



KEYSTONE SERIES 60 BUTTERFLY VALVE

- 60W wafer style resilient seated butterfly valve
- 60L lug style resilient seated butterfly valve
- Cartridge seat design



FEATURES

- Suitable for high pressure and full vacuum service due to the use of a cartridge seat design.
- Triple function cartridge seat isolates the body and stem from the media, provides positive drop-tight shut-off of line media at full rated pressure and provides a flange seal, eliminating the need for flange gaskets.
- Full rated unidirectional dead-end service is achieved by utilizing a unique patented lip in the lug body.
- Strong disc-to-stem connection and elimination of exposed pins or bolts is achieved through a rectangular drive.
- Ability to install the valve with the disc in the closed position eliminates the risk of damage to the valve during installation.
- Maximum flow and rangeability is achieved with the use of a streamlined disc.
- Blowout-proof stems as a standard.
- Longer seat life with low operating torques is ensured by utilizing upper and lower stem bearings.
- Need for costly brackets is eliminated due to the ability to direct mount actuation onto the valve top-plate.
- Designed to comply with MSS-SP-67 and API 609 (may be shell tested to spec request)

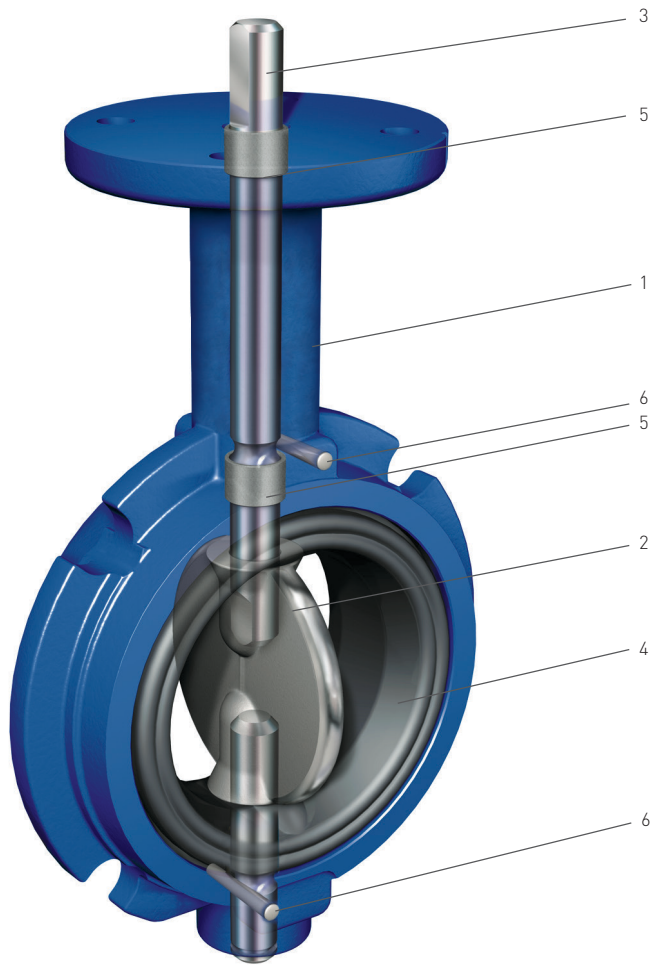
GENERAL APPLICATION

Ideally suited for many industrial applications such as food and beverage, pulp and paper, chemical, mining, water treatment, HVAC, power, and automotive where a heavy-duty resilient seated butterfly valve is required. Available in a wide variety of body, disc and seat materials to fit a wide variety of media applications.

