



## Thermoplastic Valves Product Guide & Engineering Specifications

### Butterfly Valve Dimensions & Operational Information

#### Replacement Parts for 1-1/2" - 12" PVC & CPVC Standard, True Lug and Polypropylene Valves

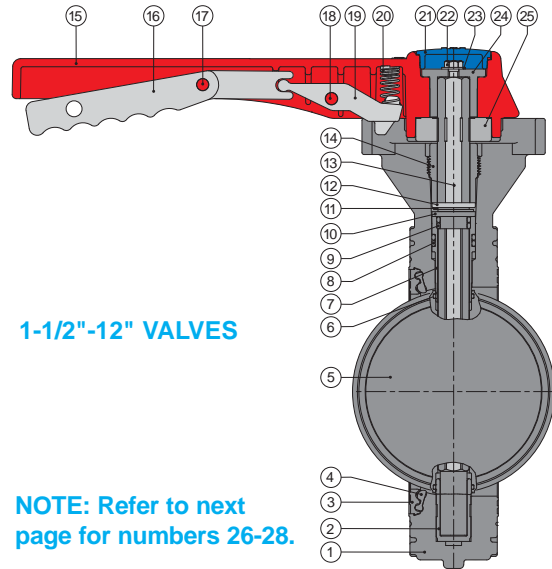
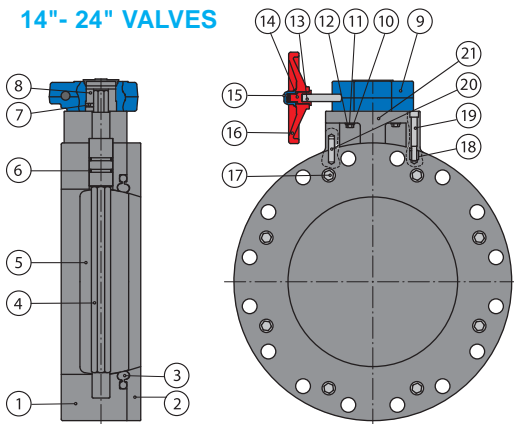
No	Component	Qty.	Material
1	Body	1	PVC/CPVC
2	Stem Bearing	1	PTFE/GFPP
3	Seal Carrier	1	PVC/CPVC/PP
4	Seat	1	Buna-N, EPDM, FKM
5	Disc	1	PVC/CPVC/PP
6	Disc O-ring	2	Buna-N, EPDM, FKM
7	Stem Bushing	1	PTFE/GFPP
8	Stem Bushing O-ring	2	Buna-N, EPDM, FKM
9	Stem O-ring	2	Buna-N, EPDM, FKM
10	Stem Washer - Hex	1	PTFE
11	Stem Washer - Slot*	1-2	SS 316
12	Stem Washer - Round	1	PTFE/GFPP
13	Stem	1	SS 316
14	Stem Nut	1	PVC/CPVC
15	Handle Body	1	PP
16	Handle Grip	1	GFPVC
17	Grip Pin	1	PP
18	Lock Pin	1	PP
19	Handle Lock	1	GFPVC
20	Handle Spring	1	SS 316
21	Handle Cover	1	PP
22	Hex Bolt	1	SS 316
23	Flat Washer	1	SS 316
24	Handle Bushing	1	GFPVC
25	Disc Timing Stop	1	CPVC
26	Lug Insert	4-12	SS/Zinc Plated Steel
27	Gear Operator Assembly	1	Cast Aluminum
28	Hand Wheel	1	PP

#### True Lug Only (not shown):

Seal Carrier Flange Plate	1	PVC/CPVC
Lug & Nut	4-12	SS/Zinc Plated Steel
Plate O-ring	1	Buna-N, EPDM, FKM

**Notes:** \*2-Slotted washers used on 6" & larger  
1: See 14"-24" PP valve illustration for Gear Operator Components, No. 8 - 16

