598	Pressure testing
MSS SP22	Valve tagging and marking

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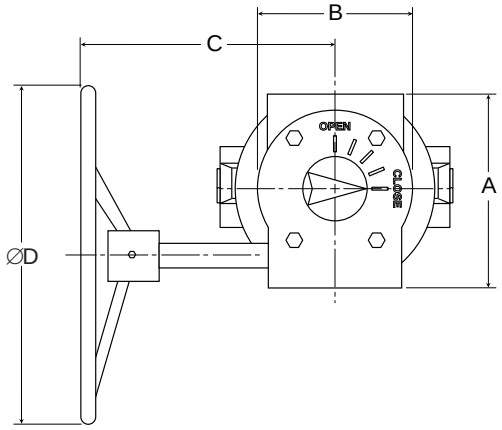
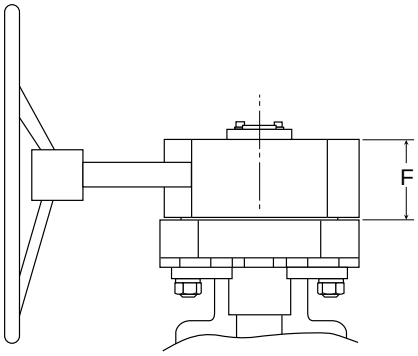
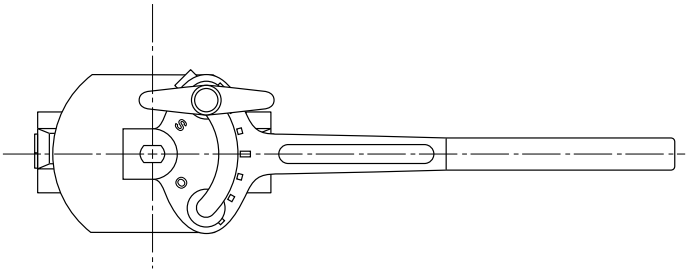
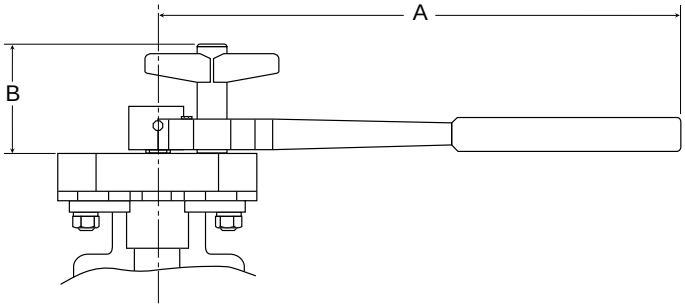
Gear Operator available for 2" - 24" sizes



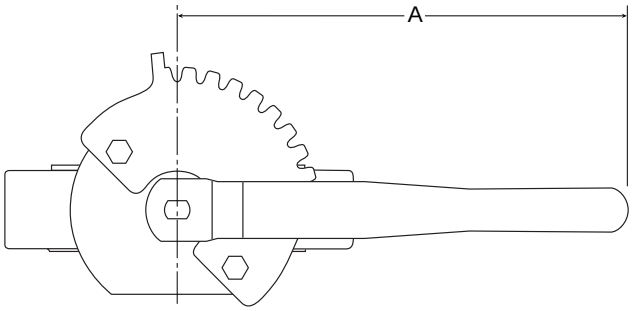


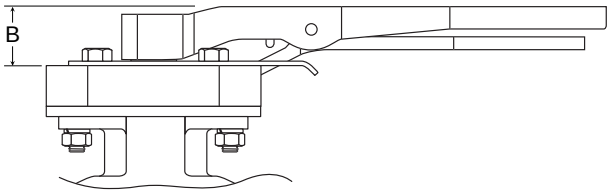
Handle available for 2" - 8" sizes





10 Position Handle available for 2" - 6" sizes





GEAR OPERATOR

in	mm	A	B	C	D	E
2"-6"	50-150	5.07	4.00	5.70	8"	2.65
8"-14"	200-350	6.09	6.00	9.50	12"	3.00
16"-20"	400-500	7.80	6.70	9.00	12" or 16"	3.00
24"	600	11.50	10.25	11.75	16" or 24"	4.40

