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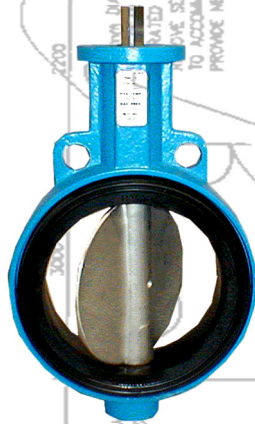
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CHALLENGER

BUTTERFLY VALVES



DRINKING WATER
NSF/ANSI 61



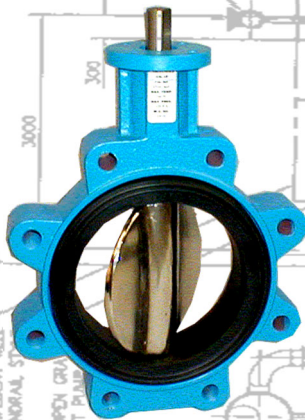
SERIES 10
2" - 12"



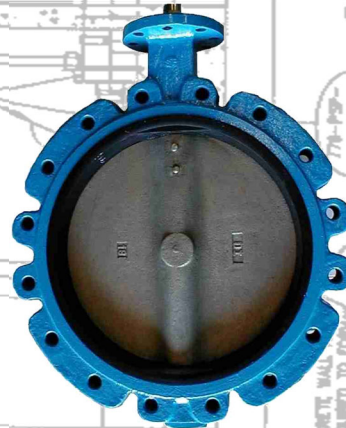
SERIES 15
14" - 24"



SERIES 30
30" - 48"



SERIES 20
2" - 12"



SERIES 25
14" - 24"

Bulletin No.
BFV-100R1



ORDERING INFORMATION

BODY STYLE	Wafer	2"-12"	10	BODY MATERIAL	Cast Iron	C
	Wafer	14"-24"	15		*Ductile Iron	D
	Lug	2"-12"	20		*(Special Order)	
	Lug	14"-24"	25			
	Double Flange	30"-48"	30			
DISC MATERIAL				SHAFT MATERIAL	410 S.S.	4
					316 S.S.	3
	Ductile Iron		D	SEAT MATERIAL	E.P.D.M. ***	E
	Ductile Iron/ Brite Nickel		N		Buna	N
	Ductile Iron/ Nylon 11		R		Viton	V
	316 S.S. ***		S			
	Bronze	14"-48"	B			

*** DENOTES NSF/ANSI 61 APPROVED TRIM

EXAMPLE: 4" Wafer Body, Cast Iron, S.S. Disc, 410 S.S. Shaft, E.P.D.M. Seat = **10-CS4E**

AVAILABLE OPTIONAL EQUIPMENT

MANUAL ACTUATORS

- (A) Lever handle with 10 position notch plate, padlockable fully open - fully closed or in any of the other 8 positions.
- (B) Infinite position lever.
- (C) Lever handle, with valve position transmitter.
- (D) Worm Gear.
- (E) Worm Gear with valve position transmitter.

PNEUMATIC ACTUATORS

- (A) Double Acting or Spring Return.
- (B) Manual Overrides.
- (C) Valve Position Transmitter.
- (D) Solenoid Valves.
- (E) Positioners - Pneumatic and Electro Pneumatic.

ELECTRIC ACTUATORS

- (A) On-Off or Modulating (100 in/lbs. - 27,300 in/lbs.).
- (B) Spring Return (200 in/lbs. - 1,000 in/lbs.).
- (C) Electric Fail Safe Devices.

ACCESSORIES

- (A) 3-Way Linkage Assemblies (Diverter or Mixing).
- (B) Torque Tube Extensions.
- (C) Input Shaft Extensions and Floor Stands.

DESIGN FEATURES 2" - 12"

Standard Materials (Special Options Available on Request)

Body: (Conforms to API Standard 609 Category A)
Cast Iron - A.S.T.M. A126-B

Body Pressure Temperature Rating:

1,575 Kpa (225 psi) - 29°C (-20° F) to +121°C (+250°F)

Lug Bodies are rated for full pressure with the downstream flange removed (Bi-Directional).

Disc:

Ductile Iron - A.S.T.M. A536
Ductile Iron - Nickel/Brite Nickel
Ductile Iron - Nylon II Coated
316 Stainless Steel - A.S.T.M. CF8M **NSF/ANSI 61**

Stem:

410 Stainless Steel
316 Stainless Steel - A.S.T.M. A276 Type 316

Seat:

Ethylene Propylene Diene Monomer (E.P.D.M.), **NSF/ANSI 61**
Maximum Temperature = 120°C (250°F)
Minimum Temperature = -40°C (-40°F)
Suitable for most general applications, including sanitary.
Recommended where abrasion is present.
Not suitable for hydrocarbon service.

Nitrile Butadiene (Buna-N), Food Grade
Maximum Temperature = 100°C (212°F)
Minimum Temperature = -17°C (0°F)
Suitable for general applications, including sanitary and some hydrocarbon services.

Viton

Maximum Temperature = 202°C (400°F)
Minimum Temperature = 0°C (32°F)
Recommended for high aromatic gasolines, jet fuel and high temperature applications.

Not suitable for low temperature applications.

Velocity Limits:

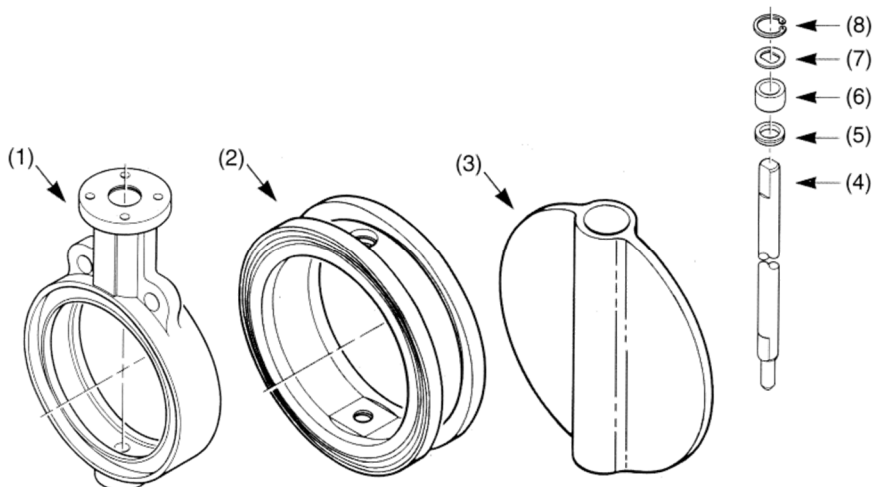
Challenger Butterfly Valves are suitable for the following pipeline velocities
Fluid - 30 ft./sec. (10 m/s)
Gases - 200 ft./sec. (65 m/s)

Valve Weights - Lbs.

SIZE	2"	2.5"	3"	4"	5"	6"	8"	10"	12"
FIG. 10	7	8	10	12	16	20	35	50	87
FIG. 20	9	10	12	17	21	27	42	63	110

Valve Components:

Item	Qty.	Description
(1)	1	Body
(2)	1	Seat
(3)	1	Disc
(4)	1	Stem
(5)	1	Stem Seal
(6)	1	Stem Bushing
(7)	1	Retaining Washer
(8)	1	Circlip



DESIGN FEATURES 2" - 12" CONTINUED

(A) Body

One-piece wafer (Series 10) or full lug (Series 20) with flange locating holes (Series 10) or tapped lugs (Series 20) conforming to A.N.S.I. 125/150 drillings. Face to face conforms to MSS-SP-67 for universal interchangeability. Extended neck design allows for a minimum of 2" (5 cm) of piping insulation.

(B) Actuator Mounting Flange

Designed to conform to universal standard I.S.O. 5211 for direct mounting of compatible manual or power actuation equipment.