TECHNICAL DATA

Size range: DN 50 to 600 (NPS 2 to 24)
Wafer and lug styles
Pressure rating: DN 50 to 300 - 17.2 bar (NPS 2 to 12 - 250 psi)
DN 350 to 600 - 13.7 bar (NPS 14 to 24 - 200 psi)
PTFE seat or elastomer covered disc
DN 50 to 300 - 10.3 bar (NPS 2 to 12 - 150 psi)
Dead end rating: Full rated in preferred direction of flow
Flange standard: ASME Class 125/150

KEYSTONE SERIES 60 BUTTERFLY VALVE



MATERIALS

Part	Standard material	Material specifications
1 Body	Cast iron ^[1]	ASTM A126 Class B
	Ductile iron (DN 50 - 300/ NPS 2 - 12)	ASTM A395 Grade 60/40/18
	Ductile iron ^[2] (DN 350 - 600/ NPS 14 - 24 Lug style)	ASTM A536 Grade 65/45/12
	316 Stainless steel ^[3]	ASTM A351 CF8M
2 Disc	Ductile iron/Nickel plated	ASTM A536 Grade 65/45/12
	Aluminum bronze	ASTM B148 C95400
	316 Stainless steel	ASTM A351 CF8M
	EPDM Coated (DN 80 - 300/ NPS 3 - 12)	
	NBR Coated (DN 80 - 300/ NPS 3 - 12)	
3 Stem	416 Stainless steel (standard)	ASTM A582 UNS S41600 cond. A
	316 Stainless steel (optional) ^[4]	ASTM A276 UNS S31600 cond. A
4 Seat	EPDM (-28°C - 120°C/ -20°F - 250°F)	
	NBR (-17°C - 82°C/ 0°F - 180°F)	
	Fluoroelastomer (-17°C - 149°C/ 0°F - 300°F)	
	PTFE (-28°C - 120°C/ -20°F - 250°F) (DN 50 - 300/ NPS 2 - 12)	
5 Bearing ^[5]	PTFE Gar-Fil® (DN 50 - 600/ NPS 2 - 24)	
6 Pin	Carbon steel	

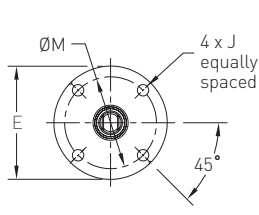
NOTES

- DN 350 (NPS 14) and larger wafer style available in cast iron body only.
- DN 350 (NPS 14) and larger lug style available in ductile iron body only.
- Offered in DN 50 - 150 (NPS 2 - 6) only. These bodies come standard with a vented shaft and food grade seats.
- 316 Stainless steel stem available in DN 50 - 300 (NPS 2 - 12) only.
- Valves with 316 S/S bodies are provided with two additional bearings in the lower stem journal.

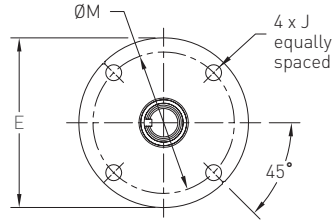
KEYSTONE SERIES 60 BUTTERFLY VALVE

METRIC DATA

TOP PLATE DIMENSIONS

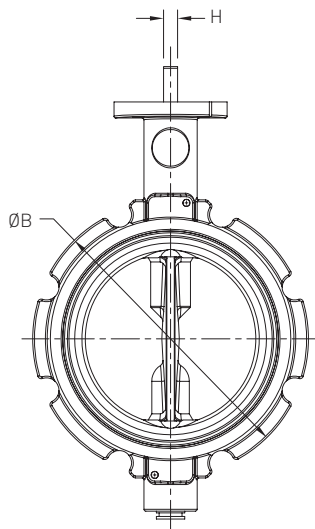


DN 50 - 200

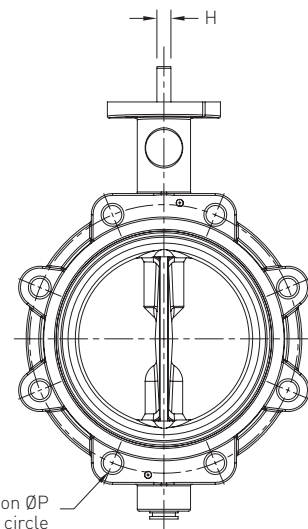
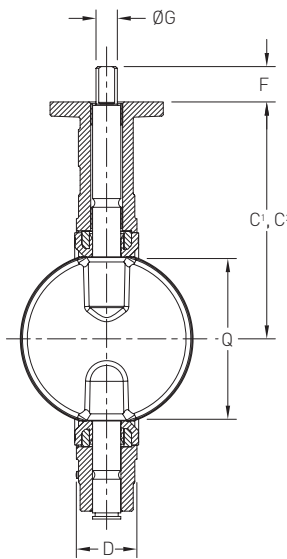