HANDLE

in	mm	A	B
2	50	11.6	2.88
2.5"-6"	65-150	13.8	2.88
8"	200	19.7	2.88

10 POSITION HANDLE

in	mm	A	B
2"-6"	50-150	13.75	1.55

NUMBERING GUIDE

XX - XXX - XXXX - SSX - XX

Size

Series

G - Soft Seat
F - Fire Safe
M - Metal Seat

ANSI Class

1 - 150
3 - 300
6 - 600

Body Style

W - Wafer
L - Lug

Body Material

C - Carbon
S - 316 Stainless

Disc

S - 316 Stainless
E - 316/ENP
T - 316/Stellite

Shaft

S - 17-4 Stainless
3 - 316 Stainless

Seat

F - RTFE/316 Stainless
R - RTFE
S - 316 Stainless
I - Inconel
H - UHMWPE
P - PTFE
K - PEEK
U - RTFE/Inconel
O - PTFE/316 Stainless

Operator

H - Infinite Handle (standard)
H10 - 10 Position Handle (optional)
G - Worm Gear

Specials

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LUGGED TYPE

Unit: Inch

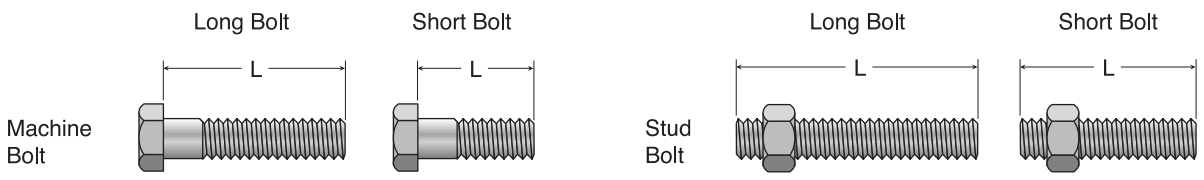
ANSI CLASS 150

Size			Long Bolt			Short Bolt		
				Length			Length	
in	mm	Bolt Size	Qty.	Machine	Stud	Qty.	Machine	Stud
2"	50	5/8" - 11 unc	8	1.375	2.375	–	–	–
2.5"	65	5/8" - 11 unc	8	1.500	2.625	–	–	–
3"	80	5/8" - 11 unc	8	1.875	2.750	–	–	–
4"	100	5/8" - 11 unc	16	1.875	2.750	–	–	–
5"	125	3/4" - 10 unc	16	2.000	3.250	–	–	–
6"	150	3/4" - 10 unc	16	2.000	3.250	–	–	–
8"	200	3/4" - 10 unc	16	1.125	3.375	–	–	–
10"	250	7/8" - 8 unc	24	2.375	3.750	–	–	–
12"	300	7/8" - 8 unc	24	2.500	4.000	–	–	–
14"	350	1" - 8 unc	24	2.750	4.375	–	–	–
16"	400	1" - 8 unc	32	2.875	4.625	–	–	–
18"	450	1 1/8" - 8 un	24	3.250	5.000	8	2.875	5.000
20"	500	1 1/8" - 8 un	32	3.250	5.125	8	2.750	4.750
24"	600	1 1/4" - 8 un	32	3.625	5.625	8	3.125	5.125

