

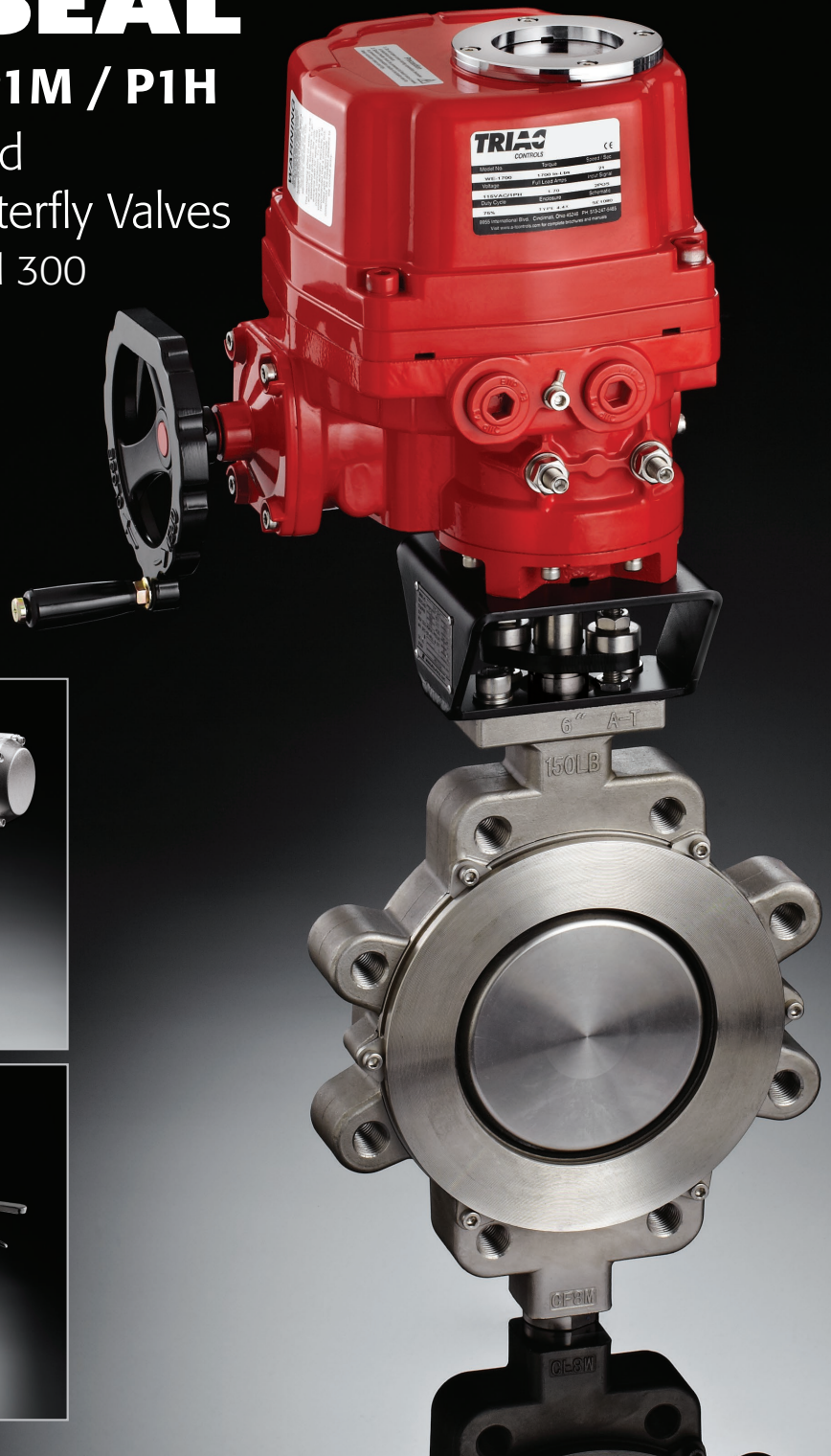


A-T Controls, Inc.

# POWER-SEAL

Series P1S / P1F / P1M / P1H

Manual and Automated  
High Performance Butterfly Valves  
ANSI/ASME Class 150 and 300



Featuring **TRIAAC**® Actuators and Accessories



# POWER-SEAL

Series P1S / P1F / P1M / P1H  
 Manual and Automated  
 High Performance Butterfly Valves  
 ANSI/ASME Class 150 and 300



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**Square Stem**

Stem design facilitates direct mounting of pneumatic and electric actuators or gear operators through 12".

**Live Loaded Packing**

Power-Seal HPBFVs come standard with Live Loaded packing. Three sets of Belleville washers are added to each gland stud to maintain a self-adjusting packing load.

**Application Specific Stem Packing**

Standard packing is PTFE V-Ring (Type P) for P1S and Graphite (Type G) for Series P1M, P1F and P1H. Other packing options include: PTFE Inverted V-Ring (Type V) or PTFE Double V-Ring (Type D).

**Internally Cast Travel Stop**

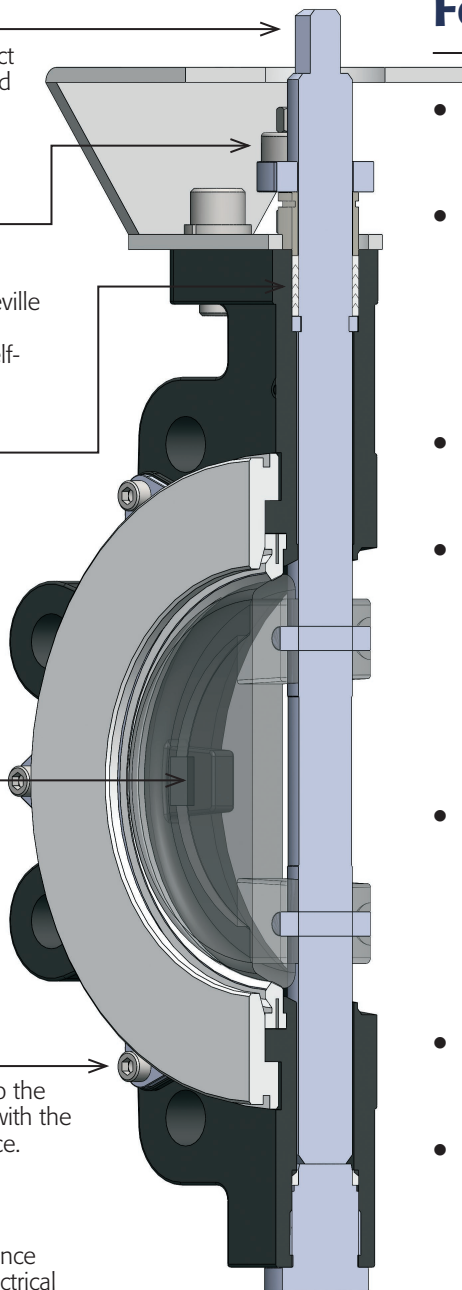
Travel Stop prevents over rotation of the disc in an effort to limit possible seat damage.

**Seat Retainer Design**

Seat retainer is designed so the fasteners do not interfere with the flange gasket sealing surface.

**Electrical Continuity**

A-T Controls high performance butterfly valves all have electrical continuity between the valve body, disc, and stem per API 609.

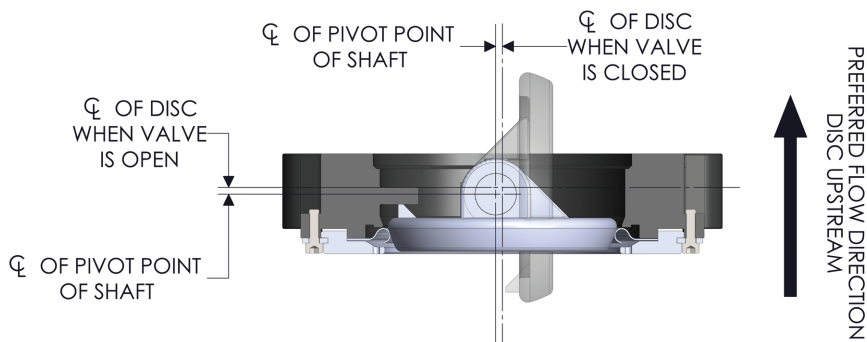


**Features and Benefits**

- Available inventory includes sizes 2"-36". Larger sizes are available upon request.
- Standard body materials are CF8M (316 SST) or WCB. Application specific options include: Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel 625, Aluminum Bronze, LCB and others.
- ANSI/ASME Class 150 and 300 Lug and Wafer.
- New & improved standard seat material: G2TFE. The new G2TFE seat contains 80% PTFE, 15% glass fiber and 5% molybdenum. The molybdenum is an element found in stainless steels which adds lubricity and longevity to the seat.
- Standard seat materials are G2TFE (soft seat), G2TFE/316L SST (Firesafe), and 316L SST (metal seat). Application specific seat materials include: 50/50 STFE, PTFE, TFM™-1600 and Inconel 625.
- Standard Stem Material is 17-4 PH®. Another option is XM-19.
- Soft seat and Firesafe seat designs offer bubble-tight, bi-directional shutoff to full ANSI/ASME Class 150 and 300 standards. Metal seat design offers Class V shutoff.
- Blow out proof stem design.
- Double Offset design (see section view below).