DN 250 - 600

VALVE DIMENSIONS



WAFER



LUG

DIMENSIONS (mm)

Size DN	B	C1	C2	D	E	F	G	H	J	M	N	P	Q*	Adapt key	Code
50	129	146	119	41	102	31.75	14.22	9.4	10.3	82.6	5/8" -11	121	36	-	BAB
65	148	159	-	44	102	31.75	14.22	9.4	10.3	82.6	5/8" -11	140	46	-	BAB
80	159	165	124	44	102	31.75	14.22	9.4	10.3	82.6	5/8" -11	152	67	-	BAB
100	198	184	152	51	102	31.75	16.00	10.9	10.3	82.6	5/8" -11	191	92	-	BAC
125	222	197	-	54	102	31.75	19.05	12.7	10.3	82.6	3/4" -10	216	119	-	BAD
150	248	213	165	54	102	31.75	19.05	12.7	10.3	82.6	3/4" -10	241	144	-	BAD
200	305	244	-	60	152	31.75	22.10	16.0	14.3	127.0	3/4" -10	298	192	-	CAE
250	368	279	-	67	152	50.80	28.45	-	14.3	127.0	7/8" -9	362	245	6.4 x 6.4	CAF
300	445	318	-	76	152	50.80	34.80	-	14.3	127.0	7/8" -9	432	292	8 x 8	CAG
350	495	337	-	78	152	76.20	34.80	-	13.5	127.0	1" -8	476	329	8 x 8	CAG
400	560	375	-	102	152	76.20	41.40	-	13.5	127.0	1" -8	540	377	9.5 x 9.5	CAH
450	595	400	-	114	171	76.20	41.40	-	13.5	127.0	1 1/8" -7	578	426	9.5 x 9.5	CAH
500	652	413	-	127	171	107.95	47.75	-	20.6	165.1	1 1/8" -7	635	475	12.7 x 9.5	DAJ
600	764	486	-	152	203	107.95	47.75	-	20.6	165.1	1 1/4" -7	749	574	12.7 x 9.5	DAJ

NOTE

C1 Dimensions apply to cast iron and ductile iron bodies ONLY.

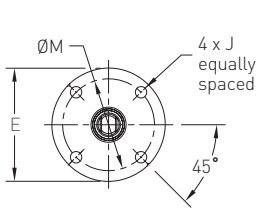
C2 Dimensions apply to stainless steel bodies ONLY.

Q* Dimension is the minimum allowable pipe or flange inside diameter at the centered body face to protect the disc sealing edge against damage when opening the valve.