Unit: Inch

ANSI CLASS 300

Size			Long Bolt			Short Bolt		
				Length			Length	
in	mm	Bolt Size	Qty.	Machine	Stud	Qty.	Machine	Stud
2"	50	5/8" - 11 unc	16	1.500	2.625	–	–	–
2.5"	65	3/4" - 10 unc	16	1.750	3.250	–	–	–
3"	80	3/4" - 10 unc	16	2.000	3.375	–	–	–
4"	100	3/4" - 10 unc	16	2.375	3.750	–	–	–
5"	125	3/4" - 10 unc	16	2.500	4.000	–	–	–
6"	150	3/4" - 10 unc	24	2.500	4.000	–	–	–
8"	200	7/8" - 8 unc	24	2.875	4.625	–	–	–
10"	250	1" - 8 unc	24	3.250	5.125	8	2.750	4.250
12"	300	1 1/8" - 8 un	32	3.750	5.750	8	3.125	5.000
14"	350	1 1/8" - 8 un	32	3.750	6.000	8	3.125	5.125
16"	400	1 1/4" - 8 un	32	4.125	6.375	8	3.250	5.375
18"	450	1 1/4" - 8 un	40	4.250	6.375	8	3.250	5.375
20"	500	1 1/4" - 8 un	40	4.500	6.500	8	3.500	5.625
24"	600	1 1/2" - 8 un	40	5.125	7.500	8	3.500	6.375



WAFER TYPE

Unit: Inch

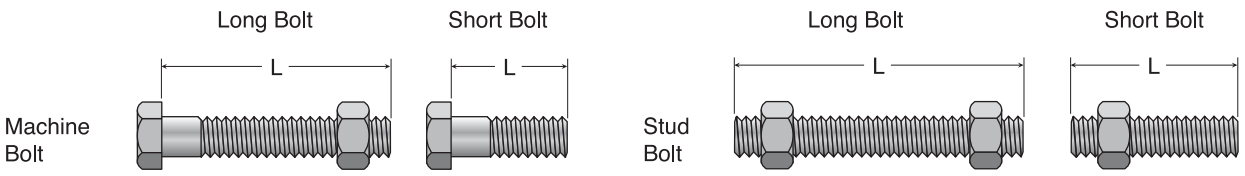
ANSI CLASS 150

Size			Long Bolt			Short Bolt		
				Length			Length	
in	mm	Bolt Size	Qty.	Machine	Stud	Qty.	Machine	Stud
2"	50	5/8" - 11 unc	4	4.625	5.375	–	–	–
2.5"	65	5/8" - 11 unc	4	5.000	5.750	–	–	–
3"	80	5/8" - 11 unc	4	5.125	6.000	–	–	–
4"	100	5/8" - 11 unc	8	5.375	6.125	–	–	–
5"	125	3/4" - 10 unc	8	5.625	6.750	–	–	–
6"	150	3/4" - 10 unc	8	5.750	6.875	–	–	–
8"	200	3/4" - 10 unc	8	6.375	7.375	–	–	–
10"	250	7/8" - 8 unc	12	6.875	8.125	–	–	–
12"	300	7/8" - 8 unc	12	7.500	8.750	–	–	–
14"	350	1" - 8 unc	12	8.375	9.875	–	–	–
16"	400	1" - 8 unc	16	8.875	10.250	–	–	–
18"	450	1 1/8" - 8 un	12	9.750	11.500	8	2.875	5.000
20"	500	1 1/8" - 8 un	16	10.500	12.250	8	2.750	4.750
24"	600	1 1/4" - 8 un	16	12.250	14.000	8	3.125	5.125

Unit: Inch

ANSI CLASS 300

Size			Long Bolt			Short Bolt		
				Length			Length	
in	mm	Bolt Size	Qty.	Machine	Stud	Qty.	Machine	Stud
2"	50	5/8" - 11 unc	8	4.750	5.750	–	–	–
2.5"	65	3/4" - 10 unc	8	5.375	6.375	–	–	–
3"	80	3/4" - 10 unc	8	5.750	8.750	–	–	–
4"	100	3/4" - 10 unc	8	6.125	7.375	–	–	–
5"	125	3/4" - 10 unc	8	6.500	7.375	–	–	–
6"	150	3/4" - 10 unc	12	6.750	7.875	–	–	–
8"	200	7/8" - 8 unc	12	7.875	9.125	–	–	–
10"	250	1" - 8 unc	12	8.875	10.500	8	2.750	4.250
12"	300	1 1/8" - 8 un	12	9.750	11.500	8	3.125	5.000
14"	350	1 1/8" - 8 un	16	11.125	12.875	8	3.125	5.125
16"	400	1 1/4" - 8 un	16	12.000	13.875	8	3.250	5.375
18"	450	1 1/4" - 8 un	20	12.875	14.875	8	3.250	5.375
20"	500	1 1/4" - 8 un	20	13.500	15.375	8	3.500	5.625
24"	600	1 1/2" - 8 un	20	15.250	17.625	8	3.500	6.375