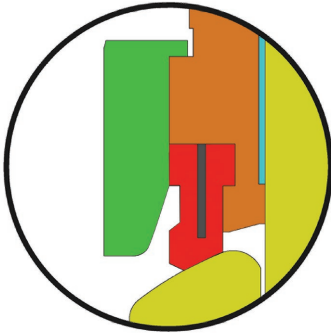
**Standards/Certifications**

ANSI-B16.34	FCI 70-2
ANSI B16.47	MSS SP-25
ANSI B16.10	MSS SP-55
API-598	MSS SP-67
API-6FA 4th Edition	MSS SP-68
• P1M/P1MC & P1H/P1HC	ISO 5211
• All Sizes	NACE (from Factory)
• Class 150 & 300	• MR0175 / MR0103
API-607 7th Edition	EN 10204-3.1
• P1F & P1FC	CRN
• 3" & Larger	ABS Type Approval
• Class 150 & 300	CSA 3.16:21
API-609	
ASME-B16.5	



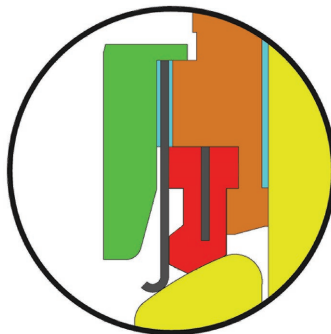
## **POWER-SEAL** High Performance Butterfly Valve seat designs:

- **P1S Series** Soft Seat design (standard G2TFE)
- **P1F Series** G2TFE/316L SST fire-safe seat design
- **P1M/P1H Series** Metal seat design for high temperature and specialized applications



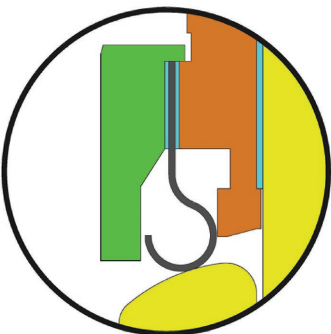
### **P1S Series**

Soft seat for bubble-tight shutoff of general purpose applications.\*



### **P1F Series**

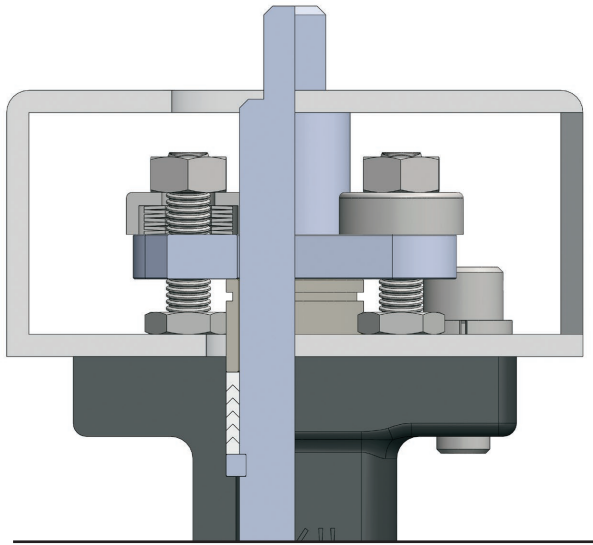
Primary G2TFE seat for bubble-tight shutoff backed up by secondary 316L SST fire-safe seat. Secondary fire-safe seat provides Class V shutoff when primary G2TFE seat is compromised in a fire event.\*



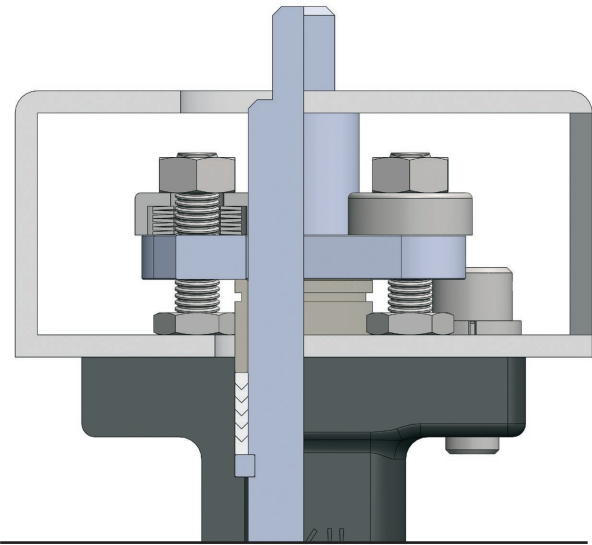
### **P1M/P1H Series**

316L SST seat for Class V shutoff of high temperature applications (Inconel® 625 seat and 316 SST with Stellite disc optional for extreme temperature).\*

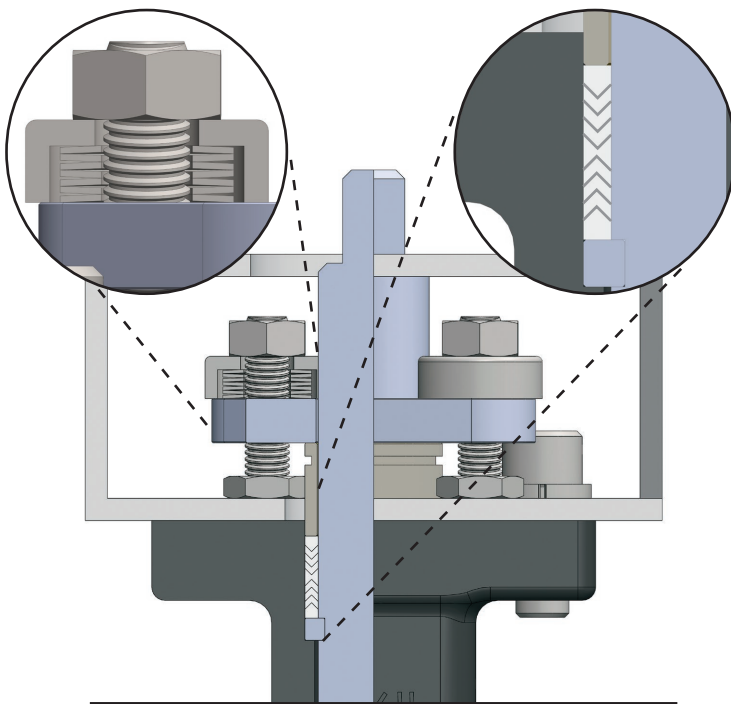
\* Refer to Pressure Temperature Chart (pg. 13)

Stem Packing Options for **POWER-SEAL** High Performance Butterfly Valves

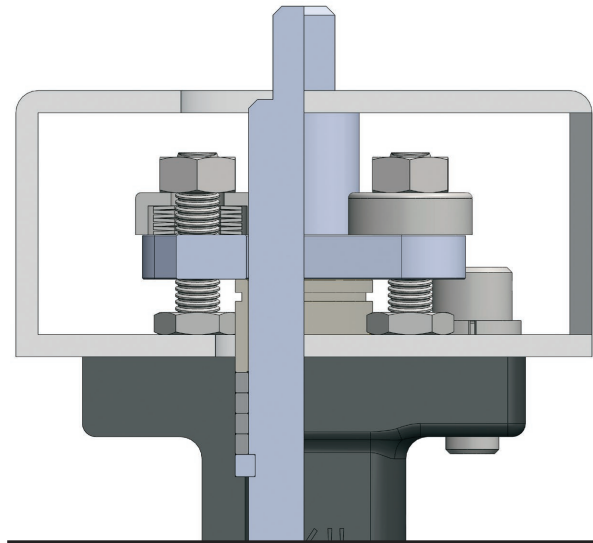
**PTFE V-Ring (P)** (standard for P1S Series)  
Live Loaded PTFE Chevron packing for pressure and vacuum applications.



**PTFE Inverted V-Ring (V)**  
Live Loaded Inverted PTFE Chevron packing for pressure and vacuum applications.



**PTFE Double V-Ring (D)**  
Live Loaded PTFE Chevron packing comes together with Inverted PTFE Chevron packing for pressure and vacuum applications.



**Graphite (G)** (standard for P1F, P1M, P1H Series)  
Power-Seal High Performance Butterfly valves with Live Loaded Graphite packing for pressure and vacuum applications.

Please refer to A-T Controls Vacuum White Paper for more information.

