



## Resilient Seated Butterfly Valve Heavy Duty Cartridge Seat Design

### VALVES & CONTROLS

#### Features and Benefits

- Primary stem seal, formed by preloaded contact of disc hub with flatted seat surfaces, completely isolates stem and body from the line media.
- Secondary stem seal, formed by an engineered interference fit of the stem through the seat, provides additional sealing integrity.
- Rounded, polished disc edge provides full 360 degree concentric seating, minimum flow restriction, lower seating and unseating torques and maximum seat life.
- Superior, one-piece thru-shaft design provides high-strength and positive disc control. Shaft ends are standardized for operator interchangeability.
- Self-locking disc screws allow quick and easy disassembly and provide a positive connection.
- Self-adjusting, bi-directional stem seal is suitable for full industrial vacuum and pressure, preventing external contamination of the stem area.
- Heavy-duty, corrosion-resistant top bushing absorbs actuator side thrust loads.
- Replaceable, metal-reinforced seat, completely encapsulated by rubber, isolates the stem and body from the media and eliminates seat distortion due to high vacuum or turbulence.
- Each valve is factory tested to 110 percent of specified pressure rating assures drop-tight shut-off.
- Cast-in top plate is an integral part of the body and is standardized to allow direct mounting of all Keystone actuators.



#### General Application

Figures 129 and 139 are heavy duty, resilient seated butterfly valves that are ideally suited for seawater service within the commercial marine and offshore markets.

#### Technical Data

Pressure Rating:	200 psi
Sizes:	2 to 20 inch [50 to 500 mm]
Temperature:	-40°F to 250°F [-40°C to 120°C]

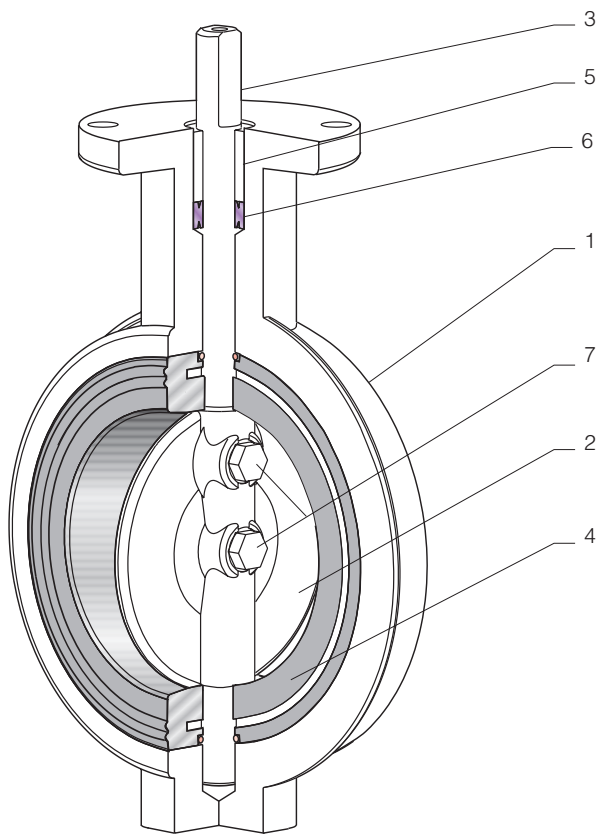
#### Flange Accommodations:

ASME 125/150  
JIS 10K/16K  
KS 10K/16K  
AS 2129E

# Keystone Butterfly Valve Figures 129 and 139

Sizes 2" to 20" [50 to 500 mm], 200 psi

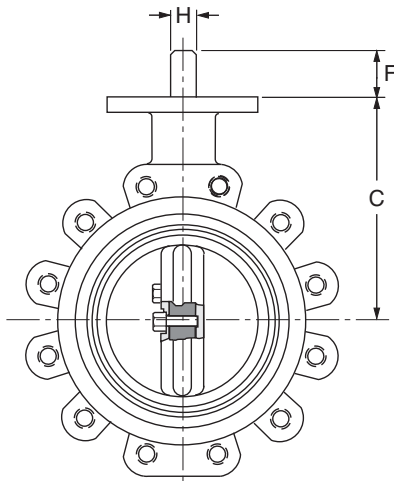
## Parts and Materials of Construction



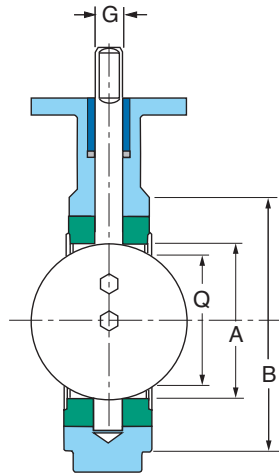
### Materials

Part	Standard Material	Material Specification
1 Body	Nickel Aluminum Bronze Ductile iron	ASTM A-B148 UNS N0C95800 ASTM A-395 GR 60/40/18
2 Disc	Aluminum bronze 316 Stainless steel Monel®	ASTM B-148, UNS C95200 Grade A ASTM A-743, CF8M ASTM A494 M35-1
3 Stem	316 Stainless steel 18-8 Stainless steel K500 Monel®	ASTM A-276 UNS S31600 ASTM A-276 UNS S30400 BS3076 NA 18
4 Seat	NBR	–
5 Upper stem bushing	Polyester	–
6 Stem packing	NBR	–
7 Disc screws	K-500 Monel®	–