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DESIGN DETAILS

The Sure Seal High Performance Butterfly Valve is a double eccentric (double offset) design. This design minimizes torque and increases valve service life by decreasing seat to disc interference through out the disc travel. Valves are available in wafer and lug design for ASME Class 150 and 300 (2”-24”) and ASME Class 600 (2”-12”). The valve is bi-directional by design but has a recommended flow direction which is clearly marked on the valve body.

PRE-INSTALLATION INSPECTION AND PREPARATION

Before installation of the valve into the pipeline it is recommended to inspect the valve as follows:

1. Check for any damage that might have occurred during shipping.
2. *Review metal tag attached to valve to ensure design, pressure class and material of construction meet required application.
3. Remove the protective covers from the face of the valve, and clean or remove any foreign particles from the machined face of the valve. This is the gasket sealing area, keeping it clean will ensure proper sealing after installation.
4. Cycle the valve from the closed to fully open position to ensure that travel stops are adjusted to provide complete travel. The valve operates counterclockwise to open and clockwise to close. A disc stop is an integral part of the valve design to stop over travel in a clockwise rotation. This stop should not be used for closure adjustment. If the valve disc is in contact with the stop the disc has traveled beyond the optimal sealing position.
5. Close valve. The valve should be in the closed position during installation to prevent damage to the disc sealing surface.

*Note: The metal tag affixed to every Sure Seal High Performance Butterfly Valve is equipped with the valve size, pressure class and materials of construction. A second metal tag with an individualized serial number is also attached to allow tracking of the valve with regard to pressure test, assembly date and material test reports.

PIPELINE INSPECTION AND PREPARATION

1. Remove any foreign materials such as rust, welding slag, or welding wire from the pipeline.
2. Clean the pipe flange to ensure good gasket contact
3. Check pipe and pipe flange I.D. to ensure adequate disc clearance.

WARNING:

Failure to properly clean the piping before start up can result in damage to the disc or seat , this could cause premature leakage and shorten the life expectancy of the valve.

INSTALLATION TOOLS

Installation tools are not included with the purchase of the Sure Seal High Performance Butterfly Valve. The only required tool for installation of valve is a wrench suitable to tighten flange bolts and/or nuts. A hoist may be required for valve sizes exceeding manageable weights.

REQUIRED BOLTING

The tables on page 14 and 15 outline size, type and quantity of bolting recommended for the installation of valve. Bolting is not supplied with the purchase of valve. Recommendations are based on pipe flanges in accordance with ASME B16.5.

FLANGE GASKET

Valve is designed to work with fiber gaskets of 1/16” or less and metallic wound gaskets.