#### 14"- 24" VALVES



#### 1-1/2"-12" VALVES

**NOTE:** Refer to next page for numbers 26-28.

#### Replacement Parts for 14" - 24" Polypropylene Valves

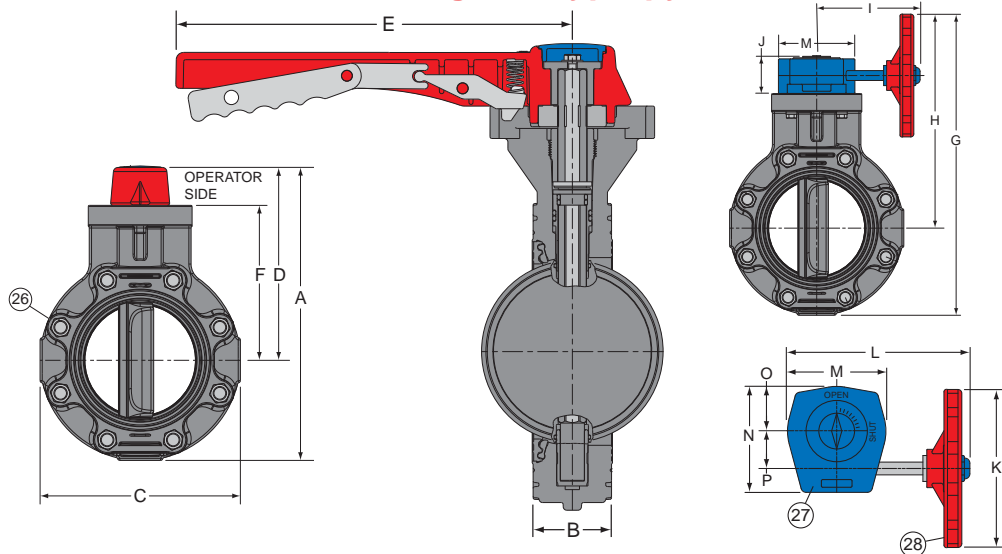
No.	Component	Qty	Material
1	Body	1	PP
2	Seal Carrier	1	PP
3	Seat	1	EPDM/FKM
4	Stem	1	SS 316L
5	Disc	1	PP
6	Stem O-ring	2	EPDM/FKM
7	Set Screw	1	Steel
8	Drive Bushing	1	Steel
9	Gear Operator	1	Epoxy Coated Aluminum
10	Flat Washer	4	SS 316
11	Lock Washer	4	SS 316
12	Hex Head Cap Screw	4	SS 316
13	Handwheel Pin	1	SS 316
14	Handwheel Adapter	1	GFPVC
15	Handwheel Nut	1	PP
16	Handwheel	1	PP
17	Hex Bolts	6-12	Nylon
18	Thread Insert	2	Steel
19	Hex Head Cap Screws	2	SS 316
20	Dowel Pin	1	Steel
21	Tower	1	PP

# Thermoplastic Valves Product Guide & Engineering Specifications

## Butterfly Valve Dimensions & Operational Information



### Standard, True Lug & Polypropylene



### Dimensions

Nominal Size	Pressure Rating <sup>1</sup> (psi)	A	B		C	D	E	F	G
			Standard, Lug Insert, & Polypropylene	True Lug					
1-1/2	150	8-5/32	1-9/16	2-1/4	5	5-19/32	9-3/32	4-3/32	11-5/32
2	150	9-11/32	1-15/16	2-9/16	6	6-13/32	9	4-3/4	13-1/8
2-1/2	150	10-9/32	2	2-3/4	7	6-25/32	9-1/4	5-1/4	13-1/8
3	150	11-1/2	2-3/32	2-13/16	7-1/2	7-27/32	12	5-5/8	14-5/32
4	150	13	2-9/32	3	9	8-1/2	12	6-1/4	15-5/8
6	150	16-19/32	2-3/4	3-13/32	10-31/32	11-3/32	13-7/8	8-19/32	19-7/32
8	150	18-5/8	2-15/16	3-23/32	13-1/2	12	13-15/16	9-1/2	21-7/16
10	150	N/A	3-1/4	4-1/4	16	N/A	N/A	11	26-5/8
12	150	N/A	3-1/2	4-1/2	19	N/A	N/A	12	29-1/8
14	100 <sup>2</sup>	N/A	6-1/4	N/A	21	N/A	N/A	13-3/16	29
16	85 <sup>2</sup>	N/A	6-3/4	N/A	23-1/2	N/A	N/A	14-7/16	31-1/2
18	70 <sup>2</sup>	N/A	7-1/8	N/A	25	N/A	N/A	15-3/16	33
20	50 <sup>2</sup>	N/A	7-3/4	N/A	27-1/2	N/A	N/A	16-7/16	35-1/2
24	50 <sup>2</sup>	N/A	8-7/16	N/A	32	N/A	N/A	18-11/16	40
30-60	Contact Spears® for 30" to 60" Valve Dimensions								