(C) Stem Seal

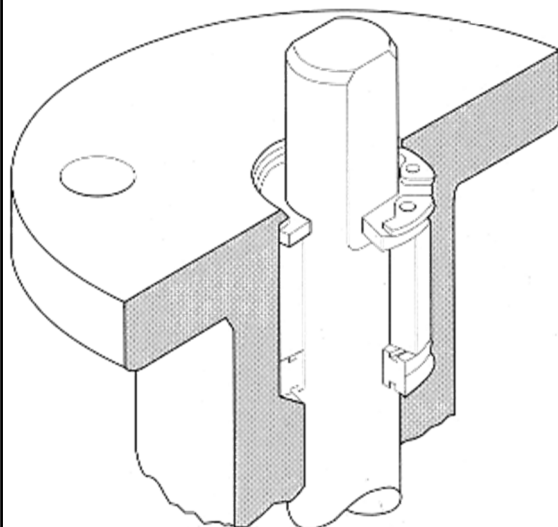
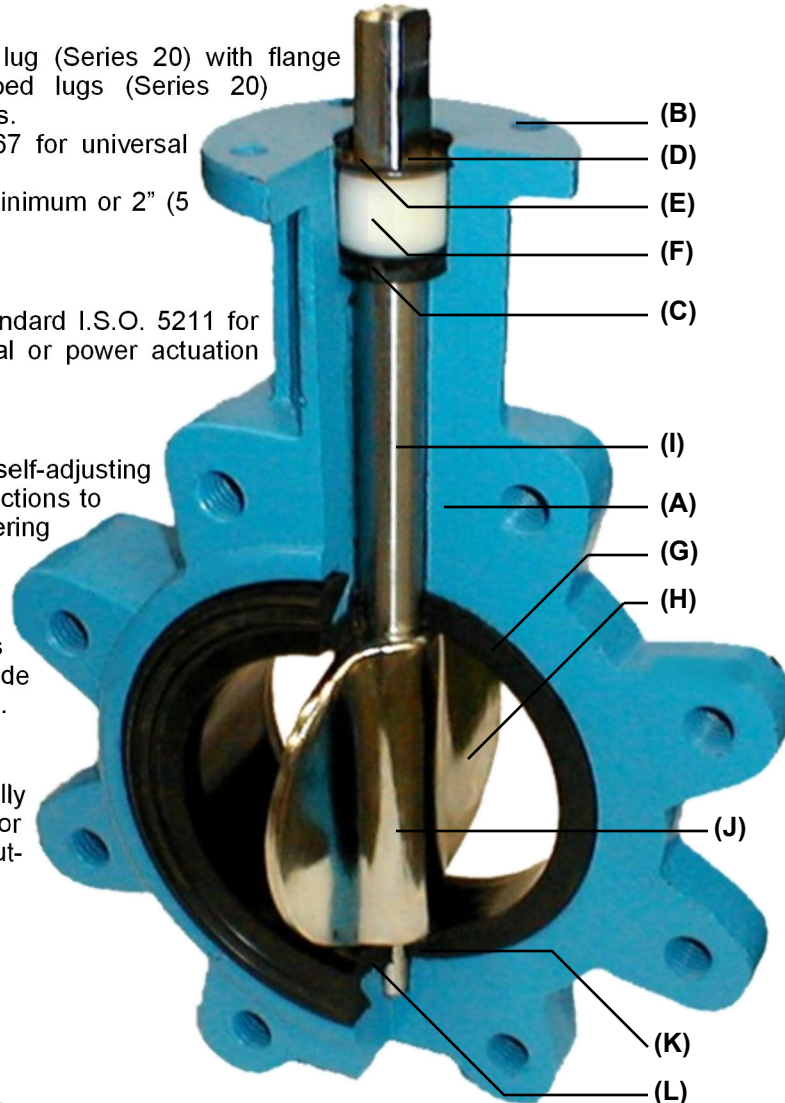
The double "U" cup seal design is self-adjusting and gives positive sealing in both directions to prevent external substances from entering the stem area.

(F) Stem Bushing

The Heavy Duty acetal bushing aligns and supports the stem and absorbs side thrust associated with power actuators.

(H) Disc

The single piece casting is spherically machined, radiused and polished for extended seat life and bubble tight shut-off.



(D & E) Stem Retaining System

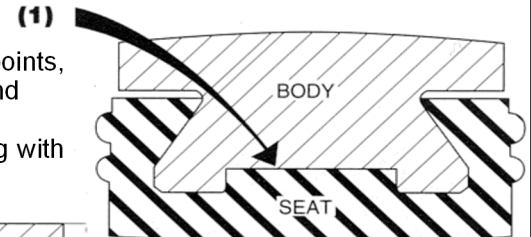
The valve stem is securely contained in the body by means of a stainless steel retaining washer, broached to fit over the flats on the top of the stem. The retaining washer is held in place by a high strength circlip that is fixed into a machined groove in the neck of the valve. This design permits quick and easy shaft removal without the need for special tools.

DESIGN FEATURES 2" - 12" CONTINUED

(G) Seat

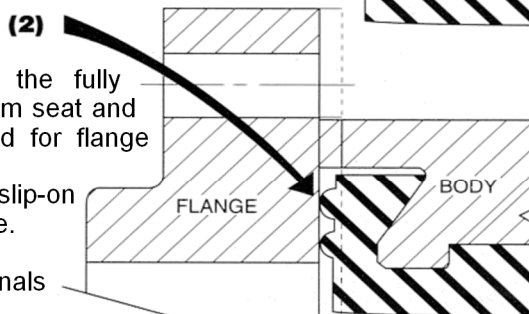
(1) The unique epsilon seat design has four retaining points, virtually eliminating any seat movement during the seating and un-seating of the disc.

The Challenger Series 20 (full lug design) provides full rating with the down stream flange removed.

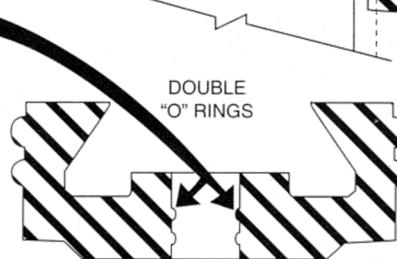


(2) The double moulded-in "O" rings are precisely positioned to allow the flange to firmly lock the seat into the fully machined dove-tail to achieve maximum seat and sealing compression without the need for flange gaskets.

This unique feature allows the use of slip-on type flanges, without de-rating the valve.

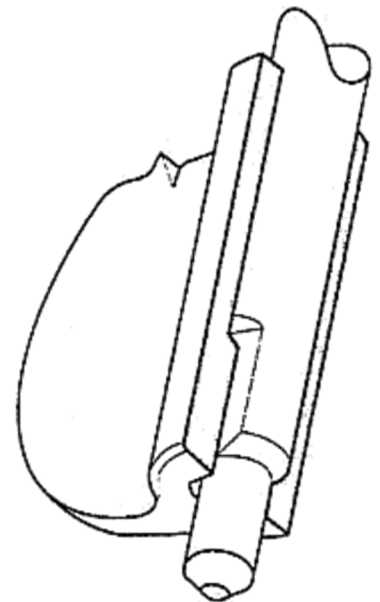


(3) Both the upper and lower shaft journals have a moulded-in double "O" ring secondary seal, isolating the media from the body cavity in the event of a primary seal failure.



(I & J) Stem & Disc Drive Connection

The close tolerance double "D" disc/stem connection features all of the benefits of a high strength one piece design without the disadvantages associated with designs using taper pins or disc screws, which often fail through abrasion, corrosion or fatigue.