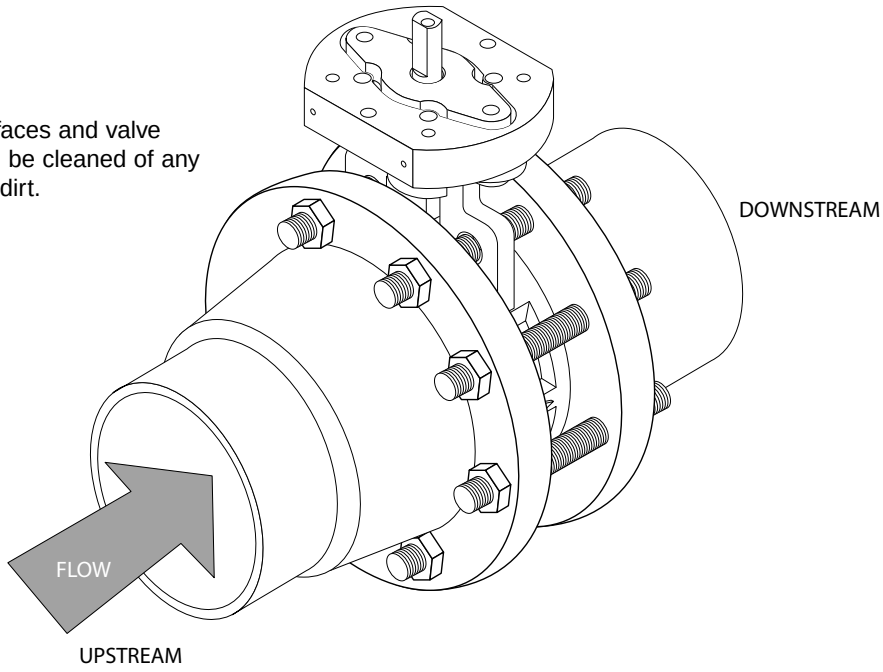
INSTALLATION

1. Ensure that disc is in the closed position
2. Be sure to identify the direction of flow arrow on the valve and place in service accordingly. For optimal performance and to extend valve life it is recommended installing the valve with the seat in the upstream position.
3. The valve can be installed in any position; horizontal, vertical or intermediate positions. For applications with solid particles present it is recommended to install the valve with the stem in the horizontal position.
4. Align gasket with the valve and pipe flange. Gaskets are not supplied with valve. Valve is designed to work with fiber gaskets of 1/16" or less and metallic wound gaskets.
5. Install lower flange bolts without tightening to support valve between flanges.
6. Place remaining bolts through flanges and tighten in a diagonal or cross pattern to ensure uniform compression of gasket.

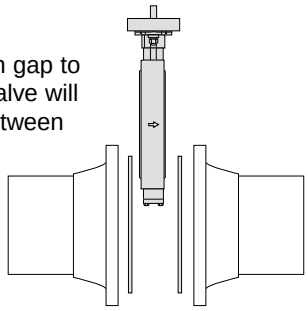
WARNING:

Failure to acknowledge the direction of flow in the pipeline and flow direction on the valve can shorten service life. Over torque of the flange bolts can lead to flange gasket damage and premature leakage.

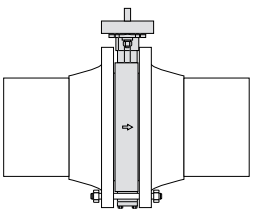
Pipe flange faces and valve faces should be cleaned of any residue and dirt.



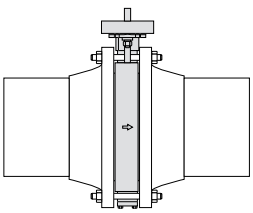
Allow enough gap to ensure the valve will slip easily between flanges.



Center the flange gasket and valve.



Install valve in the closed Position to prevent damage to the sealing areas.



Tighten all bolts to ensure a leak free seal.

OPERATION:

1. The valve can be fitted with various operating devices such as Lever Handle, Manual Gear, Pneumatic Actuator or Electric Actuator.
2. By rotating the disc counter-clockwise to open or clockwise to close the flow inside the pipeline can be regulated or shutoff, whichever is desired.

MAINTENANCE:

Regular maintenance is not needed. Occasional adjustment of the stem packing may be required using the gland flange studs and bolts. It is important to adjust these nuts evenly and not to over tighten. Failure to do so could lead to premature stem packing wear and eventual valve failure. In most cases should a stem packing leak occur during operation the packing / gland flange bolts can be tightened to correct the leakage. This is accomplished by turning the gland flange nuts clockwise one turn at a time until leakage is stopped. Should adjustment fail to correct leak packing can be replaced as steps listed under “Packing Replacement” or a new valve can be purchased.

Dirt and debris left in pipeline from construction can damage seat or disc edge and cause seat failure. Should seat failure occur follow step listed under “Seat Replacement” to correct problem.

PREPARATION / MINOR REPAIR

1. Identify media in pipe. Protection against exposure to toxic and/or flammable liquids should be taken.
2. Depressurize pipeline and drain completely.
3. Make sure disc is in the closed position and remove valve and operator by reversing the installation procedures.
   *Note: It is important that the valve operator always be attached to the valve while valve is under pressure.