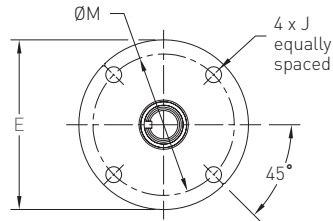
KEYSTONE SERIES 60 BUTTERFLY VALVE

IMPERIAL DATA

TOP PLATE DIMENSIONS

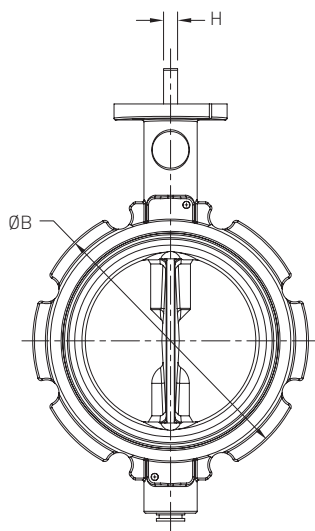


NPS 2 - 8

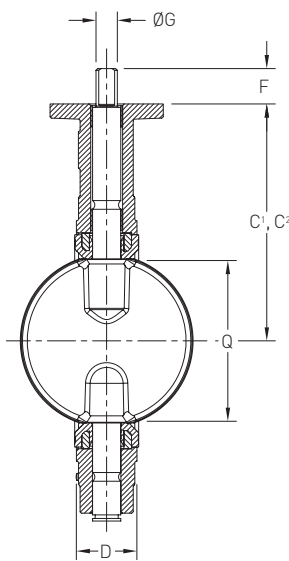


NPS 10 - 24

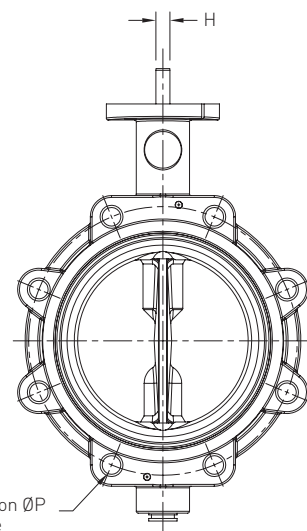
VALVE DIMENSIONS



WAFER



N thread on ØP bolt circle



LUG

DIMENSIONS (inches)

Size NPS	B	C1	C2	D	E	F	G	H	J	M	N	P	Q*	Adapt key	Code
2	5.09	5.75	4.69	1.63	4.00	1.25	0.56	0.37	0.406	3.25	5/8 -11	4.75	1.41	-	BAB
2½	5.81	6.25	-	1.75	4.00	1.25	0.56	0.37	0.406	3.25	5/8 -11	5.50	1.82	-	BAB
3	6.25	6.50	4.87	1.75	4.00	1.25	0.56	0.37	0.406	3.25	5/8 -11	6.00	2.62	-	BAB
4	7.81	7.25	6.00	2.00	4.00	1.25	0.63	0.43	0.406	3.25	5/8 -11	7.50	3.62	-	BAC
5	8.75	7.75	-	2.13	4.00	1.25	0.75	0.50	0.406	3.25	¾ -10	8.50	4.67	-	BAD
6	9.75	8.38	6.50	2.14	4.00	1.25	0.75	0.50	0.406	3.25	¾ -10	9.50	5.68	-	BAD
8	12.00	9.62	-	2.35	6.00	1.25	0.87	0.63	0.562	5.00	¾ -10	11.75	7.54	-	CAE
10	14.50	11.00	-	2.63	6.00	2.00	1.12	-	0.562	5.00	7/8 -9	14.25	9.65	¼ x ¼	CAF
12	17.50	12.50	-	3.00	6.00	2.00	1.37	-	0.562	5.00	7/8 -9	17.00	11.49	5/16 x 5/16	CAG
14	19.50	13.25	-	3.06	6.00	3.00	1.37	-	0.531	5.00	1-8	18.75	12.97	5/16 x 5/16	CAG
16	22.06	14.75	-	4.01	6.00	3.00	1.63	-	0.531	5.00	1-8	21.25	14.85	¾ x ¾	CAH
18	23.44	15.75	-	4.48	6.75	3.00	1.63	-	0.531	5.00	1½ -7	22.75	16.76	¾ x ¾	CAH
20	25.68	16.25	-	4.99	6.75	4.25	1.88	-	0.812	6.50	1½ -7	25.00	18.72	½ x ¾	DAJ
24	30.06	19.12	-	6.00	8.00	4.25	1.88	-	0.812	6.50	1¼ -7	29.50	22.59	½ x ¾	DAJ

NOTE

C1 Dimensions apply to cast iron and ductile iron bodies ONLY.

C2 Dimensions apply to stainless steel bodies ONLY.

Q* Dimension is the minimum allowable pipe or flange inside diameter at the centered body face to protect the disc sealing edge against damage when opening the valve.

KEYSTONE SERIES 60 BUTTERFLY VALVE

METRIC DATA

VALVE SIZING

Rate of flow through a valve depends upon the pressure drop. The most common method of presenting this information is by K_v . The K_v is the valve coefficient of flow and represents the volume of water in cubic meters per hour (m³/h) that will pass through a valve with a pressure drop of 1 bar at 21°C. The higher the K_v , the greater the flow and the better the control characteristics. Throttling characteristics are shown in the same manner with K_v 's at the various disc openings. Tabulated below are the K_v 's for the Series 60 Butterfly Valve.

