

# KEYSTONE

- 61W - Wafer style resilient seated butterfly valve
- 61L - Lugged style resilient seated butterfly valve

## Features

- Rounded polished disc edge gives full concentric sealing, lower torques, longer seat life and bubble-tight shutoff.
- The seat is field replaceable and fully isolates the body and stem from the flow.
- Primary stem sealing exceeds the pressure rating of the valve and prevents leakage through stem area to atmosphere.
- A secondary stem seal provides backup sealing.
- Top and bottom inboard stem bearings for optimum support and minimum friction to prolong valve life.
- Top bushing absorbs actuator side thrust loads.
- Top seal prevents moisture penetrating into the stem area.
- Thin disc design provides minimum obstruction to flow, resulting in smooth flow characteristics.
- A molded-in O-ring in the seat for flange sealing eliminates the need for gaskets.
- Extended body neck allows for pipe insulation.
- Body locating holes ease installation and centering between the flanges.
- Available approvals: PED (CE Mark), DNV, Lloyds.



## General Applications

These valves are ideally suited to many applications where tight shut-off is required, such as:

Industrial Processing  
Water & Wastewater  
Dry Bulk Conveying  
Paper Mills  
Light Slurry Handling  
Food & Beverage  
HVAC  
Transportation

## Technical Data

Size Range: 2" thru 12"  
Pressure: 235 psi  
End of line: 150 psi  
Temperature: -40°F to +300°F  
End Connection: ASME 125/150

**tyco** / Flow Control

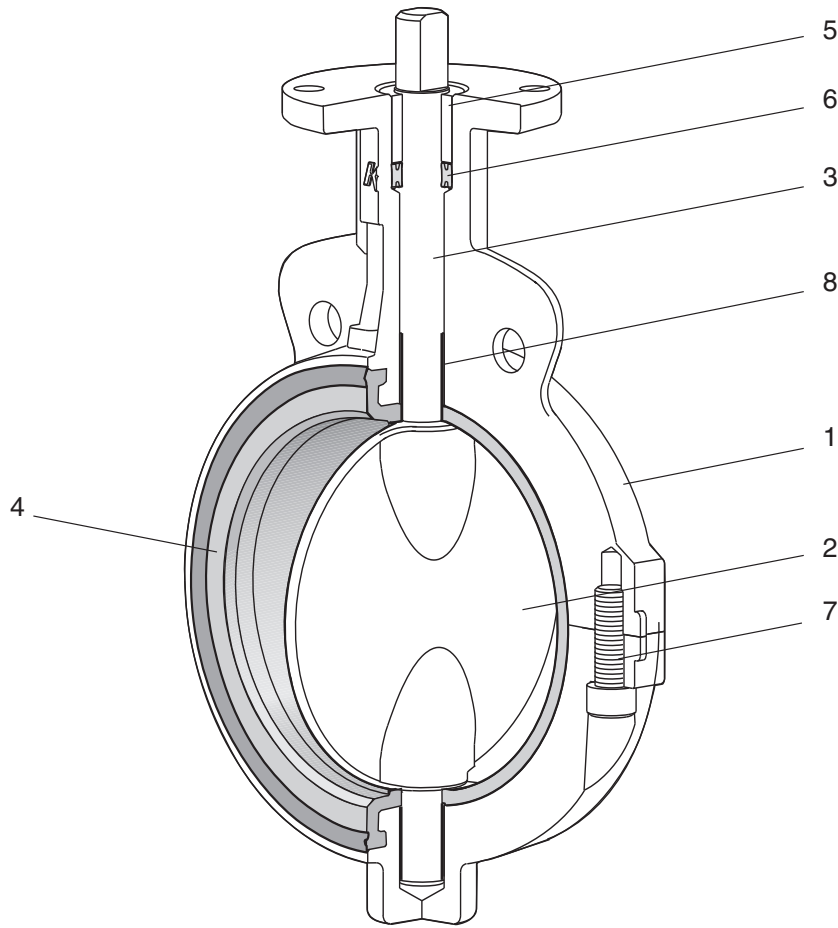
Total Flow Control Solutions™

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# Keystone Butterfly Valves - Series 61

2" thru 12"

## Specifications



### Temperature Rating

-40°F to +250°F with EPDM

+5°F to +212°F with NBR

### Notes

PED approved valves have a temperature limitation of -20°F due to body material.