**Dimensions**



**Figure 129 Lug**



**Figure 139 Wafer**

**Valve Dimensions (inches)**

Size	A	B	C	D	Q	E	F	G	H	Key	Top Plate Drilling			Tapped Lug Data			Weight (lbs)		Adapt Code
											Bolt Circle	Bolt Holes	Bolt No.	Bolt Circle	Bolt Holes	Bolt No.	129	139	
2	2	4 1/8	3 15/16	1 5/8	1 7/16	4	1 1/4	9/16	3/8	N/A	3 1/4	4	7/16	4 3/4	4	5/8 - 11NC	8	6 1/2	BAB
2 1/2	2 1/2	4 7/8	4 1/2	1 3/4	2 1/16	4	1 1/4	9/16	3/8	N/A	3 1/4	4	7/16	5 1/2	4	5/8 - 11NC	9	8	BAB
3	3	5 3/8	4 7/8	1 3/4	2 11/16	4	1 1/4	9/16	3/8	N/A	3 1/4	4	7/16	6	4	5/8 - 11NC	10	9 1/2	BAB
4	4	6 7/8	6	2	3 3/4	4	1 1/4	5/8	7/16	N/A	3 1/4	4	7/16	7 1/2	8	5/8 - 11NC	18	14	BAC
5	5	7 3/4	6	2 1/8	4 3/4	4	1 1/4	5/8	7/16	N/A	3 1/4	4	7/16	8 1/2	8	3/4 - 10NC	21	15 1/2	BAC
6	6	8 3/4	6 1/2	2 1/8	5 15/16	4	1 1/4	3/4	1/2	N/A	3 1/4	4	7/16	9 1/2	8	3/4 - 10NC	25	18 1/2	BAD
8	8	11	8 5/16	2 1/2	7 7/8	6	1 1/4	7/8	5/8	N/A	5	4	9/16	11 3/4	8	3/4 - 10NC	44	34 1/2	CAE
10	10	13 3/8	9	2 1/2	9 15/16	6	2	1 1/8	N/A	1/4 x 1/4	5	4	9/16	14 1/4	12	7/8 - 9NC	61	47	CAF
12	12	16 1/8	10 5/8	3	11 7/8	6	2	1 1/8	N/A	1/4 x 1/4	5	4	9/16	17	12	7/8 - 9NC	95	80	CAF
14	13	17 5/8	12	3	12 13/16	6	3	1 3/8	N/A	5/16 x 5/16	5	4	9/16	18 3/4	12	1 - 8UNC	131	115	CAG
16	15	20 1/4	12 61/64	4	14 3/4	6	3	1 5/8	N/A	3/8 x 3/8	5	4	9/16	21 1/4	16	1 - 8UNC	221	210	CAH
18	17	21 1/2	14 1/2	4 1/4	16 11/16	8	4 1/4	1 7/8	N/A	1/2 x 3/8	6 1/2	4	13/16	22 3/4	16	1 1/8 - 7UNC	264	240	DAJ
20	19	23 3/4	15 7/8	5	18 5/8	8	4 1/4	1 7/8	N/A	1/2 x 3/8	6 1/2	4	13/16	25	20	1 1/8 - 7UNC	368	316	DAJ

**Notes:**

- 1 "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.
2. "B" dimensions refer to Figure 139 body O.D. dimensions.

## 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 flow of water in gallons per minute (GPM) with a 1 psi pressure drop through the valve. 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. See Table 1 for tabulated  $C_v$ 's for the Figure 129/139 Butterfly Valve.

**Table 1**  
 **$C_v$  Chart (Water @ 70°F, Specific Gravity = 1.00)**

Valve Size	Disc position (Degrees Open)						
	20	30	40	50	60	70	90
2"	8	18	30	50	80	130	220
2.5"	11	25	44	70	110	180	320
3"	16	38	66	110	170	280	500
4"	28	63	110	180	280	460	820
5"	44	100	180	280	450	740	1300
6"	60	140	250	400	640	1100	1900
8"	110	250	440	690	1100	1800	3200
10"	180	400	710	1100	1800	3000	5100
12"	260	590	1000	1700	2700	4400	8000
14"	340	770	1400	2200	3400	5600	10000
16"	440	1000	1800	2800	4500	7400	13000
18"	570	1300	2300	3600	5800	9600	18000
20"	710	1600	2900	4600	7200	12000	22000

## 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. See Table 2 for torques to open and close the valve at pressures shown in wet services with minimum operating frequency of one per week (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.

**Table 2**  
**Seating and Unseating Torques**

Valve Size	Category 2 (Normal Conditions)			
	$\Delta P$ (psi)			
	50	100	150	200
2"	230	240	250	260
2.5"	280	290	300	310
3"	340	360	380	400
4"	510	540	570	600
5"	700	750	800	850
6"	1000	1100	1200	1300
8"	1700	1900	2100	2300
10"	2600	2900	3200	3500
12"	3600	4100	4600	5100
14"	5100	5900	6700	7500
16"	6700	7900	9100	10300
18"	8700	10500	12300	14100
20"	11009	13500	16000	18500