Nominal Size	H	I	J	K	L	M	N	O	P
1-1/2	8-21/32	6-7/16	2-3/8	8	8-13/16	4-13/16	5-3/16	2-13/16	1-27/32
2	10-1/8	6-7/16	2-3/8	8	8-13/16	4-13/16	5-3/16	2-13/16	1-27/32
2-1/2	9-5/8	6-7/16	2-3/8	8	8-13/16	4-13/16	5-3/16	2-13/16	1-27/32
3	10-17/32	6-7/16	2-3/8	8	8-13/16	4-13/16	5-3/16	2-13/16	1-27/32
4	11-1/8	6-7/16	2-3/8	8	8-13/16	4-13/16	5-3/16	2-13/16	1-27/32
6	13-23/32	6-7/16	2-13/32	7-15/16	8-7/8	4-27/32	5-5/32	2-7/32	1-27/32
8	14-11/16	6-7/16	2-13/32	7-15/16	8-7/8	4-27/32	5-3/16	2-7/32	1-27/32
10	18-5/8	7-1/8	2-3/8	8	9-13/16	5-3/8	5-15/16	2-7/16	2-11/32
12	19-5/8	7-1/8	2-3/8	8	9-13/16	5-3/8	5-15/16	2-7/16	2-11/32
14	18-1/2	7-3/8	2-9/16	8	10-13/16	6-7/8	7-7/16	3-1/8	3
16	19-3/4	7-3/8	2-9/16	8	10-13/16	6-7/8	7-7/16	3-1/8	3
18	20-1/2	7-3/8	2-9/16	8	10-13/16	6-7/8	7-7/16	3-1/8	3
20	21-3/4	7-3/8	2-9/16	8	10-13/16	6-7/8	7-7/16	3-1/8	3
24	24	7-3/8	2-9/16	8	10-13/16	6-7/8	7-7/16	3-1/8	3
30-60	Contact Spears® for 30" to 60" Valve Dimensions								

1: Maximum Internal Pressure Rating @ 73°F

2: Additional pressure rating is possible with attention to flow direction.



## Thermoplastic Valves Product Guide & Engineering Specifications Butterfly Valve Dimensions & Operational Information

### C<sub>v</sub> Values & Operating Torque

Valve Size	C <sub>v</sub> <sup>1</sup> Degrees Open						Operating <sup>2</sup> Torque (in.-lbs.)
	15°	30°	45°	60°	75°	90°	
1-1/2	2	8	20	36	61	81	100
2	3	11	27	49	82	109	110
2-1/2	5	19	48	86	144	192	206
3	9	35	86	155	259	345	360
4	10	41	103	185	308	411	420
6	28	113	281	506	844	1125	720
8	56	225	562	1012	1687	2249	1200
10	111	444	1110	1998	3330	4440	1320
12	158	631	1577	2839	4732	6309	1920
14	176	705	1762	3172	5286	7048	See Notes
16	211	846	2114	3805	6341	8455	
18	273	1092	2730	4914	8190	10920	
20	355	1418	3545	6381	10635	14180	
24	467	1866	4665	8397	13995	18660	

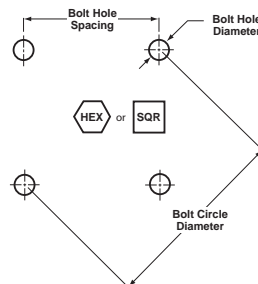
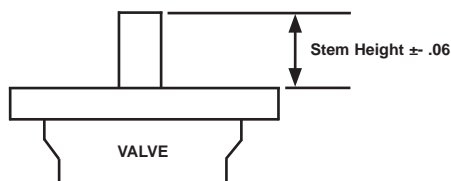
1: Gallons per minute at 1 psi pressure drop.