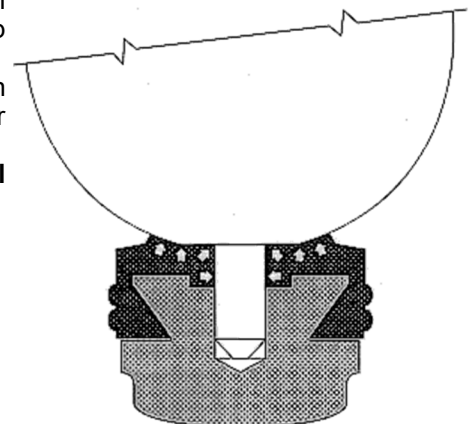


(K & L) "Challenger" Valves Have Primary & Secondary Sealing Features

The primary seal on the Challenger valve is obtained by an interference fit between the moulded flat on the seat and the hub of the disc.

The secondary seal is obtained by an interference fit between the stem and the moulded-in "O" rings on the upper and lower shaft journals.

Seating capabilities on this design do not rely on external flanging.



DESIGN FEATURES 14" - 48"

Standard Materials (Special Options Available on Request)

Body: (Conforms to API Standard 609)

Ductile Iron - A.S.T.M. A536 65-45-12

Body Pressure Temperature Rating:

1,050 Kpa (150 psi) -29°C (-20°F) to +66°C (+150°F)

875 Kpa (125 psi) -29°C (-20°F) to +121°C (+250°F)

Lug Bodies are rated for full pressure with the downstream flange removed (Bi-Directional).

Disc:

Ductile Iron - Nickel Plated -A.S.T.M. A536 65-45-12

Aluminum Bronze - A.S.T.M. B148 C954

316 Stainless Steel - A.S.T.M. A351-CF8M **NSF/ANSI 61**

Stem:

410 Stainless Steel - A.S.T.M. A582

316 Stainless Steel - A.S.T.M. A276 Type 316

Seat: (Cartridge design, rated for full vacuum service)

Ethylene Propylene Diene Monomer (E.P.D.M.), **NSF/ANSI 61**

Maximum Temperature = 120°C (250°F)

Minimum Temperature = -40°C (-40°F)

Nitrile Butadiene (Buna-N), Food Grade

Maximum Temperature = 100°C (212°F)

Minimum Temperature = -17°C (0°F)

Viton 26B

Maximum Temperature = 177°C (350°F)

Minimum Temperature = 0°C (32°F)

Velocity Limits:

Fluid - 30 ft./sec. (10 m/s)

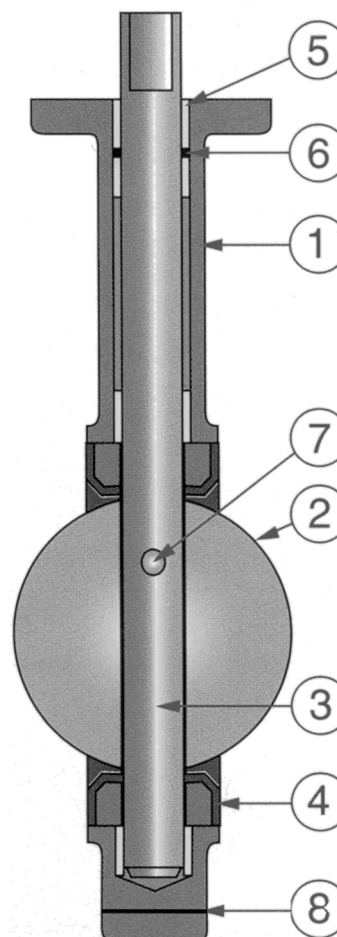
Gases - 200 ft./sec. (65 m/s)

Valve Weights - Lbs.

SIZE	14"	16"	18"	20"	24"	30"	36"	42"	48"
FIG. 15	95	117	165	275	440	N.A.	N.A.	N.A.	N.A.
FIG. 25	155	195	230	396	610	N.A.	N.A.	N.A.	N.A.
FIG. 30	N.A.	N.A.	N.A.	N.A.	N.A.	600	900	1400	2300

Valve Components:

Item	Qty.	Description
(1)	1	Body
(2)	1	Disc
(3)	1	Stem
(4)	1	Seat
(5)	4	Bushing
(6)	1	Stem Seal
(7)	2 (14"-24") 3 (30"-48")	Taper Pin
(8)	1	Thrust Plate





RATED FLOW CO-EFFICIENT C_v

Size In.	DISC POSITION (Degrees)							
	20	30	40	50	60	70	80	90
2"	7	16	28	49	77	128	198	219
2.5"	10	23	42	68	108	178	288	316
3"	15	36	65	109	167	278	427	498
4"	26	61	108	178	275	458	715	815
5"	43	98	177	278	447	737	1095	1290
6"	59	138	247	398	637	1097	1590	1895
8"	108	247	437	687	1100	1795	2790	3290
10"	178	396	705	1100	1795	2995	4590	5390
12"	256	587	995	1697	2695	4398	6790	7990
14"	336	767	1395	2202	3395	5595	8990	9990
16"	435	995	1789	2810	4496	7410	11000	13100
18"	568	1290	2285	3605	5810	9620	15100	18000
20"	708	1595	2990	4600	7215	12000	18100	22100
24"	1000	2300	4000	6400	10000	16500	24200	30100
30"	1500	3600	6200	9900	16100	26300	40000	47000
36"	2600	5200	9100	15000	23150	38000	60000	70000
42"	3000	7000	12000	19500	31200	51400	80000	93000
48"	4000	9000	16000	25200	40000	66000	102000	120000

C_v = The volume of water in U.S.G.P.M. that will flow through a given restriction or valve opening with a pressure drop of 1 p.s.i.



TORQUE FOR SEATING AND UNSEATING (In.-Lbs.)

SIZE In.	WET SERVICE			DRY SERVICE		
	225 p.s.i.	150 p.s.i.	50 p.s.i.	225 p.s.i.	150 p.s.i.	50 p.s.i.
2	132	N.A.	70	214	N.A.	85
2.5	240	N.A.	82	280	N.A.	100
3	324	N.A.	146	444	N.A.	175
4	612	N.A.	175	690	N.A.	240
5	1,140	N.A.	276	1,220	N.A.	333
6	1,176	N.A.	436	1,332	N.A.	525
8	2,400	N.A.	639	2,710	N.A.	770
10	5,100	N.A.	1,250	5,690	N.A.	1,400
12	6,000	N.A.	1,590	6,300	N.A.	1923
14	N.A.	6,088	4,400	N.A.	9,132	6,575
16	N.A.	8,356	5,350	N.A.	12,600	8,020
18	N.A.	11,200	7,200	N.A.	16,800	10,750
20	N.A.	14,950	10,200	N.A.	22,500	14,340
24	N.A.	23,400	16,200	N.A.	35,000	22,450
30	N.A.	33,400	28,300	N.A.	50,000	42,500
36	N.A.	46,500	40,650	N.A.	69,800	61,000
42	N.A.	80,000	69,800	N.A.	120,000	105,000
48	N.A.	111,200	97,000	N.A.	167,000	146,000

Note: Torque values shown are based on the maximum shut-off pressure for both wet and dry conditions. Line pressure has significant bearing on the seating/unseating torque. If line pressure is less, torque values will reduce accordingly. For 50 p.s.i. service, factory under-cut discs must be used.

INSTALLATION INSTRUCTIONS

Challenger resilient seated butterfly valves have been designed for installation between A.N.S.I. 125/150 lb. flat faced or raised face flanges with an inside diameter greater than the disc chordal dimension published on the valve drawings. The moulded in "O" rings on the face of the seat eliminate the need for flange gaskets, therefore, **GASKETS MUST NOT BE USED.**

Refer to Bulletin no. BFV-109 for bolting information.