Consult factory for available trims.

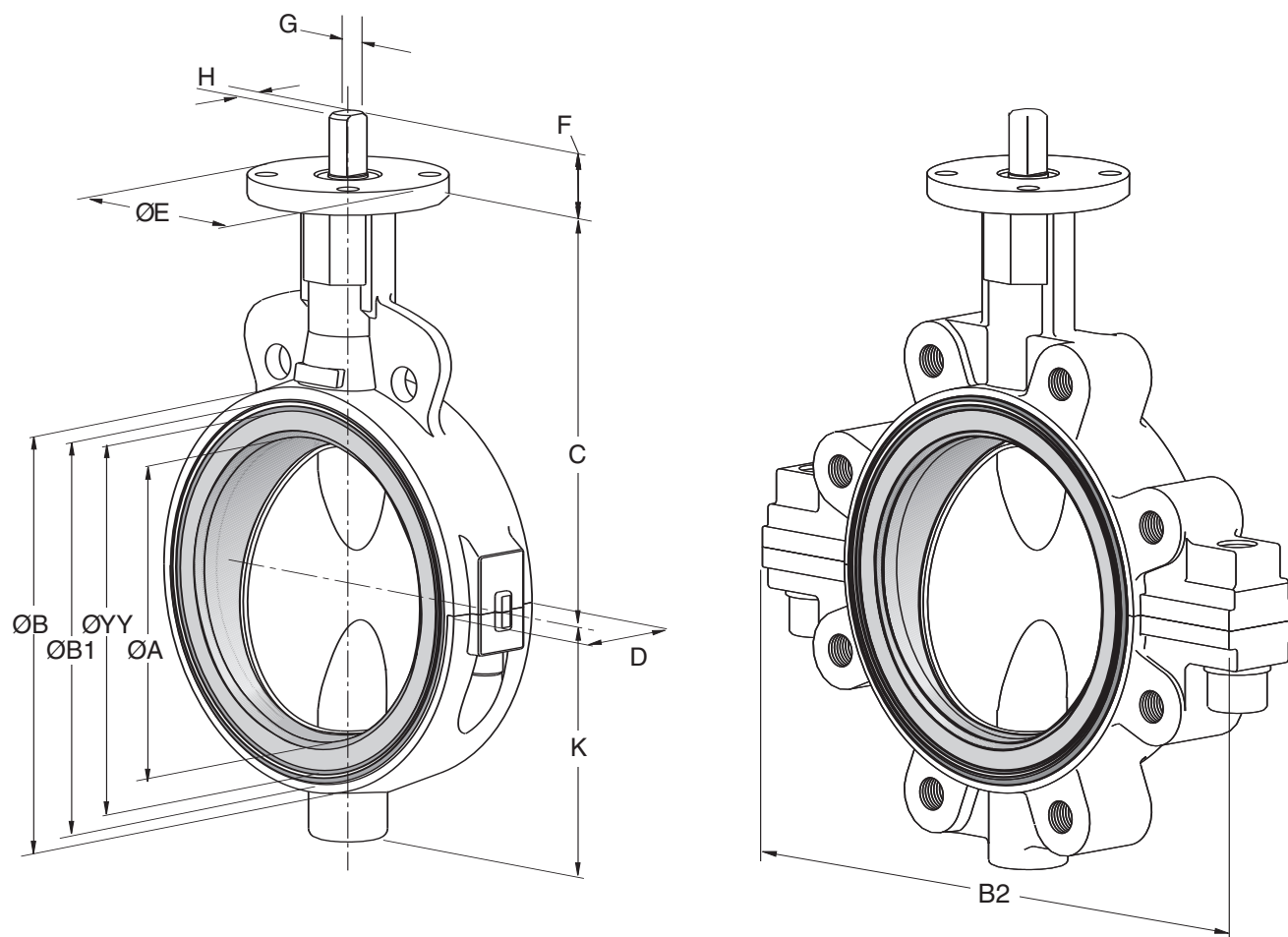
### Parts List

No.	Description	Standard Material	Material Specification
1	Body	Ductile Iron	ASTM A536 Gr 65-45-12
2	Disc	Super Duplex SAF 2507 Ductile Iron (Nylon Coated)	ASTM A890 5A ASTM A536 Gr 65-45-12
3	Stem	416 Stainless Steel (Standard) 316 Stainless Steel (Optional) Super Duplex Stainless Steel	ASTM A582 Gr 416 cond. H EN10088-3 X5CrNiMo 17-12-2 EN10088-3 X2CrNiMoN25-7-4
4	Seat	EPDM (Food Grade) NBR (Food Grade)	- -
5	Stem Bush	Polyester	-
6	Stem Packing	NBR	-
7	Body Screws	316 Stainless Steel	-
8	Bearings	Sintered Metal	ASTM B439 Grade 1

### Notes

ENP = Electroless Nickel Plated  
(for corrosion resistance)

## Specifications



### Dimensions, inches

Valve Size in.	Stem Conn. Code	Dimensions										Stem Conn. H x G inches	Key in.	Top Plate		Weight lbs.		
		ØA	ØB	ØB1	B2	C	D	ØE	F	K	Q			ØYY	Bolt Circle	Hole Dia.	Wafer	Lug
2	BB	1.97	3.70	3.15	7.09	5.31	1.69	4	0.98	2.80	1.06	2.60	0.472 x 0.315	3.25	7/16	4.50	8.00	