**Industry Leading High Performance Butterfly Valve Packing Design**

Cv Values for **POWER-SEAL** High Performance Butterfly Valves

Valve Size	ANSI Class 150 Flow Coefficient (Cv)												ANSI Class 300 Flow Coefficient (Cv)											
	Disc Angle												Disc Angle											
	5°	10°	20°	30°	40°	50°	60°	70°	80°	85°	90°	5°	10°	20°	30°	40°	50°	60°	70°	80°	85°	90°		
2"	1	2	6	13	23	36	50	74	92	101	105	1	2	6	13	23	36	50	74	92	101	105		
2-1/2"	1	3	9	19	35	54	77	112	141	154	160	1	3	9	19	35	54	77	112	141	154	160		
3"	1	4	12	25	46	71	101	147	185	202	210	1	4	12	25	46	71	101	147	185	202	210		
4"	2	9	26	53	97	150	211	308	387	422	440	2	9	26	53	97	150	211	308	387	422	440		
5"	3	14	40	83	152	235	331	483	607	662	690	3	14	40	83	152	235	331	483	607	662	690		
6"	5	18	52	108	198	306	432	630	792	864	900	5	18	52	108	198	306	432	630	792	864	900		
8"	10	38	110	228	418	646	912	1,330	1,672	1,824	1,900	8	33	97	201	368	568	803	1,170	1,471	1,605	1,672		
10"	16	62	180	372	682	1,054	1,488	2,170	2,728	2,976	3,100	14	55	158	327	600	928	1,309	1,910	2,401	2,619	2,728		
12"	24	94	273	564	1,034	1,598	2,256	3,290	4,136	4,512	4,700	22	89	259	536	982	1,518	2,143	3,126	3,929	4,286	4,465		
14"	31	122	354	732	1,342	2,074	2,928	4,270	5,368	5,856	6,100	27	110	318	659	1,208	1,867	2,635	3,843	4,831	5,270	5,490		
16"	41	162	470	972	1,782	2,754	3,888	5,670	7,128	7,776	8,100	36	146	423	875	1,604	2,479	3,499	5,103	6,415	6,998	7,290		
18"	54	216	626	1,296	2,376	3,672	5,184	7,560	9,504	10,368	10,800	49	194	564	1,166	2,138	3,305	4,666	6,804	8,554	9,331	9,720		
20"	69	274	795	1,644	3,014	4,658	6,576	9,590	12,056	13,152	13,700	62	247	715	1,480	2,713	4,192	5,918	8,631	10,850	11,837	12,330		
24"	105	420	1,218	2,520	4,620	7,140	10,080	14,700	18,480	20,160	21,000	95	378	1,096	2,268	4,158	6,426	9,072	13,230	16,632	18,144	18,900		
26"	120	480	1,392	2,880	5,280	8,160	11,520	16,800	21,120	23,040	24,000	108	432	1,253	2,592	4,752	7,344	10,368	15,120	19,008	20,736	21,600		
28"	135	540	1,566	3,240	5,940	9,180	12,960	18,900	23,760	25,920	27,000	122	486	1,409	2,916	5,346	8,262	11,664	17,010	21,384	23,328	24,300		
30"	168	670	1,943	4,020	7,370	11,390	16,080	23,450	29,480	32,160	33,500	151	603	1,749	3,618	6,633	10,251	14,472	21,105	26,532	28,944	30,150		
32"	179	716	2,076	4,296	7,876	12,172	17,184	25,060	31,504	34,368	35,800	161	644	1,869	3,866	7,088	10,955	15,466	22,554	28,354	30,931	32,220		
36"	270	1,080	3,132	6,480	11,880	18,360	25,920	37,800	47,520	51,840	54,000	243	972	2,819	5,832	10,692	16,524	23,328	34,020	42,768	46,656	48,600		
40"	338	1,352	3,921	8,112	14,872	22,984	32,448	47,320	59,488	64,896	67,600	304	1,217	3,529	7,301	13,385	20,686	29,203	42,588	53,539	58,406	60,840		
42"	355	1,420	4,118	8,520	15,620	24,140	34,080	49,700	62,480	68,160	71,000	320	1,278	3,706	7,668	14,058	21,276	30,672	44,730	56,232	61,344	63,900		
44"	445	1,780	5,162	10,680	19,580	30,260	42,720	62,300	78,320	85,440	89,000	401	1,602	4,646	9,612	17,622	27,234	38,448	56,070	70,488	76,896	80,100		
48"	503	2,010	5,829	12,060	22,110	34,170	48,240	70,350	88,440	96,480	100,500	452	1,809	5,246	10,854	19,899	30,753	43,416	63,315	79,596	86,832	90,450		
F <sub>L</sub>	0.83	0.79	0.81	0.79	0.79	0.75	0.71	0.66	0.6	0.56	0.53	0.83	0.79	0.81	0.79	0.79	0.75	0.71	0.66	0.6	0.56	0.53		
X <sub>T</sub>	0.56	0.5	0.53	0.52	0.49	0.46	0.4	0.34	0.27	0.25	0.23	0.56	0.5	0.53	0.52	0.49	0.46	0.4	0.34	0.27	0.25	0.23		
F <sub>D</sub>	0.06	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.68	0.7	0.06	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.68	0.7		

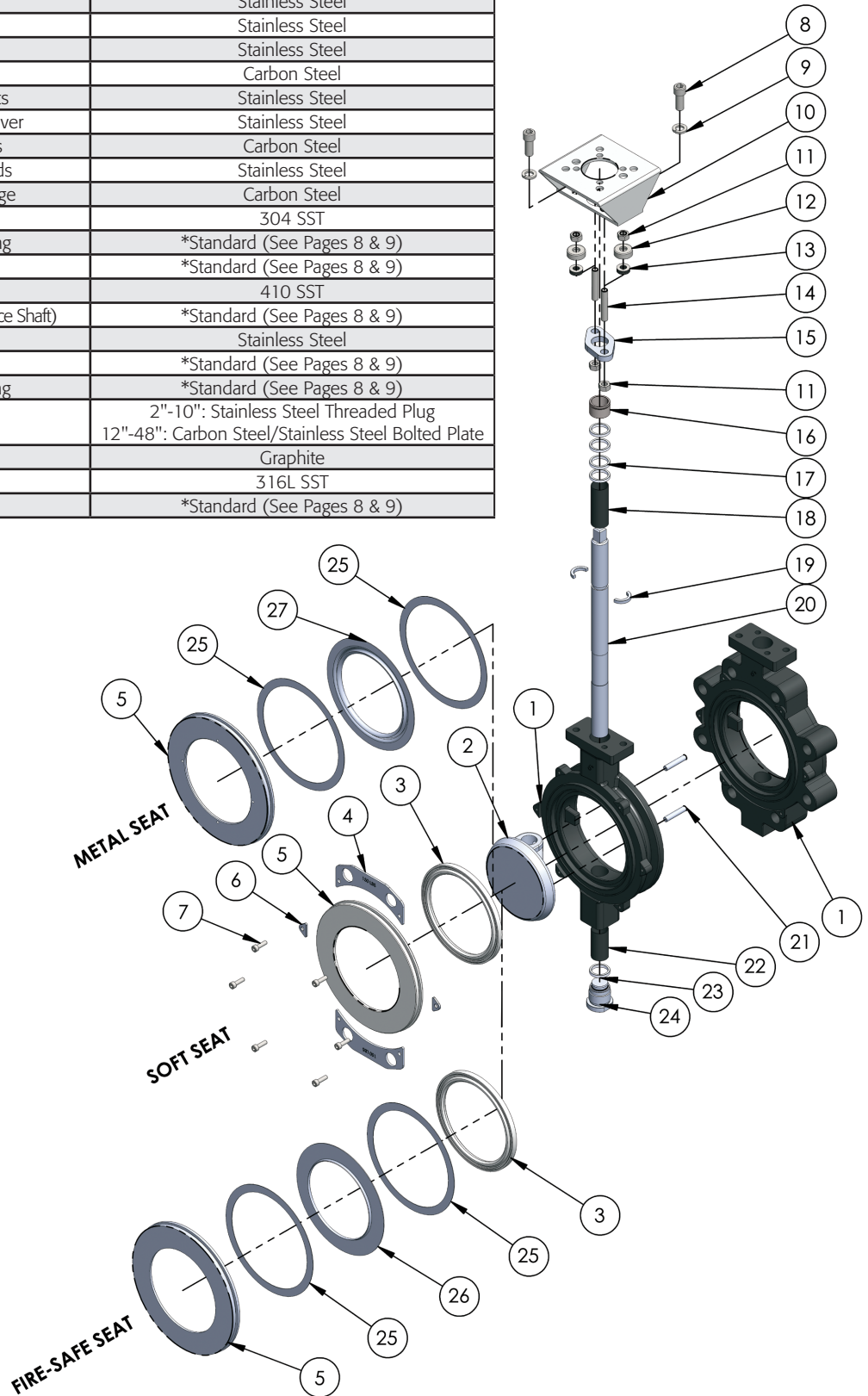
Torque Charts for **POWER-SEAL** High Performance Butterfly Valves *(All torques in in-lbs)*

Valve Size	P1S Soft Seat				P1F Soft/316L SST Seat		P1M / P1H Metal Seat*	
	75 PSID	150 PSID	220 PSID	285 PSID	150 PSID	285 PSID	150 PSID	285 PSID
2"	195	195	215	215	234	257	303	378
2-1/2"	253	273	292	311	327	374	425	519
3"	253	370	380	419	444	503	583	707
4"	419	516	594	681	619	817	804	968
5"	468	614	749	867	CF	CF	CF	CF
6"	516	730	915	1,100	1,175	1,630	1,270	1,750
8"	681	1,120	1,558	1,995	2,465	3,335	2,670	3,600
10"	1,070	1,654	2,336	2,921	3,800	5,200	4,100	5,650
12"	2,483	3,252	4,225	5,295	4,900	6,800	5,300	7,380
14"	3,407	4,858	6,123	7,340	7,625	10,500	8,260	11,350
16"	5,014	7,164	9,043	10,844	11,225	17,750	12,165	19,200
18"	7,106	9,667	12,606	14,358	15,500	22,800	17,230	24,725
20"	10,289	13,959	17,873	20,569	23,600	30,950	25,600	34,500
24"	17,512	22,935	28,299	32,825	39,750	55,000	43,100	59,600
26"	20,540	26,994	33,292	38,597	CF	CF	CF	CF
28"	24,005	31,414	38,695	44,847	CF	CF	CF	CF
30"	34,742	43,396	53,803	61,911	CF	CF	CF	CF
32"	39,785	49,773	61,639	70,886	CF	CF	CF	CF
36"	51,009	63,449	78,392	90,054	CF	CF	CF	CF
40"	73,106	88,974	107,274	127,230	CF	CF	CF	CF
42"	87,709	104,062	124,699	150,204	CF	CF	CF	CF
44"	100,558	119,637	143,195	172,495	CF	CF	CF	CF
48"	125,770	148,938	178,044	214,159	CF	CF	CF	CF