2: Operating torque for large diameter valves varies significantly with system operating pressure, flow direction and velocity.  
Contact Spears® for torque requirement based on application.

### Actuator Mounting Dimensions For Custom Actuation

Size	Bolt Hole Spacing		Bolt Hole Diameter		Bolt Circle Diameter		Hex	Square	Stem Height	
	Standard	Wafer	Standard	Wafer	Standard	Wafer	+ .000 - .006	+ .000 - .002		
1-1/2	1.95	N/A	.34	N/A	2.75	N/A	.375	N/A	.75	N/A
2	1.95	2.47	.34	.40	2.75	3.50	.500	.375	.75	1.30
2-1/2	1.95	2.47	.34	.40	2.75	3.50	.500	.375	.75	1.34
3	2.65	2.47	.41	.40	3.75	3.50	.563	.500	1.00	1.34
4	2.65	2.47	.41	.40	3.75	3.50	.625	.500	1.04	1.37
6	3.17	2.83	.41	.40	4.48	4.00	.875	.750	1.27	1.80
8	3.17	3.17	.41	.40	4.48	4.48	1.000	.875	1.29	1.96
10	3.54	N/A	.41	N/A	5.00	N/A	1.125	N/A	1.38	N/A
12	3.54	N/A	.41	N/A	5.00	N/A	1.250	N/A	1.38	N/A
14	3.54	N/A	.41	N/A	5.00	N/A	1.250	N/A	1.62	N/A
16	3.54	N/A	.41	N/A	5.00	N/A	1.250	N/A	1.75	N/A
18	3.54	N/A	.41	N/A	5.00	N/A	1.250	N/A	1.75	N/A
20	3.93	N/A	.41	N/A	5.56	N/A	1.250	N/A	1.75	N/A
24	4.33	N/A	.41	N/A	6.12	N/A	1.250	N/A	1.75	N/A

**Note:** Standard = Standard, Lug & True Lug Style Valves  
Wafer = Wafer Style Valves



## Thermoplastic Valves Product Guide & Engineering Specifications Butterfly Valve Dimensions & Operational Information



### General Installation Information

Spears® Butterfly Valves are designed for system connections either between two flanges, or with single-side (flange one-side only) connection for dead-end service using lug style valves. Lug Insert Valves require attention to flow direction, True Lug valves may be installed either direction. The valve handle (or gear operator) is reversible 180° for either left or right side operation. Spears® Butterfly Valves are designed for installation with user supplied 1/8" full-faced gaskets, hex bolts, nuts and flat washers.

**Caution:** Spears® Butterfly Valves are designed for use with flanges or flanged equipment having minimum waterway inside diameter no less than that of Schedule 80 PVC pipe (ASTM D 1785). *Use of smaller inside diameter flange connections may result in obstruction and damage to the valve disc.*