K_v CHART

Valve size DN	Disc position (Degrees open)							
	25°	30°	40°	50°	60°	70°	80°	90°
50	3	6	16	31	54	73	99	104
65	3	9	21	41	67	98	157	168
80	12	18	39	73	115	176	330	372
100	26	45	87	143	234	363	608	718
125	74	112	182	298	454	714	1168	1298
150	143	195	311	493	709	1090	1622	1713
200	182	260	415	675	1142	1972	3270	3348
250	350	497	735	1038	1644	2855	5277	5579
300	476	649	1038	1622	2465	4347	8045	8477
350	562	714	1298	1990	3028	5363	8391	9083
400	692	865	1600	2509	3979	6488	9169	11678
450	952	1211	2119	3287	4325	8391	11980	15570
500	1211	1427	2638	4152	6401	10813	15354	19895
600	1730	2076	3633	5709	9083	14705	1990	26815

TORQUE DATA

Torque is the rotary effort required to operate a valve. This turning force in a butterfly valve is determined by three factors - the friction of the disc and seat due to interference for sealing, bearing friction, and fluid dynamic torque.

Breakaway torque at 21°C

Breakaway torque is the total of the torques resulting from bearing friction and disc/seat interference friction at a given pressure differential. Listed below are torques to open and close the valve at pressures shown in wet services (normal conditions).

NOTE

These values are valid for water and lubricating fluids only at 21°C. Since torques are greatly increased for dry and nonlubricating fluids and temperature variations, contact your Keystone representative for accurate values in these applications.

BREAKAWAY TORQUE (Nm)*

Line pressure (bar)	Size													
	50	65	80	100	125	150	200	250	300	350	400	450	500	600
3.5	10	14	20	40	63	104	163	279	397	588	780	1017	1243	1808
7	12	17	23	47	74	117	191	340	468	678	904	1186	1582	2373
10	14	20	29	53	81	130	217	401	635	847	1073	1356	1717	3164
14	16	22	34	60	89	143	249	463	868	966	1215	1525	1989	3808
17	18	25	38	67	98	157	280	527	1193	-	-	-	-	-

* For wet service applications/standard disc

KEYSTONE SERIES 60 BUTTERFLY VALVE

IMPERIAL DATA

VALVE SIZING

Rate of flow through a valve depends upon the pressure drop. The most common method of presenting this information is by C_v . The C_v is the valve coefficient of flow and represents the volume of water in gallons per minute (GPM) that will pass through a valve with a pressure drop of 1 psi at 70°F. The higher the C_v , the greater the flow and the better the control characteristics. Throttling characteristics are shown in the same manner with C_v 's at the various disc openings. Tabulated below are the C_v 's for the Series 60 Butterfly Valve.

C_v CHART

Valve size NPS	Disc position (Degrees open)							
	25°	30°	40°	50°	60°	70°	80°	90°
2	3	7	19	36	63	84	115	120
2½	4	10	24	47	78	113	182	194
3	14	21	45	84	133	203	382	430
4	30	52	100	165	270	420	703	830
5	85	130	210	345	525	825	1350	1500
6	165	225	360	570	820	1260	1875	1980
8	210	300	480	780	1320	2280	3780	3870
10	405	575	850	1200	1900	3300	6100	6450
12	550	750	1200	1875	2850	5025	9300	9800
14	650	825	1500	2300	3500	6200	9700	10500
16	800	1000	1850	2900	4600	7500	10600	13500
18	1100	1400	2450	3800	5000	9700	13850	18000
20	1400	1650	3050	4800	7400	12500	17750	23000
24	2000	2400	4200	6600	10500	17000	2300	31000

TORQUE DATA

Torque is the rotary effort required to operate a valve. This turning force in a butterfly valve is determined by three factors - the friction of the disc and seat due to interference for sealing, bearing friction, and fluid dynamic torque.

Breakaway torque at 70°F

Breakaway torque is the total of the torques resulting from bearing friction and disc/seat interference friction at a given pressure differential. Listed below are torques to open and close the valve at pressures shown in wet services (normal conditions).

NOTE

These values are valid for water and lubricating fluids only at 70°F. Since torques are greatly increased for dry and nonlubricating fluids and temperature variations, contact your Keystone representative for accurate values in these applications.