PACKING REPLACEMENT (ONCE PIPELINE IS DEPRESSURIZED AND DRAINED.)

1. Remove operator and mounting hardware from top of valve.
2. Remove gland flange nuts and lock washers.
3. Remove gland flange, bolts and packing gland.
4. Remove old packing and replace with new.
5. Reverse steps reinstalling packing gland, gland flange, bolts nut and washers. Tighten nuts to below listed torque.

Gland Flange Bolt Torque

in	mm	
2"-6"	**50-150**	4 ft lbs
8"-14"	**200-350**	8 ft lbs
16"-24"	**400-600**	11 ft lbs

6. Cycle valve several times with wrench (being careful to not damage stem) and then reinstall operator.

SEAT REPLACEMENT

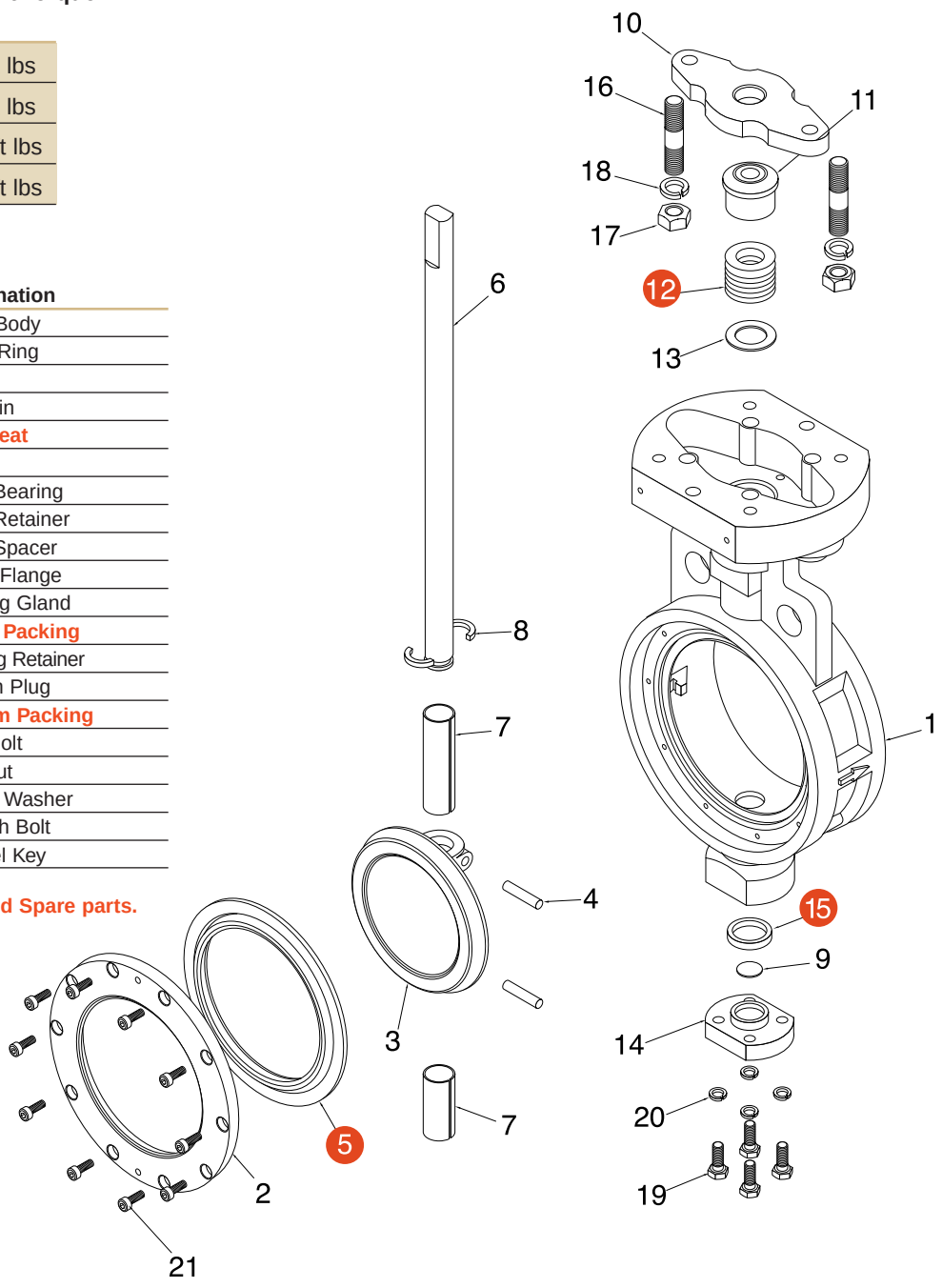
1. Place valve on bench with seat retainer ring facing up. Remove all retainer ring cap screws and lift ring from valve. (Cap screws can be threaded into the tapped holes located at the 12 o'clock and 6 o'clock positions to aid in retainer ring removal.)
2. Remove old seat and discard.
3. Clean seat cavity and retainer ring. Clean and polish disc edge to remove any scratches that may interfere with sealing against seat.
4. Attach seat to seat ring.
5. Install seat and seat ring. Install seat ring bolts and torque in a cross pattern to below listed torques.