Valve Size	P1S Soft Seat				P1F Soft/316L SST Seat				P1M / P1H Metal Seat*				
	150 PSID	285 PSID	425 PSID	570 PSID	740 PSID	150 PSID	285 PSID	570 PSID	740 PSID	150 PSID	285 PSID	570 PSID	740 PSID
2"	195	215	311	399	526	234	257	479	631	308	333	592	755
2-1/2"	273	311	468	604	779	327	374	725	935	432	485	890	1,131
3"	380	419	633	837	1,080	455	520	1,005	1,296	593	649	1,243	1,568
4"	516	681	1,003	1,324	1,723	619	817	1,589	2,067	817	1,049	1,976	2,498
5"	672	895	1,343	1,791	2,327	CF	CF	CF	CF	CF	CF	CF	CF
6"	799	1,227	1,830	2,443	3,164	1,175	1,700	2,932	3,796	1,270	1,913	3,639	4,594
8"	1,256	2,180	3,252	4,235	5,403	2,465	3,400	5,082	6,484	2,670	3,660	6,328	7,855
10"	1,957	3,368	5,042	6,717	8,732	3,800	5,560	8,060	10,478	4,100	5,990	10,034	12,706
12"	3,874	5,715	8,557	11,409	14,563	4,900	7,100	13,691	17,475	6,141	8,906	17,042	21,201
14"	5,821	8,722	13,054	17,980	23,373	7,625	11,050	21,575	28,047	9,228	13,595	26,879	34,027
16"	8,595	12,752	19,089	25,846	33,574	11,225	19,160	31,015	40,289	13,626	20,600	38,636	48,879
18"	11,574	17,016	25,465	34,519	44,837	15,500	24,000	41,423	53,805	18,349	26,543	51,592	65,280
20"	16,354	23,821	35,658	47,475	61,668	23,600	33,500	56,970	74,002	25,926	37,159	70,973	89,786
24"	26,605	38,179	57,083	75,997	98,679	39,750	58,050	91,196	118,415	43,100	62,300	113,615	143,677
26"	32,514	45,869	68,580	93,062	120,835	CF	CF	CF	CF	CF	CF	CF	CF
28"	37,643	52,897	79,083	109,542	142,231	CF	CF	CF	CF	CF	CF	CF	CF
30"	47,505	67,840	101,365	134,901	175,124	CF	CF	CF	CF	CF	CF	CF	CF
32"	59,615	83,464	124,699	165,944	215,425	CF	CF	CF	CF	CF	CF	CF	CF
36"	76,747	106,204	158,585	215,444	279,643	CF	CF	CF	CF	CF	CF	CF	CF
40"	106,301	148,646	221,849	294,956	382,762	CF	CF	CF	CF	CF	CF	CF	CF
42"	124,310	172,690	257,673	342,558	426,080	CF	CF	CF	CF	CF	CF	CF	CF
44"	141,832	196,930	293,690	382,372	485,460	CF	CF	CF	CF	CF	CF	CF	CF
48"	175,514	250,567	373,514	486,142	617,168	CF	CF	CF	CF	CF	CF	CF	CF

Bill of Materials for **POWER-SEAL** High Performance Butterfly Valves

Item No.	Description	Material
1	Body	*Standard (See Pages 8 & 9)
2	Disc	*Standard (See Pages 8 & 9)
3	Seat	*Standard (See Pages 8 & 9)
4	Clamp Plate (Wafer Only)	Stainless Steel
5	Retainer Ring	Carbon Steel / Stainless Steel
6	Clamps	Stainless Steel
7	Clamp Bolts	Stainless Steel
8	Bracket Bolts	Stainless Steel
9	Bracket Washer	Stainless Steel
10	Bracket	Carbon Steel
11	Packing Gland Nuts	Stainless Steel
12	Belleville Washer Cover	Stainless Steel
13	Belleville Washers	Carbon Steel
14	Packing Gland Studs	Stainless Steel
15	Packing Gland Flange	Carbon Steel
16	Gland	304 SST
17	Shaft Upper Packing	*Standard (See Pages 8 & 9)
18	Upper Bearing	*Standard (See Pages 8 & 9)
19	Thrust Bearing	410 SST
20	Shaft (2" - 3" have Two Piece Shaft)	*Standard (See Pages 8 & 9)
21	Disc Pin	Stainless Steel
22	Lower Bearing	*Standard (See Pages 8 & 9)
23	Shaft Lower Packing	*Standard (See Pages 8 & 9)
24	Bottom Cover	2"-10": Stainless Steel Threaded Plug 12"-48": Carbon Steel/Stainless Steel Bolted Plate
25	Body Gasket	Graphite
26	Secondary Seat	316L SST
27	Metal Seat	*Standard (See Pages 8 & 9)



## Standard Materials of Construction for **POWER-SEAL Class 150**

### Soft Seat Materials

Component	Carbon Steel Standard Material	Stainless Steel Standard Material	Options
Body	A216 Gr WCB	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316	A351 Gr CF8M-316	Same as body; except CS (316 standard)
Shaft	17-4 PH®	17-4 PH®	XM-19, K-Monel, Duplex 2205, Inconel® 718
Seat	G2TFE	G2TFE	PTFE, 50/50 STFE, TFM™-1600
Packing	PTFE V-Ring	PTFE V-Ring	Graphite (G), PTFE V-Rings (P,V,D)
Bearing	PTFE Composite	PTFE Composite	Bronze, Carbon Graphite

### Fire Safe Seat Materials

Component	Carbon Steel Standard Material	Stainless Steel Standard Material	Options
Body	A216 Gr WCB	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316 / HCr	A351 Gr CF8M-316/ HCr	Same as body; except CS (316 standard)
Shaft	17-4 PH®	17-4 PH®	XM-19, K-Monel, Duplex 2205, Inconel® 718
Seat	G2TFE	G2TFE	PTFE, 50/50 STFE, TFM™-1600
Secondary Seat	316L SST	316L SST	
Packing	Graphite	Graphite	
Bearing	Metaloplast	Metaloplast	Bronze, Carbon Graphite

### Metal Seat Materials (Carbon Steel)

Component	Carbon Steel Standard		Options
	Material (-20°F to 660°F)	Material (-20°F to 800°F)	
Body	A216 Gr WCB	A216 Gr WCB	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316/ HCr	A351 Gr CF8M-316/ Stellite	
Shaft	17-4 PH®	17-4 PH®	
Seat	316L SST	Inconel® 625	
Packing	Graphite	Graphite	PTFE V-Ring to 400°F
Bearing	Carbon Graphite	Carbon Graphite	Bronze

### Metal Seat Materials (Stainless Steel)

Component	Stainless Steel Standard		Options
	Material (-100°F to 660°F)	Material (-100°F to 1100°F)	
Body	A351 Gr CF8M-316	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Aluminum Bronze, LCB, Other
Disc	A351 Gr CF8M-316/ HCr	A351 Gr CF8M-316/ Stellite	
Shaft	17-4 PH®	17-4 PH®	XM-19
Seat	316L SST	Inconel® 625	
Packing	Graphite	Graphite	PTFE V-Ring to 400°F
Bearing	Carbon Graphite	Carbon Graphite	Bronze



## Standard Materials of Construction for **POWER-SEAL Class 300**

### Soft Seat Materials

Component	Carbon Steel Standard Material	Stainless Steel Standard Material	Options
Body	A216 Gr WCB	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316	A351 Gr CF8M-316	Same as body; except CS (316 standard)
Shaft	17-4 PH®	17-4 PH®	XM-19, K-Monel, Duplex 2205, Inconel® 718
Seat	G2TFE	G2TFE	PTFE, 50/50 STFE, TFM™-1600
Packing	PTFE V-Ring	PTFE V-Ring	Graphite (G), PTFE V-Rings (P,V,D)
Bearing	PTFE Composite	PTFE Composite	Bronze, Carbon Graphite

### Fire Safe Seat Materials

Component	Carbon Steel Standard Material	Stainless Steel Standard Material	Options
Body	A216 Gr WCB	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316 / HCr	A351 Gr CF8M-316/ HCr	Same as body; except CS (316 standard)
Shaft	17-4 PH®	17-4 PH®	XM-19, K-Monel, Duplex 2205, Inconel® 718
Seat	G2TFE	G2TFE	PTFE, 50/50 STFE, TFM™-1600
Secondary Seat	316L SST	316L SST	
Packing	Graphite	Graphite	
Bearing	Metaloplast	Metaloplast	Bronze, Carbon Graphite