- (1) Install the valve in a location that the disc will not interfere with adjacent equipment such as check valves and pumps. Ideally, the valve should be installed with a distance of six pipe diameters upstream and downstream of any bends, pumps or valves. The valve can be installed in any orientation, however, Challenger recommends that the valve should be installed with the stem horizontal and the lower edge of the disc opening downstream on any slurry applications or applications with solid particles in the flow stream.
- (2) With the disc partially into the seat, carefully install the valve between the flanges. Be sure to spread the flanges enough to clear the protrusion of the seat, approximately 1/4" to eliminate the possibility of lipping the seat.
- (3) Rotate the disc to the full open position to allow the seat to position itself in the body prior to tightening the flange bolts. Note: Challenger Valve recommends the removal of spring return actuators prior to installation to facilitate opening the disc.
- (4) Tighten the flange bolts in a cross pattern, alternating until all fasteners are snug.
- (5) After installation, carefully cycle the valve manually to ensure that the disc does not interfere with the flange piping or other adjacent equipment.
- (6) If removed, re-install the actuator being careful to position the disc (A) closed for fail close or (B) open for fail open prior to installing the actuator.

MAINTENANCE INSTRUCTIONS

Challenger Butterfly Valves have been designed and manufactured to maximise life and minimise wear. All dynamic components have been lubricated prior to assembly and further lubrication is not required.

Note: Valves installed in applications where the valve remains stationary for long periods of time should be routinely cycled at least twice per year to reduce seat set and to clear the disc edge of any scaling.

If replacement of a valve component is required, refer to the assembly and disassembly instructions in Bulletin BFV-107 for valve sizes 2" - 12" or Bulletin BFV-108 for valve sizes 14" - 48".

ASSEMBLY/DISASSEMBLY INSTRUCTIONS
VALVE SIZES 2" to 12"

Assembly Instructions**Valve Sizes 2" - 12"**

- (1) Clamp the valve body in a vice.
- (2) Spray the interior of the body with a silicone based lubricant to facilitate seat alignment.
- (3) Holding the seat in your hand, insert a flathead screwdriver or prybar (1.5 times longer than the seat diameter) through the large hole from the inside out. Note that the large hole will be at the top of the valve.
- (4) Rotate the screwdriver or bar until the seat is semi-inverted.
- (5) With the body facing you, place the seat into the body from the opposite side, bottom first.
- (6) Keeping the seat inverted and applying pressure, lip the seat into the dovetail from the front of the valve using a small flat prying tool. Start at the bottom and work up to the midpoint, at this time you can remove the large prybar. Continue lipping the seat until it is completely inserted into the body.
- (7) Line up the upper and lower shaft journals using a soft hammer.
- (8) Apply a silicone based lubricant to both journals.
- (9) Into the top neck of the valve, insert the shaft seal and the bushing (items 5 & 6).
- (10) Insert the shaft into the neck of the valve and tap it down until it protrudes through the upper shaft journal by approximately one inch.
- (11) Rotate the shaft until the flats are in line with the pipe. This will align the "Double D" drive with the disc.
- (12) With the broach in the disc facing down, insert the top of the disc into the seat, engaging the shaft with the top hole of the disc.
- (13) Push the bottom of the disc into the seat.
- (14) With the disc fully open and the valve shaft aligned with the pipe, drive the shaft down using a non-metallic hammer.
- (15) Install the retaining collar (item 7) and tap it down until it clears the groove in the top of the valve.
- (16) Install the circlip (item 8).

Disassembly Instructions**Valve Sizes 2" - 12"**

- (1) Remove actuator assembly from mounting flange.
- (2) Remove the circlip (item 8) from the top of the valve.
- (3) Remove the valve stem (item 4), retaining washer (item 7), bushing (item 6) and stem seal (item 5).
- (4) Protecting the disc edge from damage, push the disc through the seat (this is easier with the disc in the open position)
- (5) Insert a large flat screwdriver or prybar between the body and the dovetail on the seat and collapse the seat to an oval shape, remove from valve body.



ASSEMBLY/DISASSEMBLY INSTRUCTIONS
VALVE SIZES 14" to 48"

Assembly Instructions

Valve Sizes 14" - 48"

- (1) Secure the valve body (preferably to a floor vice).
- (2) Spray the interior of the body and shaft journals with a silicone based lubricant to facilitate ease of assembly.
- (3) Slide the cartridge seat into the valve body and align the top and bottom shaft journals. Note: If this is a lug body, install the seat retaining screws around the perimeter of the body (refer to drawings BFV-2002 or BFV-2003)
- (4) Insert the lower centre and lower top bushings into the shaft journal. Insert the stem seal followed by the top bushing (refer to Bulletin BFV-103 for details).
- (5) Apply a silicone based grease to the upper and lower flats on the seat and to the inside of the bushings and shaft seals.
- (6) Position the disc onto the seat with the two taper pin holes at the top and squeeze the disc into the seat until the upper and lower shaft holes are aligned (large C-clamps can facilitate this operation).
- (7) Insert the stem into the top of the valve and using a non-metallic hammer, drive the shaft down until the taper pin holes are aligned.
- (8) Set the taper pins.
- (9) Install the bottom thrust plate complete with integral "O" ring seal.

Disassembly Instructions

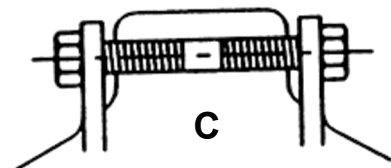
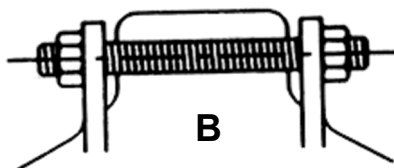
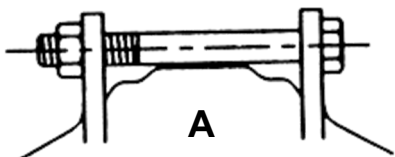
Valve Sizes 14" - 48"

- (1) Remove actuator assembly from mounting flange.
- (2) Remove the bottom thrust plate.
- (3) Remove the disc/stem taper pins.
- (4) Using a round bar, drive the shaft up and out of the top of the valve.
- (5) Carefully squeeze the disc out of the seat (C-clamps can facilitate this operation).
- (6) Press the cartridge seat out of the body. **Note:** If this is a lug body, remove the seat retaining screws around the perimeter of the body (refer to drawings BFV-2002 or BFV-2003).
- (7) Remove the bushings and upper stem seal.

BOLTING INFORMATION

Valve	No. of Bolts Req'd.		Bolt Size	Bolt Length - inches			
Size	Wafer	Lug		Fig. A	Fig. B	Fig. C	Reg. Torque (Ft.—lbs)
(in.)	Style	Style		Wafer	Wafer/Lug	Lug	
2	4	8	5/8"-11	4	4-3/4	1-1/4	60
2.5	4	8	5/8"-11	4-1/2	5-1/2	1-1/2	60
3	4	8	5/8"-11	4-1/2	5-1/2	1-3/4	60
4	8	16	5/8"-11	5-1/4	5-3/4	1-3/4	60
5	8	16	3/4"-10	5-1/4	6	2	100
6	8	16	3/4"-10	5-1/2	6	2	100
8	8	16	3/4"-10	6	6-1/2	2-1/4	100
10	12	24	7/8"-9	6-1/2	7-1/4	2-1/2	160
12	12	24	7/8"-9	7	7-3/4	2-3/4	160
14	8(A or B) + 8 C	24	1"-8	7-1/4	8	2-3/4	250
16	8(A or B) + 8 C	32	1"-8	8	8-3/4	3	250
18	12(A or B) + 8 C	32	1-1/8"-7	9	10	3-1/2	300
20	16(A or B) + 8 C	40	1-1/8"-7	10-1/4	11-1/4	4	300
24	16(A or B) + 8 C	40	1-1/4"-7	11-1/2	12-3/4	4-1/2	350
30	24(A or B) + 8 C	56	1-1/4"-7	13-1/4	14-1/2	4-3/4	C.F
36	28(A or B) + 8 C	64	1-1/2"-6	15	16-1/2	4-3/4	C.F.
42	32(A or B) + 8 C	72	1-1/2"-6	17-3/4	19-1/2	5-1/2	C.F.
48	40(A or B) + 8 C	88	1-1/2"-6	18-1/2	20	5-1/2	C.F.