2.5	BAB	2.44	4.29	3.66	7.87	5.91	1.81	4	1.18	3.07	1.69	3.07	9/16 x 3/8	3.25	7/16	7.00	11.00	
3	BAB	3.07	4.96	4.41	9.45	6.30	1.81	4	1.18	3.98	2.52	3.82	9/16 x 3/8	3.25	7/16	8.00	13.00	
4	BAC	3.90	6.14	5.67	10.55	7.09	2.05	4	1.18	4.53	3.43	5.08	5/8 x 7/16	3.25	7/16	11.50	18.50	
5	BAD	4.88	7.44	6.89	11.81	7.68	2.20	4	1.18	4.69	4.45	6.30	3/4 x 1/2	3.25	7/16	16.75	25.50	
6	BAD	5.94	8.43	7.72	13.19	8.27	2.20	4	1.18	5.59	5.55	7.13	3/4 x 1/2	3.25	7/16	18.75	28.70	
8	CAE	7.68	10.51	9.76	15.63	9.45	2.36	6	1.26	7.05	7.40	9.17	7/8 x 5/8	5.00	9/16	35.50	49.00	
10	CAF	9.65	12.64	12.01	18.90	10.83	2.68	6	1.97	8.62	9.33	11.42	1 1/8	1/4 x 1/4	5.00	9/16	52.00	74.00
12	CAF	11.50	14.76	13.98	21.42	12.20	3.07	6	1.97	9.61	11.14	13.39	1 1/8	1/4 x 1/4	5.00	9/16	70.50	112.50

### Notes

"Q" dimension is the disc chordal dimension at face of valve for disc clearance into lined pipe or fittings.

"H" dimension is the stem connection.

"G" dimension is across the stem flats.

"ØB1" dimension is to the outside of the seat.

"ØYY" dimension is to the O-ring seal.

Weight may vary depending on trim materials used.