### PVC & CPVC Butterfly Valve Torque and Hardware Requirements

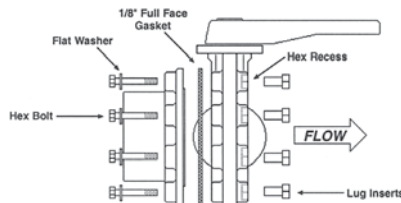
Valve Size (in.)	No. of Bolt Holes	Bolt Torque (ft.-lb.)	Standard Valve						Valve with Lug Inserts					True Lug Valve			
			Bolt Lengths <sup>1</sup> (in.)		Bolt Diameter (in.)	Bolt Threads per inch	Flat Washer O.D. (in.)		Bolt Lengths <sup>1</sup> (in.)		Bolt Diameter (in.)	Lug Threads per inch	Flat Washer O.D. (in.)	Bolt Lengths <sup>2</sup> (in.)	Bolt Diameter (in.)	Lug Threads per inch	Flat Washer O.D. (in.)
			Single Side	Dual Flange <sup>3</sup>					Single Side	2nd Flange <sup>2</sup>							
1-1/2	4	12	3-1/4	4-1/4	1/2	13	1-3/8		1-3/4	1-1/2	1/2	13	1-3/8	1-1/2	7/16	14	1-1/4
2	4	25	3-3/4	4-3/4	5/8	11	1-3/4		2	1-3/4	5/8	11	1-3/4	1-1/2	1/2	13	1-3/8
2-1/2	4	25	4-1/4	5-1/4	5/8	11	1-3/4		2-1/4	2	5/8	11	1-3/4	1-3/4	1/2	13	1-3/8
3	4	25	4-1/4	5-1/2	5/8	11	1-3/4		2-1/4	2	5/8	11	1-3/4	2	1/2	13	1-3/8
4	8	25	4-1/2	5-3/4	5/8	11	1-3/4		2-1/2	2	5/8	11	1-3/4	2	1/2	13	1-3/8
6	8	40	5-1/4	6-3/4	3/4	10	2		3-1/4	2-1/4	3/4	10	2	2-1/4	5/8	11	1-3/4
8	8	40	5-3/4	7-1/4	3/4	10	2		3-3/4	2-1/4	3/4	10	2	2-1/4	5/8	11	1-3/4
10	12	64	6-1/2	8-1/4	7/8	9	2-1/4		4	3	7/8	9	2-1/4	2-3/4	3/4	10	2
12	12	95	6-3/4	8-1/2	7/8	9	2-1/4		4-1/4	3	7/8	9	2-1/4	2-3/4	3/4	10	2

1: Minimum bolt lengths based on use of Spears® flanges, 1/8" full faced gaskets, standard S.A.E. hex bolts and Standard Plate Series flat washers.

2: Specified bolt lengths are **maximum allowable** for maintaining proper clearance in initial Single-Side installation with Lugs where anticipated 2nd Flange installation option is to be retained without removal of valve.

3: Minimum bolt length through 2-flanges, 2-gaskets, 2-flat washers and 1-valve body.

### Single-Side (flange one side) Installation Using Standard Valve with Lug Inserts (for field installable Insert Sets or valves with factory installed Lug Inserts)



**CAUTION:** Flange must be installed on side of valve **opposite** the hex nut recesses for Single-Side Installation as illustrated.

(Flange, bolts, nuts, washers and gaskets not included.  
Lug inserts may be ordered separately.)



### Polypropylene Butterfly Valve Torque and Hardware Requirements

Valve Size	No. of Bolt Holes	Bolt Diameter (in.)	Bolt Torque (ft.-lb.)	Bolt Lengths	Valve Lay Length
1-1/2	4	1/2	12	Bolt lengths will vary according to thickness of valve, mating flanges, nuts and gaskets used.  The following formula may be use to calculate bolt length for installation with mating flange each side.  $L = V + 2 ( F + G + W ) + N$ Where: L = Minimum Bolt Length V = Valve Lay Length F = Flange Thickness G = Gasket Thickness W = Washer Thickness N = Nut Thickness	1-9/16
2	4	5/8	25		1-7/8
2-1/2	4	5/8	25		2-1/16
3	4	5/8	25		2-1/8
4	8	5/8	25		2-5/16
6	8	3/4	40		3
8	8	3/4	40		2-3/4
10	12	7/8	64		3-1/4
12	12	7/8	95		3-1/2
14	12	1	110		6-1/4
16	16	1	110		6-3/4
18	16	1-1/8	110		7-1/8
20	20	1-1/8	110		7-3/4
24	20	1-1/4	110		8-1/2