C.F. = CALL FACTORY





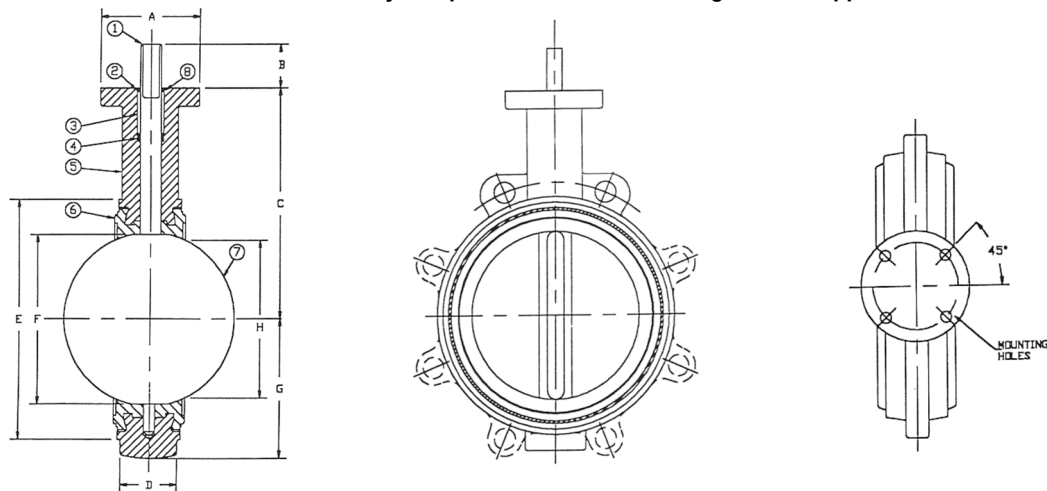
Series 10/20
CH-100

VALVE DIMENSIONS - Inches (Imperial)

Valve Size	A	B	C	D	E	F	G	H	Top Flange Holes		Bolt Circle	Shaft End		Bolting Data		Lug Threads (UNC)	Wt. lbs. (Series)	
									Qty.	Dia.		Dia.	x Flat	BC	# Holes		10	20
2	3.5	1.2	5.5	1.7	3.7	2.1	2.2	1.2	4	.35	2.75	.551	.370	4.75	4	5/8-11	7	9
2.5	3.5	1.2	6.0	1.8	4.4	2.7	2.6	2.0	4	.35	2.75	.551	.370	5.50	4	5/8-11	8	10
3	3.5	1.2	6.2	1.8	5.0	3.2	3.0	2.7	4	.35	2.75	.551	.370	6.00	4	5/8-11	10	12
4	3.5	1.2	7.0	2.1	6.2	4.1	3.7	3.5	4	.35	2.75	.748	.500	7.50	8	5/8-11	12	17
5	3.5	1.2	7.5	2.2	7.5	5.1	4.1	4.6	4	.35	2.75	.748	.500	8.50	8	3/4-10	16	21
6	3.5	1.2	8.0	2.2	8.3	6.0	4.8	5.6	4	.35	2.75	.866	.625	9.50	8	3/4-10	20	27
8	5.0	1.2	9.5	2.4	10.5	8.0	5.9	7.6	4	.43	4.0	.866	.625	11.75	8	3/4-10	35	42
10	5.0	1.9	10.7	2.7	13.0	9.9	7.8	9.6	4	.43	4.0	1.181	.945	14.25	12	7/8-9	50	63
12	5.0	1.9	12.2	3.1	14.8	11.9	8.9	11.5	4	.43	4.0	1.181	.945	17.00	12	7/8-9	87	110

Note: Dimension "H" is the chordal dimension at face of valve for disc clearance.

Dimension "D" is with the seat fully compressed between the flanges, allow approx. 3/16" for clearance.



Item No.	Description	Material	Remarks
1	Shaft		
2	C-Clip	Steel	
3	Bushing	Delrin	
4	Shaft Seal		
5	Body		
6	Seat		
7	Disc		
8	Washer	Stainless	

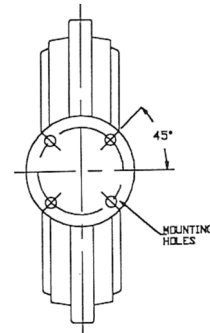
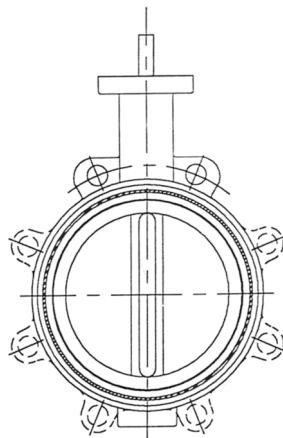
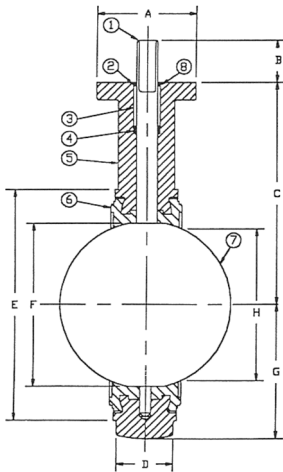
Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

VALVE DIMENSIONS - Millimetres (Metric)

Valve Size	A	B	C	D	E	F	G	H	Top Flange Holes		Bolt Circle	Shaft End		Bolting Data		Lug Threads (UNC)	Wt. kgs. (Series)	
									Qty.	Dia.		Dia.	x Flat	BC	# Holes		10	20
50	89	31	140	43	94	53	56	31	4	9	70	14	9.4	121	4	5/8-11	3	4
65	89	31	152	46	112	69	66	51	4	9	70	14	9.4	140	4	5/8-11	3.6	4.5
80	89	31	158	46	127	81	76	69	4	9	70	14	9.4	152	4	5/8-11	4.5	5.5
100	89	31	178	53	158	104	94	89	4	9	70	19	12.7	191	8	5/8-11	5.5	7.7
125	89	31	191	56	199	130	104	117	4	9	70	19	12.7	216	8	3/4-10	7.3	9.5
150	89	31	203	56	211	152	122	142	4	9	70	22	15.9	241	8	3/4-10	9	12.3
200	127	31	241	61	267	203	150	193	4	11	102	22	15.9	299	8	3/4-10	16	19
250	127	48	272	69	330	252	198	244	4	11	102	30	24	362	12	7/8-9	23	28
300	127	48	310	79	376	302	226	292	4	11	102	30	24	432	12	7/8-9	40	50

Note: Dimension "H" is the chordal dimension at face of valve for disc clearance.

Dimension "D" is with the seat fully compressed between the flanges, allow approx. 4.2mm for clearance.