Seat Ring Bolt Torque

mm	
4	4 ft lbs
6	8 ft lbs
8	11 ft lbs
10	15 ft lbs

Part #	Designation
1	Valve Body
2	Insert Ring
3	Disc
4	Disc Pin
*5	**Soft Seat**
6	Shaft
7	Shaft Bearing
8	Shaft Retainer
9	Shaft Spacer
10	Gland Flange
11	Packing Gland
*12	**Gland Packing**
13	Packing Retainer
14	Bottom Plug
*15	**Bottom Packing**
16	Stud Bolt
17	Hex Nut
18	Spring Washer
19	Wrench Bolt
20	Parallel Key

***Recommended Spare parts.**



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A DOVER COMPANY

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Throughout the world, OPW-FTG companies are hard at work ensuring the safe processing and transportation of hazardous products and safeguarding against costly petroleum and chemical spills, tank overfills and fugitive vapor emissions. Whether your need is in the chemical plant, at the terminal loading rack, or outfitting a fleet of rail tank cars, cargo tanks or dry-bulk trailers, OPW-FTG systems set the standard for safety, performance and peace-of-mind assurance in the most rigorous and demanding applications. If the safe, profitable handling of hazardous liquids and dry bulk commodities such as gasoline and diesel, chlorine, chlor-alkali products, LPG, acids, cement, flour and starch, among others, is your concern, trust OPW-FTG.