## Dimensions

### Anticipated Seating and Unseating Torque Values - lbs. in.

Valve Size, in	Shut Off Pressure psi, Normal Service					
	0	50	100	150	175	235
2	115	115	115	124	133	133
2.5	159	168	177	186	204	221
3	221	230	239	266	292	319
4	301	327	354	389	434	451
5	469	513	558	620	708	752
6	655	717	779	876	1000	1062
8	1168	1310	1451	1664	1938	2080
10	1867	2133	2398	2788	3310	3567
12	2682	3053	3425	3991	4744	5115

### Notes

1. The charted seating and unseating torques are the sum of all friction and includes opening and closing of the disc against the indicated pressure differential for normal service.
2. Normal Service: Clean liquid service at temperatures between 24°F to 200°F with no internal deposition or chemical attack. Operated a minimum of once per day.
3. The relationship between values are linear, therefore you can interpolate between nominated values.
4. The effect of dynamic torque is not considered in tabulation.
5. In sizing operators it is not necessary to include safety factors.

### For conditions that vary from those noted, then apply the following Application Factor Multipliers:

Operated less than once per day	x 1.2
Dry Service with gas or air	x 1.5
Dry Service with abrasives, cement	x 1.7
Lubrication oils	x 0.5
Temperature - lower than 24°F	x 1.2
- higher than 200°F	x 1.2
Chemical attack: Consult factory	

To apply the as noted Application Factor Multipliers:

1. Find the base torque value by selecting the required valve size from the left hand column and read across to the intended line pressure column. Note the torque value. (You can interpolate between line pressure values.)
2. Find the zero pressure torque for the same valve on the same row and subtract this zero pressure torque from the value in step 1.
3. Multiply the zero pressure torque value by the expected Application Factors.
4. Add the difference between the zero pressure torque and the line pressure torque (value of step 2 plus value of step 3) to give the new torque value specific to the actual service conditions.

### Example:

A 6" Series 61 valve is to be used in a clean water application. The line pressure is 235 psi @ 210°F. The valve may only cycle twice per month.

1. Using the Normal Service Torque Values table base torque value for **6" @ 235 psi = 1062 lbs. in.**
2. Find torque value at zero psi = **655 lbs. in.**  
Subtract **1062 - 655 = 407 lbs. in.**
3. Multiply zero pressure torque value by Application Factors  
Application Factors:  
Operated less than once per day = x 1.2  
Temperature higher than 200°F = x 1.2  
Multiply Application Factors **1.2 x 1.2 = 1.44 (round off to 1.4) 655 x 1.4 = 917 lbs. in.**
4. Add the difference between zero pressure and line pressure, as per step 2, to the value determined in step 3: **407 + 917 = 1324 lbs. in.**

**The new torque value for this valve, specific to the actual service conditions is 1324 lbs. in.**

## Specifications

### Notes

1. The charted seating and unseating torques are the sum of all friction and includes opening and closing of the disc against the indicated pressure differential for normal service.
2. Normal Service: Clean liquid service at temperatures between 24°F to 200°F with no internal deposition or chemical attack. Operated a minimum of once per day.
3. The relationship between values are linear, therefore you can interpolate between nominated values.
4. The effect of dynamic torque is not considered in tabulation.
5. In sizing operators it is not necessary to include safety factors.

### Anticipated Seating and Unseating Torque Values - lbs. in. (Undercut Valves)

Valve Size, in.	Shut Off Pressure psi, Normal Service
	50
2	69
2.5	101
3	138
4	196
5	308
6	430
8	786
10	1280
12	1832

### For conditions that vary from those noted, then apply the following Application Factor Multipliers:

Operated less than once per day	x 1.2
Dry Service with gas or air	x 1.5
Dry Service with abrasives, cement	x 1.7
Lubrication oils	x 0.5
Temperature - lower than 24°F	x 1.2
- higher than 200°F	x 1.2

Chemical attack: Consult factory

To apply the as noted Application Factor Multipliers:

1. Find the base torque value by selecting the required valve size from the left hand column and read across to the intended line pressure column. Note the torque value. (You can interpolate between line pressure values.)
2. Multiply the noted value by the expected Application Factors.
3. The result provides the new torque value specific to the actual service conditions.