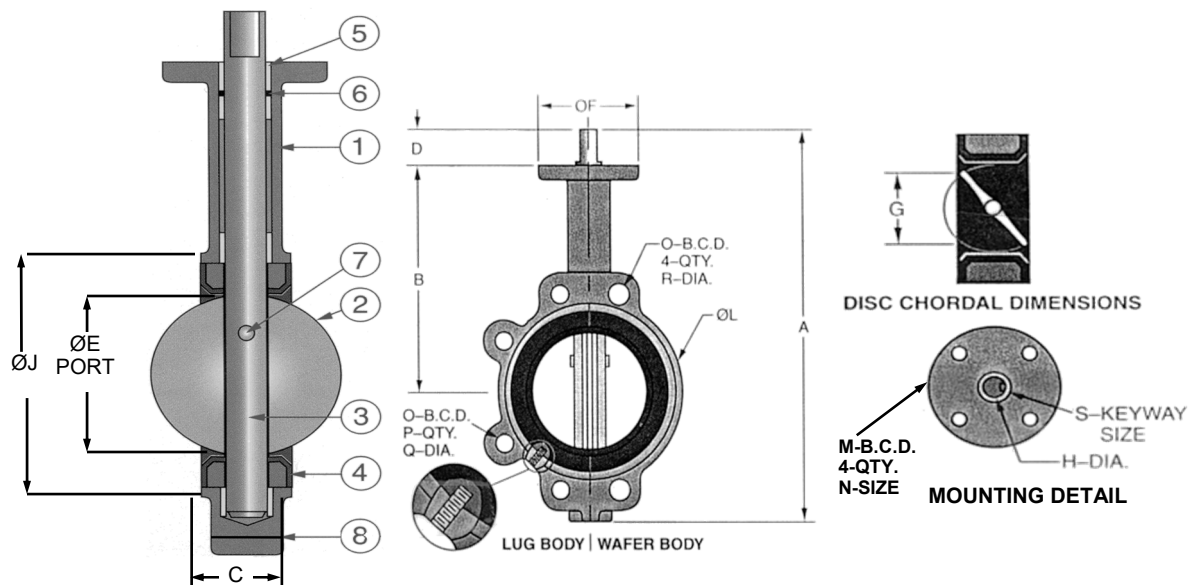


Item No.	Description	Material	Remarks
1	Shaft		
2	C-Clip	Steel	
3	Bushing	Delrin	
4	Shaft Seal		
5	Body		
6	Seat		
7	Disc		
8	Washer	Stainless	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

VALVE DIMENSIONS - INCHES (Imperial)																		Wt. lbs.	
Size	A	B	C	D	E	F	G	H	J	L	M	N	O	P	Q	R	S	Series	
																		15	25
14	26.75	14.50	3.05	1.75	13.13	5.50	12.81	1.25	17.19	17.13	4.01	0.472	18.75	12	1"-8UNC	1.062	0.312 x 1.00	95	155
16	29.94	15.75	3.41	2.00	15.38	7.75	15.00	1.30	19.21	20.00	5.51	0.709	21.25	16	1"-8UNC	1.062	0.394 x 1.73	117	195
18	31.56	16.61	4.16	2.00	17.38	7.75	16.87	1.50	21.22	21.38	5.51	0.709	22.75	16	1-1/8"-7UNC	1.250	0.394 x 1.97	165	230
20	35.65	18.90	5.19	2.53	19.38	7.75	18.69	1.63	23.38	23.31	5.51	0.709	25.00	20	1-1/8"-7UNC	1.250	0.394 x 2.36	275	396
24	42.97	22.13	5.96	2.75	23.31	10.88	22.58	2.00	32.13	27.88	6.49	0.906	29.50	20	1-1/4"-7UNC	1.375	0.5 x 2.36	440	610

Note: Quantity "P" & Dimension "Q" refer to lug style. Dimension "R" refers to wafer style.
Dimension "C" is shown with the seat fully compressed between the flanges, allow approx. 1/8" for clearance.



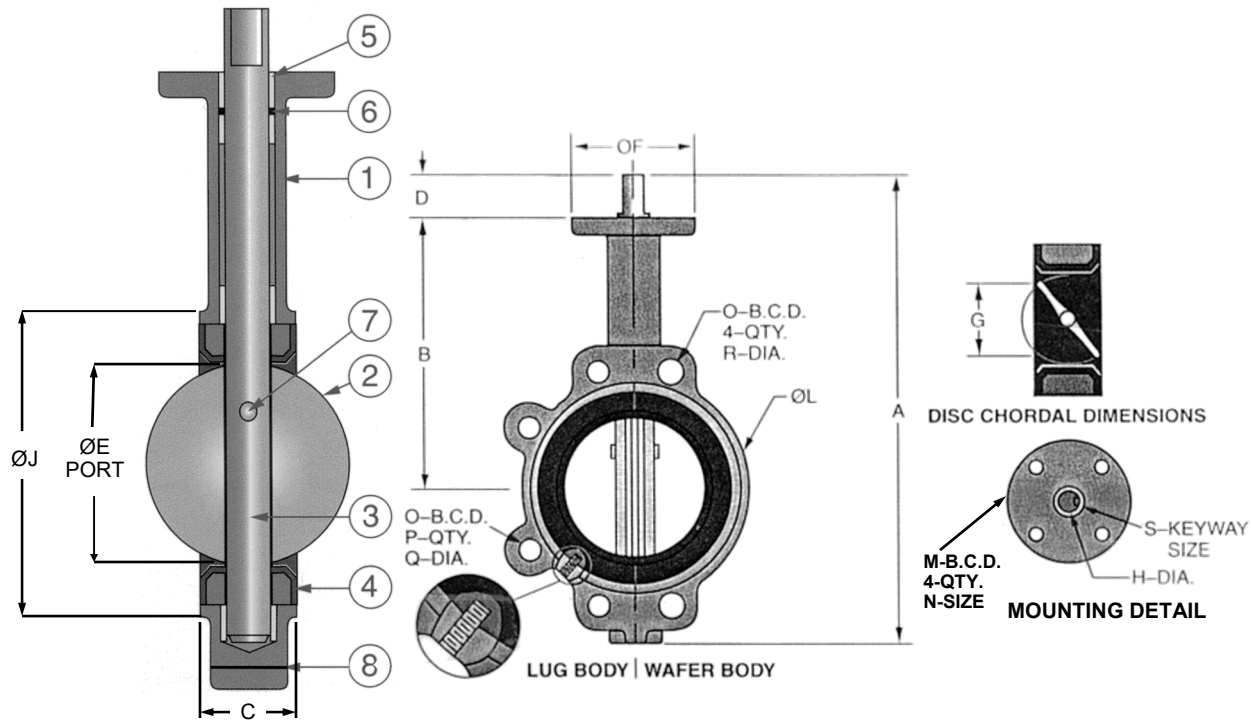
Item No.	Description	Material	Remarks
1	Body		
2	Disc		
3	Shaft		
4	Seat		
5	Bushings	Bronze	(Four)
6	Shaft Seal	BUNA-"N"	
7	Taper Pins	316 S.S.	
8	Thrust Plate	Steel	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

VALVE DIMENSIONS - MILLIMETRES (Metric)																		Wt. kgs.	
Size	A	B	C	D	E	F	G	H	J	L	M	N	O	P	Q	R	S	Series	
																		15	25
350	679	368	77	44	334	140	325	32	437	435	102	12	476	12	1"-8UNC	27	8x 25.4	43	70
400	760	400	87	51	391	197	381	33	488	508	140	18	540	16	1"-8UNC	27	10 x 44	53	89
450	802	422	106	51	441	197	428	38	539	543	140	18	578	16	1-1/8"-7UNC	32	10 x 50	75	105
500	906	480	132	64	492	197	475	41	594	592	140	18	635	20	1-1/8"-7UNC	32	10 x 60	125	180
600	1091	562	151	70	592	276	574	51	816	708	165	23	749	20	1-1/4"-7UNC	35	12.7 x 60	200	277

Note: Quantity "P" & Dimension "Q" refer to lug style. Dimension "R" refers to wafer style.

Dimension "C" is shown with the seat fully compressed between the flanges, allow approx. 7mm for clearance.