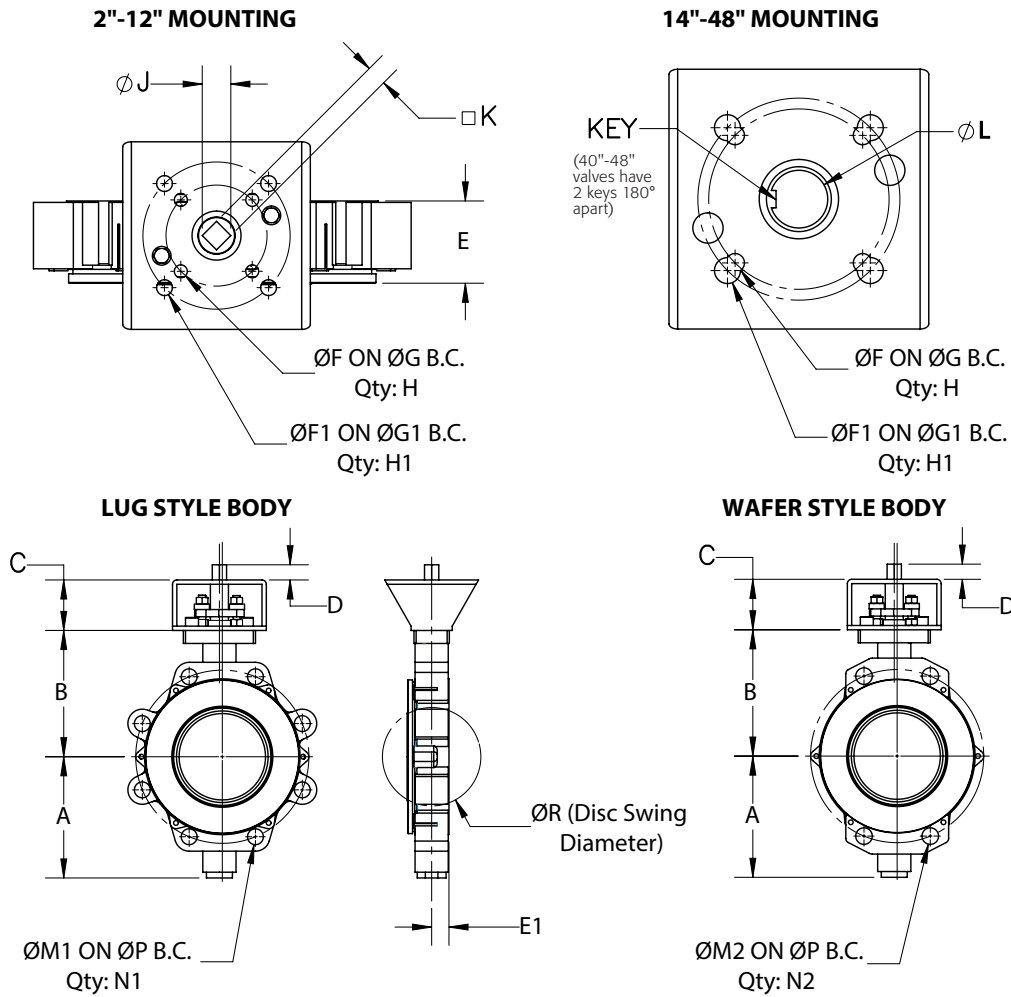
### Metal Seat Materials (Carbon Steel)

Component	Carbon Steel Standard		Options
	Material (-20°F to 660°F)	Material (-20°F to 800°F)	
Body	A216 Gr WCB	A216 Gr WCB	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316/ HCr	A351 Gr CF8M-316/ Stellite	
Shaft	17-4 PH®	17-4 PH®	XM-19
Seat	316L SST	Inconel® 625	
Packing	Graphite	Graphite	PTFE V-Ring to 400°F
Bearing	Carbon Graphite	Carbon Graphite	Bronze

### Metal Seat Materials (Stainless Steel)

Component	Stainless Steel Standard		Options
	Material (-100°F to 660°F)	Material (-100°F to 1100°F)	
Body	A351 Gr CF8M-316	A351 Gr CF8M-316	Alloy 20, Monel, CD3MN, Hastelloy C-276, Inconel® 625, Alum-Bronze, LCB, Other
Disc	A351 Gr CF8M-316/ HCr	A351 Gr CF8M-316/ Stellite	
Shaft	17-4 PH®	XM-19	
Seat	316L SST	Inconel® 625	
Packing	Graphite	Graphite	PTFE V-Ring to 400°F
Bearing	Carbon Graphite	Carbon Graphite	Bronze

## Dimensions for **POWER-SEAL Class 150**



### ANSI/ASME Class 150

Size	A	B	C	D	E	E1	ØF	ØG	H	ØF1	ØG1	H1	ØJ	K	ØL	Key (mm)	ØM1	N1	ØM2	N2	ØP	ØR	Lug (lbs)	Wafer (lbs)
2"	3.94	4.33	2.36	0.71	1.77	0.71	0.35	2.756 (F07)	4	-	-	-	0.480	0.354	-	-	5/8 - 11	4	0.75	4	4.75	2.14	12	9
2-1/2"	3.98	4.33	2.36	0.71	1.89	0.75	0.35	2.756 (F07)	4	-	-	-	0.480	0.354	-	-	5/8 - 11	4	0.75	4	5.50	2.79	14	10
3"	4.84	5.24	2.76	0.75	1.89	0.81	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	5/8 - 11	4	0.75	4	6.00	3.15	17	15
4"	5.31	5.71	2.76	0.83	2.13	0.87	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	5/8 - 11	8	0.75	4	7.50	3.66	28	19
5"	6.38	6.50	2.76	0.83	2.20	0.91	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	3/4 - 10	8	0.88	4	8.50	4.69	39	23
6"	6.61	6.89	2.76	0.83	2.24	0.94	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.756	0.551	-	-	3/4 - 10	8	0.88	4	9.50	5.37	52	32
8"	7.68	7.87	2.76	1.02	2.52	1.06	0.43	4.016 (F10)	4	0.51	4.921 (F12)	4	1.031	0.748	-	-	3/4 - 10	8	0.88	4	11.75	7.34	63	47
10"	9.51	10.43	3.15	1.18	2.80	1.10	0.43	4.016 (F10)*	4	0.71	5.512 (F14)*	4	1.031	0.748	-	-	7/8 - 9	12	1.00	4	14.25	8.86	103	79
12"	10.55	11.42	3.15	1.18	3.19	1.22	0.43	4.016 (F10)*	4	0.71	5.512 (F14)*	4	1.181	0.866	-	-	7/8 - 9	12	1.00	4	17.00	10.91	155	115
14"	11.57	12.20	3.54	2.17	3.62	1.57	0.51	4.921 (F12)	4	0.71	5.512 (F14)	4	-	-	1.378	10x8	1 - 8	12	1.13	4	18.75	12.35	181	159
16"	14.02	14.57	3.94	2.56	4.02	1.78	0.51	4.921 (F12)	4	0.71	5.512 (F14)	4	-	-	1.575	12x8	1 - 8	16	1.13	4	21.25	14.50	251	216
18"	14.69	15.35	3.94	2.95	4.49	1.97	0.71	5.512 (F14)	4	0.87	6.496 (F16)	4	-	-	1.772	14x9	1 1/8 - 8	16	1 1/8 - 8	4	22.75	16.46	353	287
20"	16.06	15.94	3.94	2.95	5.00	2.17	0.71	5.512 (F14)	4	0.87	6.496 (F16)	4	-	-	2.165	18x11	1 1/8 - 8	20	1 1/8 - 8	4	25.00	18.36	432	377
24"	18.90	18.90	4.72	3.35	6.06	2.52	0.71	8.071 (F20)	8	-	-	-	-	-	2.559	18x11	1 1/4 - 8	20	1 1/4 - 8	4	29.50	22.25	697	582
26"	20.28	23.03	4.72	3.74	6.50	2.87	0.71	8.071 (F20)	8	0.71	10.000 (F25)	8	-	-	2.559	18x11	1 1/4 - 8	24	1 1/4 - 8	4	31.75	23.88	750	631
28"	20.63	21.46	5.12	3.74	6.50	2.82	0.71	8.071 (F20)	8	0.71	10.000 (F25)	8	-	-	2.559	18x11	1 1/4 - 8	28	1 1/4 - 8	4	34.00	26.00	926	741
30"	21.65	24.02	5.12	4.13	7.48	3.43	0.71	10.000 (F25)	8	-	-	-	-	-	3.346	25x14	1 1/4 - 8	28	1 1/4 - 8	4	36.00	28.00	992	860
32"	22.64	25.04	5.51	5.12	7.48	3.43	0.71	10.000 (F25)	8	0.87	11.732 (F30)	8	-	-	3.543	22x14	1 1/2 - 8	28	1 1/2 - 8	4	38.50	30.00	1433	1036
36"	26.14	28.15	5.51	5.12	7.99	3.90	0.71	10.000 (F25)	8	0.87	11.732 (F30)	8	-	-	3.543	22x14	1 1/2 - 8	32	1 1/2 - 8	4	42.75	33.69	1631	1301
40"	29.25	29.13	5.91	5.12	8.50	4.25	0.87	11.732 (F30)	8	1.26	14.016 (F35)	8	-	-	3.937	28x16	1 1/2 - 8	36	1 1/2 - 8	4	47.25	37.72	1808	1433
42"	29.76	32.28	5.91	5.12	9.88	4.96	0.87	11.732 (F30)	8	1.26	14.016 (F35)	8	-	-	4.331	28x16	1 1/2 - 8	36	1 1/2 - 8	4	49.50	40.35	2381	1830
44"	31.65	31.50	5.91	5.12	10.00	4.72	0.87	11.732 (F30)	8	1.26	14.016 (F35)	8	-	-	4.331	28x16	1 1/2 - 8	40	1 1/2 - 8	4	51.75	42.06	2712	1962
48"	34.29	35.04	5.91	5.91	10.00	4.33	1.26	14.016 (F35)	8	1.50	15.984 (F40)	8	-	-	4.724	32x18	1 1/2 - 8	44	1 1/2 - 8	4	56.00	45.25	2976	2161

\* Unless otherwise specified, all dimensions are in inches.