# Keystone Butterfly Valves - Series 61

2" thru 12"

## Specifications

### Maximum Allowable Stem Torques - lbs. in.

Valve Size	2	2.5	3	4	5	6	8	10	12
416 SS	620	1044	1044	1548	2478	2478	4380	8585	8585
316 SS	575	974	974	1416	2301	2301	4248	8585	8585

### Flow Rate Coefficient - C<sub>v</sub> Values

Size, in.	Disc Opening (Degrees)								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2	0	1	6	16	35	54	83	114	125
2.5	0	3	13	31	58	90	142	199	251
3	0	7	32	64	105	163	249	351	473
4	0	16	66	126	205	306	471	694	933
5	0	32	98	183	289	405	728	1114	1446
6	8	60	150	261	424	668	1141	1793	2250
8	25	133	267	468	747	1190	2050	3364	4065
10	39	200	392	741	1133	1787	3095	5143	6712
12	57	292	572	1081	1653	2607	4514	7757	10301

#### Note

C<sub>v</sub> = The valve flow capacity expressed as the flow rate of 70°F water, in US gallons per minute, which produces a 1 psi pressure drop across the valve.

### Simplified Sizing Formulas

#### Liquid

$$C_v = Q \sqrt{\frac{S.G.}{\Delta P}}$$

#### Gas

$$C_v = \frac{1}{Q} \sqrt{\frac{(S.G.)}{(P_2) (\Delta P)}}$$

#### Where:

**Q** = Flow through valve (USG per minute)  
**S.G.** = Specific gravity (water = 1)  
**ΔP** = Pressure drop across valve (psi)

#### Where:

**Q** = Flow through valve (SCFM)  
**S.G.** = Specific gravity (air = 1)  
**ΔP** = Pressure drop across valve (psi)  
 [Less than 1/2 inlet pressure (psi)]  
**P<sub>2</sub>** = Outlet pressure (psi)

**Series 61 Ordering Information**

**Example:**

a 2" wafer style valve with ductile iron body, nylon coated disc, 416 SS stem, EPDM seat, and no actuation

**020 61W DRS1 0**

**020 61 W D R S 1 0**

**Size**

- 020 - 2"
- 025 - 2.5"
- 030 - 3"
- 040 - 4"
- 050 - 5"
- 060 - 6"
- 080 - 8"
- 100 - 10"
- 120 - 12"

**Series**

61

**Body Style**

- W - Wafer
- L - Lug

**Body**

- D - Ductile Iron (A536)

**Disc Material**

- T - Super Duplex
- R - Ductile Iron/Nylon

**Stem Material**

- S - 416 Stainless Steel (Standard)
- P - 316 Stainless Steel (Optional)
- T - Super Duplex

**Seat Material**

- 1 - EPDM (Food Grade)
- 2 - NBR (Food Grade)

**Special Requirements (if no Special Requirements leave blank)**

- U - 50 psi Rating

**Actuation**

- 0 - None
- 1 - Handle
- 2 - Gear
- 3 - Chain Wheel
- 4 - Pneumatic DA
- 5 - Pneumatic SR
- 6 - Electric
- X - Other

## Additional Keystone Products



**Keystone K-LOK** ANSI rated high performance valves are available in ASME 150 and ASME 300 pressure classes. They are available in a variety of trims to meet your higher pressure higher temperature requirements.



**Keystone Figure 106** large diameter butterfly valves are offered in sizes 24" through 48" for your larger diameter valve requirements.

**Tyco Flow Control** offers a complete line of actuation and controls to meet all your automation needs. This allows us to supply a complete package for single source responsibility.



**Keystone MRP Pneumatic Rack & Pinion Actuators**



**Keystone EPI<sub>2</sub> Electric Actuator**

For more specific information on the above products and additional products, please visit the following websites:

[www.keystonevalves.com](http://www.keystonevalves.com)

[www.tycoflowcontrol.com](http://www.tycoflowcontrol.com)

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