BREAKAWAY TORQUE (inch/pounds)*

Line pressure (psi)	Size													
	2	2½	3	4	5	6	8	10	12	14	16	18	20	24
50	85	126	180	355	562	918	1440	2466	3510	5200	6900	9000	11000	16000
100	108	153	207	414	652	1035	1692	3010	4140	6000	8000	10500	14000	21000
150	126	175	256	472	715	1152	1922	3550	5616	7500	9500	12000	15200	28000
200	144	198	297	531	787	1269	2205	4095	7686	8550	10750	13500	17600	33700
250	162	221	339	590	869	1386	2476	4660	10556	-	-	-	-	-

* For wet service applications/standard disc

KEYSTONE SERIES 60 BUTTERFLY VALVE

Valve weights

WAFER BODY (kg)

Valve size	Bare stem	Lever OP	Gear OP
50	2.3	4.5	6.4
65	2.7	5.0	6.8
80	3.2	5.4	8.6
100	7.7	10	11
125	8.6	11	14
150	13	15	15
200	16	19	28
250	26	29	38
300	39	42	59
350	64	-	74
400	80	-	91
450	101	-	112
500	157	-	168
600	211	-	243

LUG BODY (kg)

Valve size	Bare stem	Lever OP	Gear OP
50	3.6	5.9	7.7
65	4.5	6.8	8.6
80	5.0	7.3	9.1
100	6.8	9.1	12
125	12	15	18
150	14	16	20
200	20	22	36
250	29	31	52
300	54	57	74
350	71	-	82
400	101	-	113
450	121	-	132
500	187	-	198
600	225	-	256

WAFER BODY (lbs)

Valve size	Bare stem	Lever OP	Gear OP
2	5	10	14
2½	6	11	15
3	7	12	19
4	17	22	24
5	19	24	30
6	29	34	32
8	36	41	62
10	58	63	84
12	87	92	130
14	140	-	164
16	177	-	201
18	222	-	246
20	347	-	371
24	465	-	535

LUG BODY (lbs)

Valve size	Bare stem	Lever OP	Gear OP
2	8	13	17
2.5	10	15	19
3	11	16	20
4	15	20	27
5	27	32	40
6	31	36	44
8	44	49	79
10	64	69	115
12	120	125	163
14	156	-	180
16	223	-	250
18	266	-	290
20	412	-	436
24	495	-	565

KEYSTONE SERIES 60 BUTTERFLY VALVE

SELECTION GUIDE

Example:	60L	0100	- D0	A1	S2	E0	A1	K	- 00	000	00
Body style											
60L	Lug										
60W	Wafer										
Size DN (NPS)											
0050	50 (2)	0150	150 (6)	0400	400 (16)						
0065	65 (2½)	0200	200 (8)	0450	450 (18)						
0080	80 (3)	0250	250 (10)	0500	500 (20)						
0100	100 (4)	0300	300 (12)	0600	600 (24)						
0125	125 (5)	0350	350 (14)								
Body⁽¹⁾											
I0	Cast iron										
D0	Ductile iron A536										
D2	Ductile iron A395										
S0	316 Stainless steel										
Disc											
D0	Ductile iron - ENP										
S0	316 Stainless steel										
A1	Aluminum bronze										
Shaft											
S0	316 Stainless steel ⁽²⁾										
SG	416 SS										
Seat											
E0	EPDM FG										
EB	EPDM-non FG										
N1	NBR										
F1	FKM										
T5	PTFE										
Flange drilling											
A1	ASME 125/150										
Actuator mounting											
K	Keystone mount										
Actuation											
00	None										
H1	10 pos handle - blue										
G1	Gear - blue										
G5	Chainwheel - blue										
Special											
000	None										
P04	Reduced disc for 50 psi										
017	Sanitary service										
009	Silicone free										
Coating											
00	Standard blue										

NOTES

- DN350 (NPS 14) and larger wafer style body is available in cast iron only and lug style is available in ductile iron only. Stainless steel body is offered in DN 50-150 (NPS 2-6) only and comes standard with a vented shaft and FG seats.
- 316 SS shaft is available in DN 50-300 (NPS 2-12) only.
- Valves with 316 SS bodies are provided with 2 additional bearings in the lower stem journal.

Other options are available upon request. Please consult your local sales representative.

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