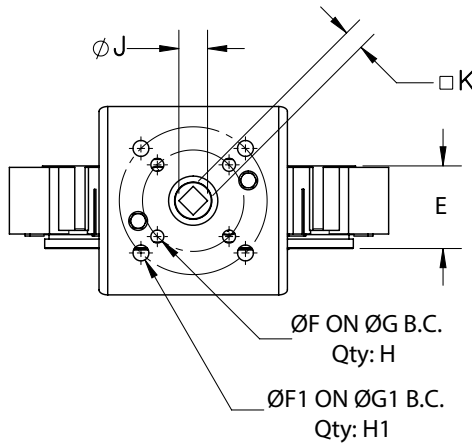
\* 10" & 12" valves also have an F12 bolt circle: Ø0.51 ON A Ø4.921 B.C. Qty: 4.

\* For ØM2, 2"-16" are clearance holes and 18"-48" are threaded holes. Refer to the High Performance Butterfly Valve Stud & Bolt Sizing in the IOM for more information.

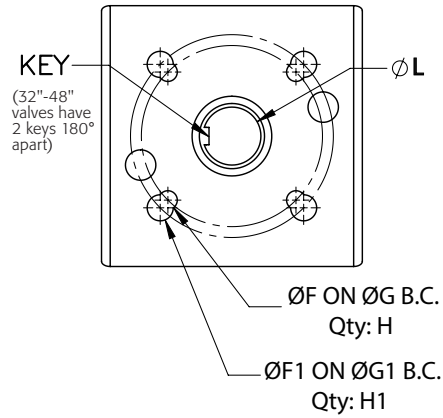
End Connection: 2"-24": ANSI B16.5 Class 150 | 26"-48": ANSI B16.47 Series A Class 150

## Dimensions for **POWER-SEAL Class 300**

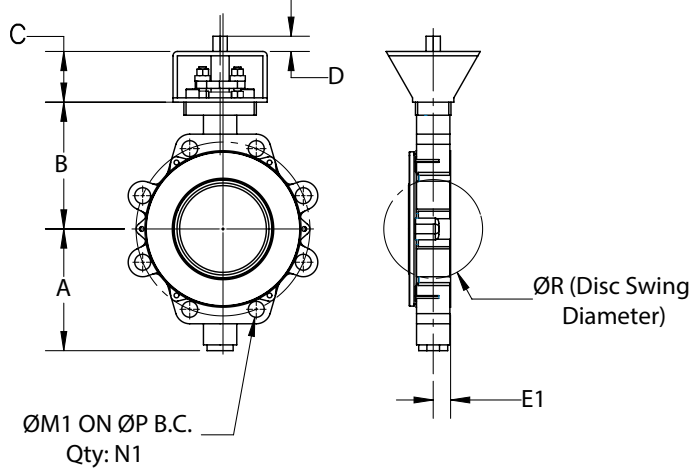
**2"-12" MOUNTING**



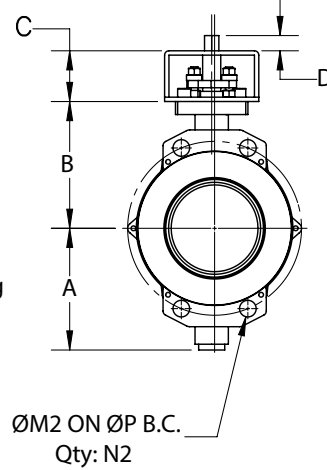
**14"-48" MOUNTING**



**LUG STYLE BODY**



**WAFER STYLE BODY**



### ANSI/ASME Class 300

Size	A	B	C	D	E	E1	ØF	ØG	H	ØF1	ØG1	H1	ØJ	K	ØL	Key (mm)	ØM1	N1	ØM2	N2	ØP	ØR	Lug (lbs)	Wafer (lbs)
2"	3.94	4.33	2.36	0.71	1.77	0.71	0.35	2.756 (F07)	4	-	-	-	0.480	0.354	-	-	5/8 - 11	8	0.75	4	5.00	2.14	12	9
2-1/2"	3.98	4.33	2.36	0.71	1.89	0.75	0.35	2.756 (F07)	4	-	-	-	0.480	0.354	-	-	3/4 - 10	8	0.88	4	5.88	2.79	14	10
3"	4.84	5.24	2.76	0.75	1.89	0.81	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	3/4 - 10	8	0.88	4	6.62	3.15	25	15
4"	5.31	5.71	2.76	0.83	2.13	0.87	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	3/4 - 10	8	0.88	4	7.88	3.66	36	19
5"	6.38	6.50	2.76	0.83	2.20	0.91	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	0.591	0.433	-	-	3/4 - 10	8	0.88	4	9.25	4.69	39	23
6"	6.61	6.89	2.76	1.02	2.32	1.00	0.35	2.756 (F07)	4	0.43	4.016 (F10)	4	1.031	0.748	-	-	3/4 - 10	12	0.88	4	10.62	5.37	75	36
8"	8.03	8.27	2.76	1.18	2.87	1.42	0.43	4.016 (F10)	4	0.51	4.921 (F14)	4	1.181	0.866	-	-	7/8 - 9	12	1.00	4	13.00	7.34	94	59
10"	9.51	10.43	3.15	1.18	3.27	1.57	0.43	4.016 (F10)*	4	0.71	5.512 (F14)*	4	1.181	0.866	-	-	1 - 8	16	1 - 8	4	15.25	8.86	171	111
12"	11.18	12.20	3.15	1.18	3.62	1.65	0.43	4.016 (F10)*	4	0.71	5.512 (F14)*	4	1.181	0.866	-	-	1 1/8 - 8	16	1 1/8 - 8	4	17.75	10.91	268	154
14"	12.76	13.39	3.54	2.56	4.61	2.56	0.51	4.921 (F12)	4	0.71	5.512 (F14)	4	-	-	1.969	14x9	1 1/8 - 8	20	1 1/8 - 8	4	20.25	12.35	370	284
16"	14.57	14.57	3.94	2.95	5.24	2.76	0.51	4.921 (F12)	4	0.71	5.512 (F14)	4	-	-	2.165	18x11	1 1/4 - 8	20	1 1/4 - 8	4	22.50	14.50	477	419
18"	15.55	15.94	3.94	2.95	5.87	2.87	0.71	5.512 (F14)	4	0.87	6.496 (F16)	4	-	-	2.362	18x11	1 1/4 - 8	24	1 1/4 - 8	4	24.75	16.46	687	542
20"	16.65	17.52	3.94	3.74	6.26	3.11	0.71	5.512 (F14)	4	0.87	6.496 (F16)	4	-	-	2.559	18x11	1 1/4 - 8	24	1 1/4 - 8	4	27.00	18.36	770	612
24"	20.08	20.04	4.72	4.13	7.13	3.59	0.71	8.071 (F20)	8	-	-	-	-	-	2.953	20x12	1 1/2 - 8	24	1 1/2 - 8	4	32.00	22.25	1319	997
26"	21.46	23.03	4.72	4.13	6.50	2.68	0.71	10.000 (F25)	8	0.87	11.732 (F30)	8	-	-	3.149	22x14	1 5/8 - 8	28	1 5/8 - 8	4	34.50	23.88	1414	1069
28"	22.44	23.23	5.12	4.13	6.50	2.80	0.71	10.000 (F25)	8	0.87	11.732 (F30)	8	-	-	3.543	22x14	1 5/8 - 8	28	1 5/8 - 8	4	37.00	26.00	1781	1195
30"	24.80	26.97	5.12	5.12	9.05	3.43	0.87	11.732 (F30)	8	-	-	-	-	-	3.740	25x14	1 3/4 - 8	28	1 3/4 - 8	4	39.25	28.00	1895	1335
32"	25.98	27.56	5.51	5.12	9.49	3.23	0.87	11.732 (F30)	8	1.26	14.016 (F35)	8	-	-	4.134	28x16	1 7/8 - 8	28	1 7/8 - 8	4	41.50	30.00	2388	1671
36"	26.77	29.13	5.51	5.12	9.49	4.98	0.87	11.732 (F30)	8	1.26	14.016 (F35)	8	-	-	4.528	32x18	2 - 8	32	2 - 8	4	46.00	33.69	2604	2168
40"	30.43	29.92	5.91	5.90	11.80	3.94	1.26	14.016 (F35)	8	1.50	15.984 (F40)	8	-	-	4.921	32x18	1 5/8 - 8	32	1 5/8 - 8	4	45.50	37.72	3013	2429
42"	29.76	32.28	5.91	5.90	11.80	4.33	1.26	14.016 (F35)	8	1.50	15.984 (F40)	8	-	-	5.118	32x18	1 5/8 - 8	32	1 5/8 - 8	4	47.50	40.35	3814	2932
44"	31.65	31.69	5.91	7.09	11.80	4.72	1.50	15.984 (F40)	8	1.50	19.016 (F48)	12	-	-	5.315	36x20	1 3/4 - 8	32	1 3/4 - 8	4	49.75	42.06	4519	3383
48"	34.57	35.04	5.91	7.09	13.80	6.89	1.50	15.984 (F40)	8	1.50	19.016 (F48)	12	-	-	5.709	36x20	1 7/8 - 8	32	1 7/8 - 8	4	54.00	45.25	4960	3725