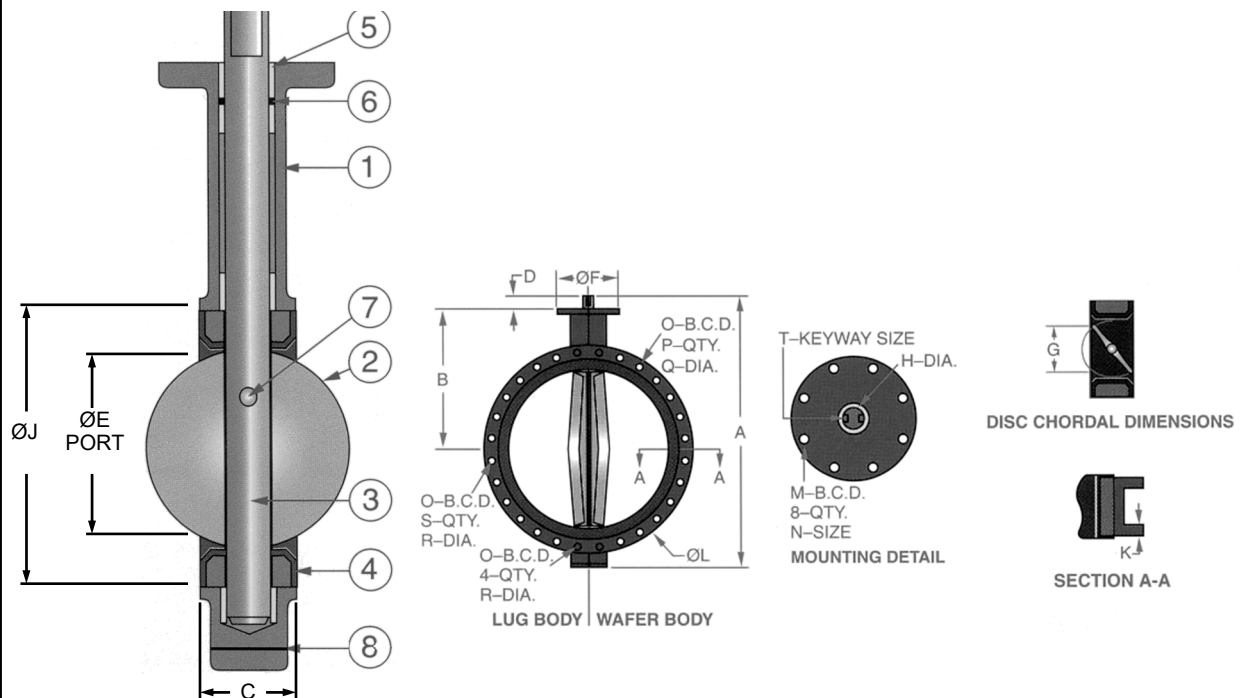
Item No.	Description	Material	Remarks
1	Body		
2	Disc		
3	Shaft		
4	Seat		
5	Bushings	Bronze	(Four)
6	Shaft Seal	BUNA-"N"	
7	Taper Pins	316 S.S.	
8	Thrust Plate	Steel	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

VALVE DIMENSIONS - INCHES (Imperial)

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	Wt. lbs.
30	50.56	26.00	6.57	2.63	28.56	11.81	27.75	2.49	31.29	2.13	38.75	10.00	0.708	36.00	24	1.38	1-1/4"- 7UNC-2B	28	0.63x2.50	600
36	58.53	28.38	7.99	4.63	33.13	11.81	32.00	2.95	37.29	2.38	46.00	10.00	0.708	42.75	28	1.63	1-1/2"- 6UNC-2B	32	0.75x3.93	900
42	70.25	33.75	9.88	5.91	39.31	11.81	38.00	3.74	44.25	2.63	53.00	10.00	0.708	49.50	32	1.63	1-1/2"- 6UNC-2B	36	0.88x5.5	1400
48	76.91	37.00	10.87	5.91	44.37	13.75	42.91	4.13	49.75	2.75	59.50	11.75	0.866	56.00	40	1.63	1-1/2"- 6UNC-2B	44	1.13x5.5	2300

Note: Dimension "C" is shown with the seat fully compressed between the flanges, allow approx. 3/8" for clearance.



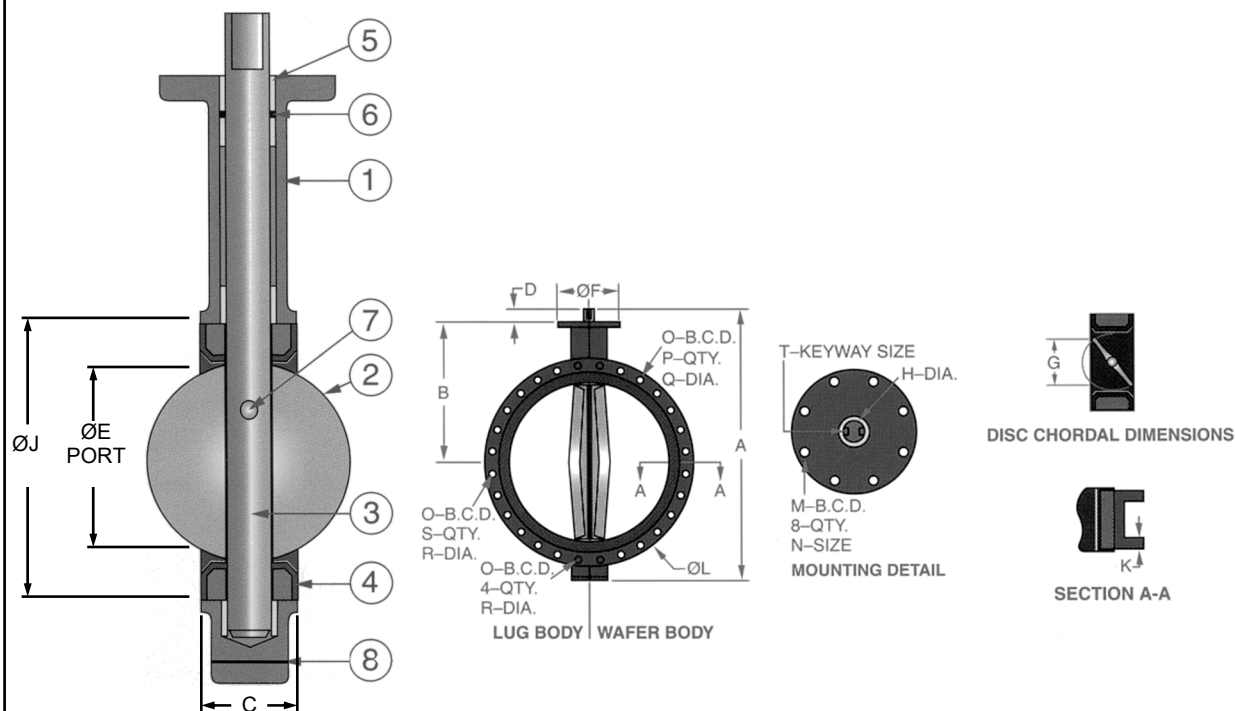
Item No.	Description	Material	Remarks
1	Body		
2	Disc		
3	Shaft		
4	Seat		
5	Bushings	Bronze	
6	Shaft Seal	BUNA-"N"	
7	Taper Pins	316 S.S.	
8	Thrust Plate	Steel	

Customer:	
Project:	
Valve Sizes:	
Certified By:	Date:

VALVE DIMENSIONS - MILLIMETRES (Metric)

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	Wt. kgs.
750	1284	660	167	67	725	300	705	63	795	54	984	254	18	914	24	35	1-1/4"-7UNC-2B	28	16x63	273
900	1487	721	203	118	842	300	813	75	974	60	1168	254	18	1086	28	41	1-1/2"-6UNC-2B	32	19x99	409
1050	1785	857	251	150	998	300	965	95	1124	67	1346	254	18	1257	32	41	1-1/2"-6UNC-2B	36	22x140	636
1200	1954	940	276	150	1127	349	1090	105	1264	70	1511	298	22	1422	40	41	1-1/2"-6UNC-2B	44	29x140	1045

Note: Dimension "C" is shown with the seat fully compressed between the flanges, allow approx. 10mm for clearance.