Expert Solutions for the Safe Handling & Transport of Hazardous Bulk Products

	Applications	Processing	Load	Transport		Unload
PETROLEUM	• Gasoline • Alcohols • Fuel Oil • LPG	• Bellow Sealed Valves • Sample Valves • Lined Ball Valves • Lined Butterfly Valves • Industrial Valves • ISO Rings • Sight Flow Indicators • Globe Valves • Swivels	• Loading Arms • Couplers • Rack Monitors • Dry Disconnects • API Coupler • Swivels	**Cargo Tanks** • Manholes • Vapor Vents • Electronics • Internal Valves • API Adaptors • Sealed Parcel • Pneumatic Controls • Manifold Systems	**Rail Tank Cars** • Pressure Relief Valves • Plug Valves • Ball Valves • Level Measurement • Autoloks • Kamvaloks • Dryloks • Rupture Disc Devices • Angle Valves	• Drylok Couplers • Adaptors • Delivery Elbows • Vapor Recovery Elbows • Swivels
CHEMICALS	• Chlorine • Acids & Bases • Amines • Anhydrous Ammonia • Propylene • Butadiene • Hazardous Liquids	• Bellow Sealed Valves • Sample Valves • Lined Ball Valves • Lined Butterfly Valves • Industrial Valves • ISO Rings • Sight Flow Indicators • Globe Valves • Swivels • Dry Disconnects • Quick Disconnects	• Loading Arms • Autoloks • Kamvaloks • Dryloks • Loading Manholes • Valves • Actuators • Swivels	**Cargo Tanks** • Manholes • Vapor Vents • Electronics • Internal Valves • Sealed Parcel	**Rail Tank Cars** • Safety Valves • Plug Valves • Ball Valves • Level Measurement • Autoloks • Kamvaloks • Dryloks • Rupture Disc Devices • Angle Valves	• Loading Arms • Autoloks • Kamvaloks • Dryloks • Valves • Actuators • Safety Breakaways • Swivels
DRY BULK	• Cement • Flour/Starch • Pharmaceuticals	• Industrial Valves • Sight Flow Indicators • Butterfly Valves • Swivels	• Loading Arms • Aerators • Hatch Covers • Swivels	**Cargo Tanks** • Manholes • Check Valves • Hopper Tees • Butterfly Valves • Aerators • Weld Rings	**Rail Cars** • Manholes • Hatches • Access Ports • Check Valves • Hopper Tees • Butterfly Valves • Aerators • Pressure Vacuum Valves	• Aerators • Butterfly Valves • Tank Hatches • Pressure Relief • Vacuum Relief • Temperature Monitoring
INDUSTRIAL/GENERAL	• Food Processing • Pharmaceuticals • Waste Water • High-Purity Liquids • Breweries • Pulp and Paper • Steel Processing	• Lined Ball Valves • Lined Butterfly Valves • Sample Systems • Sight Flow Indicators • ISO Rings • Dry Disconnects • Swivels • Quick Disconnects • High-Performance Butterfly Valves	• Loading Arms • Couplers • Rack Monitors • Swivels • Dry Disconnects • Quick Disconnects • Butterfly Valves	**Cargo Tanks** • Manholes • Vapor Vents • Electronics • Weld Rings • Hopper Tees • Pneumatic Controls • Sealed Parcel	**Rail Tank Cars** • Safety Valves • Plug Valves • Ball Valves • Level Measurement • Autoloks • Kamvaloks • Dryloks • Rupture Disc Devices • Angle Valves	• Loading Arms • Couplers • Rack Monitors • Swivels • Dry Disconnects • Quick Disconnects • Butterfly Valves

Chemical & Industrial Processing Market Unit

- Food Processing
- Chemical Plants
- Petroleum Loading Stations
- Steel Processing, Pulp & Paper
- Waste Water Treatment
- Pharmaceutical
- Breweries
- High-Purity Liquids

Rail Car Market Unit

- Pressure & General Purpose Rail Tank Cars
- Dry Bulk Rail Cars

Cargo Tank Market Unit

- Gasoline & Diesel
- Chemical
- Dry Bulk

SURE SEAL INCORPORATED

11172 State Highway O
Mineral Point, MO 63660 USA
Telephone: +1 573 438 5000
Fax: +1 573 438 4853
www.suresealinc.com

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Telephone: +1 513 696 1500
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OPW FLUID TRANSFER GROUP - INDIA

36 Marol Co-op. Ind. Est. Ltd.
2nd Floor, M.V. Rd., Marol
Andheri (E), Mumbai – 400 059
Telephone: +91 851 72 96 / 851 73 55
Fax: +91 851 73 33

OPW FLUID TRANSFER GROUP - BRAZIL

Rua Manuel Augusto de Alvarenga, 155
São Paulo, São Paulo, Brazil
CEP 04402-050
Telephone/Fax: +55 11 5564 6466

OPW Fluid Transfer Group Europe B.V.

Boekweitstraat 1, P.O. Box 32,
2150 AA Nieuw-Vennep, Netherlands
Telephone: +31 252 660 300
Fax: +31 252 687 258
www.opw-ftg.nl

OPW Fluid Transfer Group Europe B.V. is a leading manufacturer of a full range of loading arms, and subsequent fluid handling equipment and a major provider of cargo tank products and an extensive package of bulk handling fittings for markets in Europe, the former Soviet Union, Africa, the Middle East, and Asia as far as Pakistan.