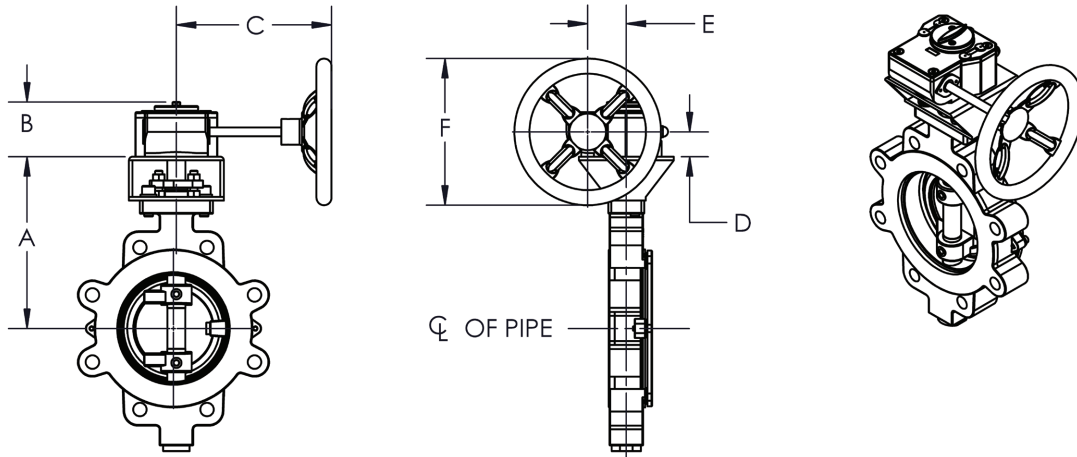
\* Unless otherwise specified, all dimensions are in inches.

\*10" & 12" valves also have an F12 bolt circle: Ø0.51 ON A Ø4.921 B.C. Qty: 4.

\* For ØM2, 2"-8" are clearance holes and 10"-48" are threaded holes. Refer to the High Performance Butterfly Valve Stud & Bolt Sizing in the IOM for more information.

End Connection: 2"-24": ANSI B16.5 Class 300 | 26"-48": ANSI B16.47 Series A Class 300

Dimensions for **POWER-SEAL** Manual Handles / Gear Operators

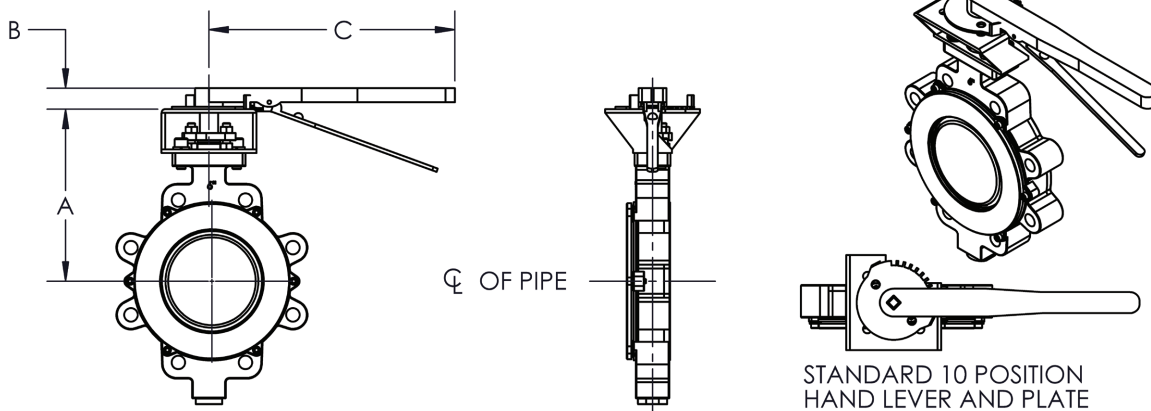


**CLASS 150**

SIZE	GEAR	A	B	C	D	E	HANDWHEEL DIAMETER (F)
2"	Q200-S	6.69	2.52	5.16	1.12	1.71	4
3"	Q200-S	7.99	2.52	5.16	1.12	1.71	4
4"	Q200-S	8.46	2.52	5.16	1.12	1.71	4
5"	Q400-S	9.25	2.94	7.12	1.34	2.07	4
6"	Q400-S	9.65	2.94	7.28	1.34	2.07	6
8"	Q800-S	10.63	3.56	10.24	1.67	2.71	12
10"	Q800-S	13.58	3.56	10.24	1.67	2.71	12
12"	Q800-S	14.57	3.56	11.71	1.67	2.71	16
14"	Q2000-S	15.75	3.94	12.64	1.97	3.8	16
16"	Q2000-S	18.5	3.94	13.39	1.97	3.8	20
18"	Q4000-S	19.29	5.04	16.07	2.15	5.41	20
20"	Q4000-S	19.88	5.04	17.61	2.15	5.41	27
24"	Q6500-S	23.23	5.04	16.58	2.15	5.41	16

**CLASS 300**

SIZE	GEAR	A	B	C	D	E	HANDWHEEL DIAMETER (F)
2"	Q200-S	6.69	2.52	5.16	1.12	1.71	4
3"	Q200-S	7.99	2.52	5.16	1.12	1.71	4
4"	Q200-S	8.46	2.52	5.16	1.12	1.71	4
5"	Q400-S	9.25	2.94	7.12	1.34	2.07	4
6"	Q400-S	9.65	2.94	7.28	1.34	2.07	6
8"	Q800-S	11.02	3.56	10.73	1.67	2.71	12
10"	Q800-S	13.58	3.56	11.71	1.67	2.71	16
12"	Q2000-S	15.35	3.94	12.64	1.97	3.8	16
14"	Q4000-S	16.93	5.04	16.07	2.15	5.41	20
16"	Q4000-S	18.5	5.04	17.61	2.15	5.41	27
18"	Q4000-S	19.88	5.04	17.61	2.15	5.41	27
20"	Q6500-S	21.46	5.04	16.58	2.15	5.41	16
24"	Q6500-S	24.76	5.04	17.33	2.15	5.41	20



STANDARD 10 POSITION HAND LEVER AND PLATE

**CLASS 150**

SIZE	A	B	C
2"	6.69	1.02	11
3"	7.99	1.02	11
4"	8.46	1.02	11
5"	9.25	1.02	11
6"	9.65	1.14	17
8"	10.63	1.14	22

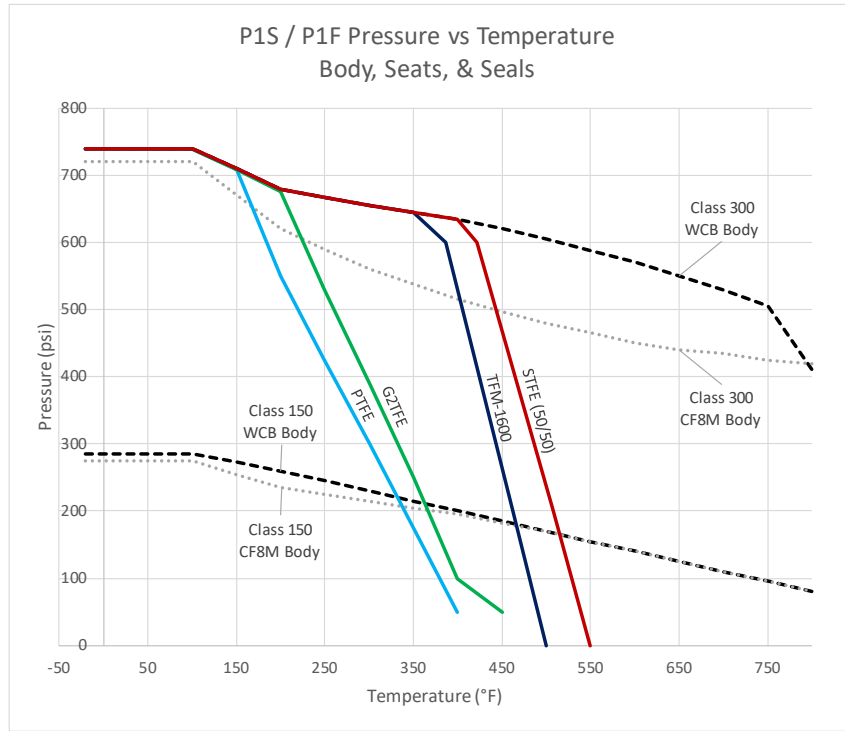
**CLASS 300**

SIZE	A	B	C
2"	6.69	1.02	11
3"	7.99	1.02	11
4"	8.46	1.02	11
5"	9.25	1.02	11
6"	9.65	1.14	22

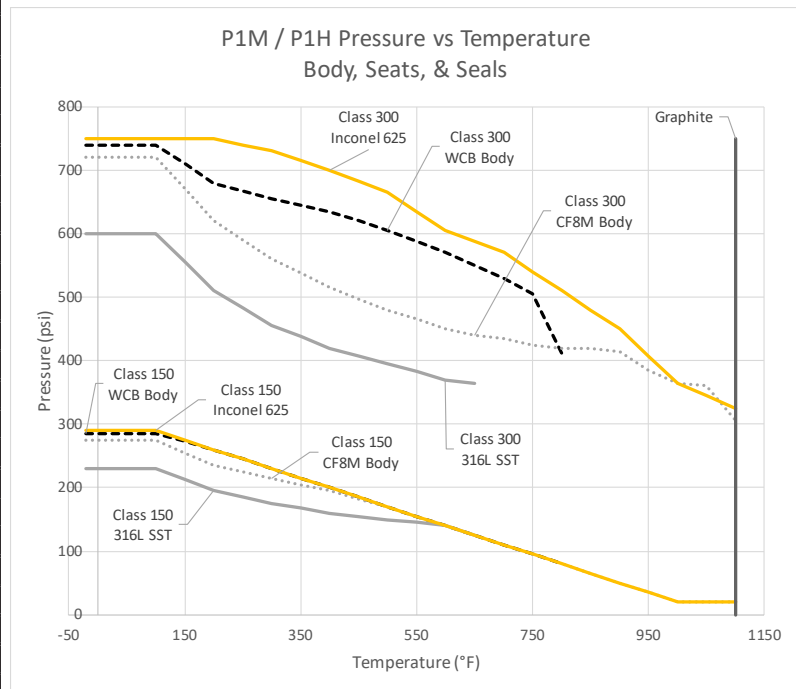
# Pressure Temperatures for **POWER-SEAL** High Performance Butterfly Valves

## Component Ratings

Component	Material	Temperature (°F)
SEATS - SOFT	PTFE	-50 to 400° F
	G2TFE	-50 to 450° F
	50/50 STFE	-50 to 550° F
	TFM™-1600	-75 to 500° F
SEATS - FIRESAFE	G2TFE/316L SST	-50 to 450° F
SEATS - METAL	Inconel® 625	-100 to 1100° F
	316L SST	-100 to 660° F
STEM PACKING	Graphite	-100 to 1100° F
	PTFE V-Ring	-100 to 400° F
STEM	K-Monel	-100 to 1100° F
	17-4 PH®	-100 to 1100° F
	XM-19	-100 to 1100° F
BEARINGS	PTFE Composite / Metaloplast	-100 to 550° F
	Bronze	-100 to 650° F
	Carbon Graphite	-100 to 1100° F
DISC	316/HCr	-100 to 660° F
	316/Stellite 6	-100 to 1100° F
BODY	A216 Gr. WCB	-20 to 800° F
	A351 Gr. CF8M	-100 to 1100° F



Temp. (°F)	BODY RATINGS				METAL SEAT RATINGS			
	Pressure (psi)							
	Class 150		Class 300		Class 150		Class 300	
	WCB	CF8M	WCB	CF8M	316L SST	Inconel 625	316L SST	Inconel 625
-20°	285	275	740	720	230	290	600	750
100°	285	275	740	720	230	290	600	750
150°	273	255	710	670	213	275	555	750
200°	260	235	680	620	195	260	510	750
250°	245	225	668	590	185	245	483	740
300°	230	215	655	560	175	230	455	730
350°	215	205	645	538	168	215	438	715
400°	200	195	635	515	160	200	420	700
450°	185	183	620	498	155	185	408	683
500°	170	170	605	480	150	170	395	665
550°	155	155	588	465	145	155	383	635
600°	140	140	570	450	140	140	370	605
650°	125	125	550	440	125	125	365	588
700°	110	110	530	435	-	110	-	570
750°	95	95	505	425	-	95	-	540
800°	80	80	410	420	-	80	-	510
850°	-	65	-	420	-	65	-	480
900°	-	50	-	415	-	50	-	450
950°	-	35	-	385	-	35	-	408
1000°	-	20	-	365	-	20	-	365
1050°	-	20	-	360	-	20	-	345
1100°	-	20	-	305	-	20	-	325



- At temperature, the maximum pressure for the valve is limited by either the valve body, seat, or seals; whichever is lower.
- Reference ASME B16.34 for metal working pressures at temperature.

## Part Number Matrix for **POWER-SEAL** High Performance Butterfly Valves

1 Valve Series	
P1S	Power-Seal Soft seat
P1F	Power-Seal Firesafe Seat
P1M	Power-Seal Metal seat
P1H	Power-Seal Metal Seat High Temp

2 Body Material			
blank	(No Designation) = CF8M (316 SST)		
C	Carbon Steel	J	CF3 (304L SST)
A	Alloy 20	5	LCB
M	Monel	N	Inconel® 625
D	CD3MN Duplex SST	B	Aluminum-Bronze
T	Hastelloy C-276	*	Other

3 End Connection	
L1	Class 150 Lug
L3	Class 300 Lug
W1	Class 150 Wafer with Guide Holes
W3	Class 300 Wafer with Guide Holes

4 Valve Size			
0200	2"	2000	20"
0250	2-1/2"	2400	24"
0300	3"	2600	26"
0400	4"	2800	28"
0500	5"	3000	30"
0600	6"	3200	32"
0800	8"	3600	36"
1000	10"	4000	40"
1200	12"	4200	42"
1400	14"	4400	44"
1600	16"	4800	48"
1800	18"		

5 Seat Material			
P	PTFE*	6	316L SST <i>(Standard on P1M)</i>
G	G2TFE <i>(Standard on P1S)</i>	7	Inconel® 625 <i>(Standard on P1H)</i>
S	50/50 STFE*	F	G2TFE/ 316L SST* <i>(Standard on P1F/P1FC)</i>
T	TFM™-1600*	W	Hastelloy C-276

\*When used in P1F (CF8M body) or P1FC (WCB body) valves, the soft seat is backed up with a 316L SST secondary seat. The standard secondary seat in P1F\_ valves for all other body materials is Inconel 625.

6 Disc Material/Style	
S	CF8M (316 SST) <i>(Standard on P1S with CS or SST body)</i>
X	Same as Body Material
7	CF8M (316 SST)/Stellite® <i>(Standard on P1H)</i>
6	CF8M (316 SST)/HCr <i>(Standard on P1M &amp; P1F)</i>

7 Stem Bearing	
R	PTFE Composite <i>(Standard on P1S)</i>
C	Carbon Graphite <i>(Standard on P1M/P1H)</i> or Metaloplast <i>(Standard on P1F)</i>
B	Bronze
*	Other

8 Operator Designation	
X	Bare Stem
H	Standard 10 point Handle
S	Stainless Steel 10 point Handle
G	Gear Operator

9 Stem	
A	17-4 PH® Stem <i>(Standard)</i>
N	17-4 PH® Stem (NACE MR0175/MR0103 Compliant)
B	XM-19
C	Duplex 2205
T	Hastelloy C-276
*	Other

10 Packing (Live Loaded)	
G	Graphite <i>(Standard on P1F, P1M, &amp; P1H)</i>
P	PTFE V-Ring <i>(Standard on P1S)</i>
V	PTFE Inverted V-Ring
D	PTFE Double V-Ring

11 Additional Options	
blank	(No designation) = Valves Series Standard
X	Multiple Option Designation
N	NACE MR0175/MR0103 Compliant <i>(No weld repair)</i>
C	CSA 3.16 Certified <i>(with CSA Marking)</i>

## How To Order **POWER-SEAL** High Performance Butterfly Valves

How To Order Manual Power-Seal High Performance Butterfly Valves	
1 2	3 4 5 6 7 8 9 10 11
↓ ↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
P1SC	- W1 - 0300 - GS R - X A P - _

How To Order Automated Power-Seal High Performance Butterfly Valves	
1 2	3 4 5 6 7 8 9 10 / actuator size - options
↓ ↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
P1SC	- W1 - 0300 - GS R - X AP / 3RHS - XX
(see Actuator Size Legend & Automated Accessories)	

Pneumatic Accessories



Stainless Steel Actuators



Solenoids, Positioners, Limit Switches, Lock Up Valves, Declutchable Gear Operators, Speed Controls, Quick Exhaust Valves and more

See product brochures for Rack & Pinion, Heavy Duty (THD) and other pneumatic automation options

Electric Actuator Options & Features



Explosion Proof

Options Specification

- Voltage Options: 110VAC, 220 VAC, 24 VDC/VAC, 12 VDC, 440 VAC, 460 VAC, 480 VAC
- Potentiometer unit (1K)
- (TMC) Electronic Modulating Card
- 4-20mA, 1-5mA, 0-10 VDC, 1-5 VDC, 0-135 Ohm Command Signal
- Current position transmitter (Output 4~20mA DC)
- Multi (24 VAC/DC)
- DC motor (24 VDC)
- Local control unit: remote/local/stop and open/close



TMC4 Electronic Control Card (24VDC/120VAC/220VAC)

- 4-20mA, 0-10VDC, 0-5VDC, 0-135Ω, 0-1kΩ or discrete Open/Close command input.
- Programmable fail positions on loss of command signal. Fail in Place, Fail CW, Fail CCW, Fail % Value.
- On board 4-20mA or 0-10VDC self-powered feedback transmitter.
- LCD screen with easy to navigate UI.
- Expansion module slots for additional options.
- Electronics temperature monitoring.
- External brake control for spring return actuators.
- Field upgradable via micro USB connection.

Optional Features:

- Communication protocols: Modbus RTU, Modbus TCP, Profibus DP, Ethernet I/P.
- Motor temperature management.

See electric actuator product brochures for ratings and other options



# **POWER-SEAL**

Series P1S / P1F / P1M / P1H

Manual and Automated  
High Performance Butterfly Valves

ANSI/ASME Class 150 and 300



  
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