Item No.	Description	Material	Remarks
1	Body		
2	Disc		
3	Shaft		
4	Seat		
5	Bushings	Bronze	
6	Shaft Seal	BUNA-"N"	
7	Taper Pins	316 S.S.	
8	Thrust Plate	Steel	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

CHALLENGER

4" ALUMINUM VALVES AND ACCESSORIES UNIVERSAL MOUNTING TO TTMA-1, TTMA-2 & ANSI 125 - 150 FLANGE PATTERNS



SERIES 05 BARE SHAFT



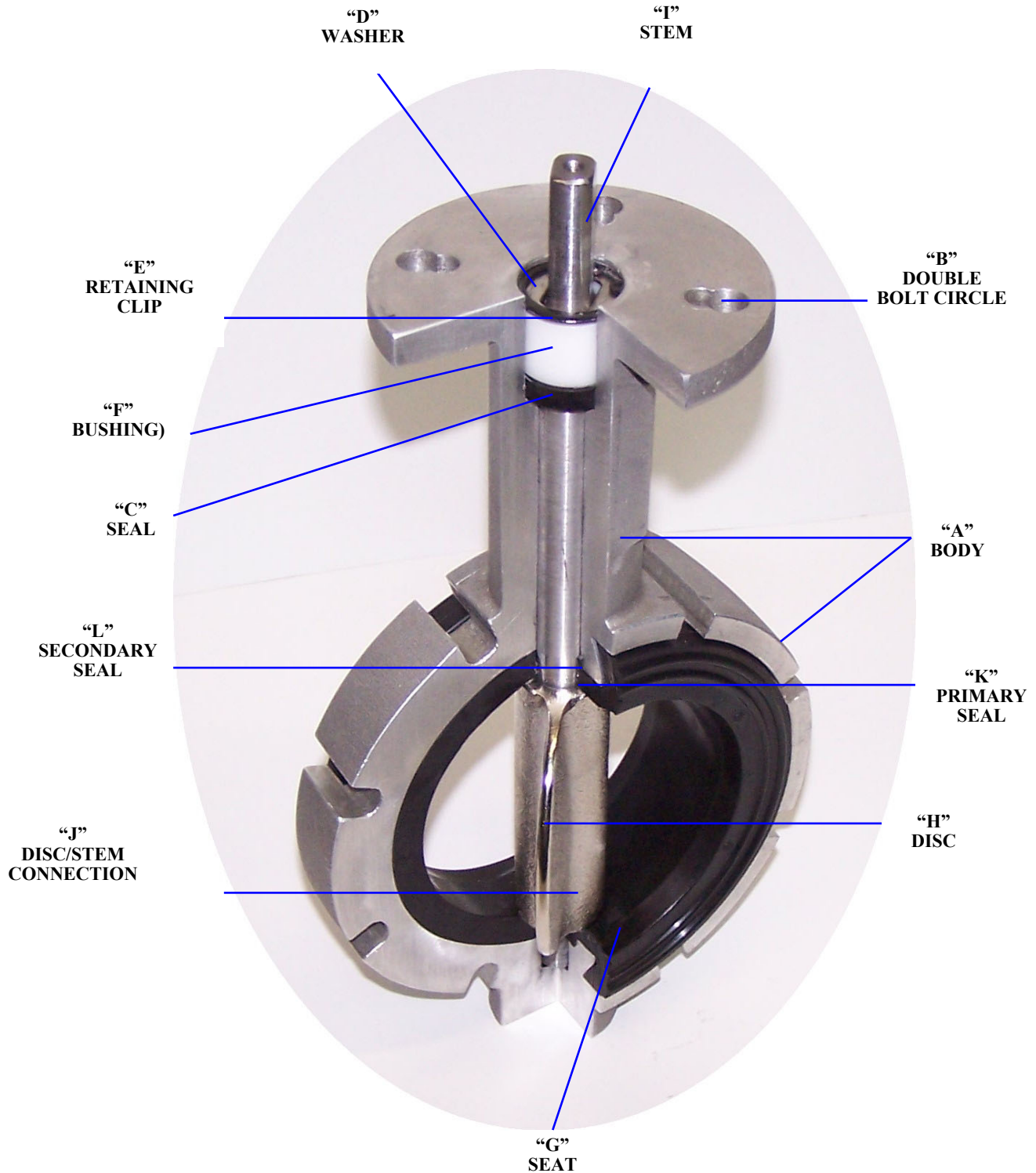
SERIES 05 WITH LEVER



SERIES 05 WITH 083 ACTUATOR

BULLETIN NO.
TTMA-100

DESIGN FEATURES SERIES 05
SUITABLE FOR MOUNTING TO TTMA #1, TTMA #2 AND ANSI 125/150 FLANGES



**DESIGN FEATURES SERIES 05
CONTINUED**

(A) BODY:

One piece design Tenzaloy 713 high strength aluminum wafer body drilled to accept TTMA # 1, TTMA #2 and A.N.S.I. 125/150 flanged drillings.

Face to face conforms to MSS-SP-67 for universal interchangeability.

Extended neck design allows for a minimum of 2" of piping insulation.

(B) ACTUATOR MOUNTING FLANGE AND VALVE STEM CONNECTION;

Mounting flange is double drilled to conform to universal standard I.S.O. 5211 F7 and non-standard 3.25" bolt circles for direct mounting of Challenger I.S.O. plus most competitors non I.S.O. actuators.

Valve stem is machined to accept the actuator bore for Challenger plus most competitors actuators.

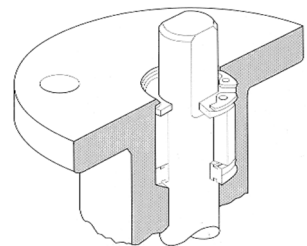
(C) STEM SEAL

The double "u" cup seal design is self-adjusting and gives positive sealing in both directions to prevent external substances from entering the stem area.

(D & E) STEM RETAINING SYSTEM

The valve stem is securely contained in the body by means of a stainless steel retaining washer broached to fit over the flats on top of the stem. The retaining washer is held in place by a high strength circlip that is fixed into a machined groove in the neck of the valve.

This design permits quick and easy shaft removal without the need for special tools.



(F) STEM BUSHING

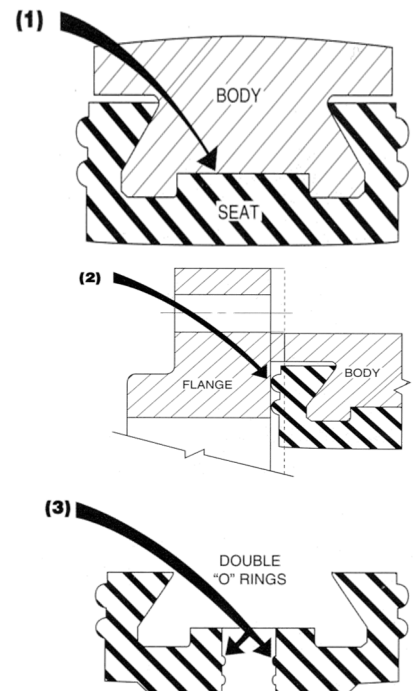
The heavy duty acetal bushing aligns and supports the stem and absorbs side thrust associated with power actuators.

(G) SEAT

The unique epsilon seat design has four retaining points virtually eliminating any seat movement during the seating and un-seating of the disc.

The double moulded in "O rings" are precisely positioned on the face of the seat to allow the flange to firmly lock the seat into the fully machined dove tail on the body to achieve maximum seat and sealing compression without the need for flange gaskets.

Both the upper and lower shaft journals have moulded-in double "O" rings which isolate the media from the body cavity in the event of a primary seat failure.

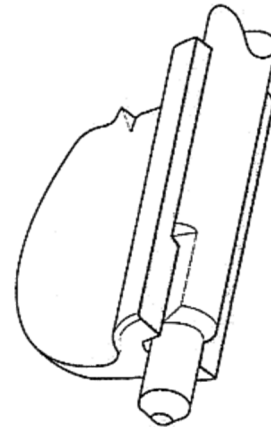


**DESIGN FEATURES SERIES 05
CONTINUED****(H) DISC**

The single piece casting is spherically machined, radiused and polished for extended seat life and bubble tight shut-off.

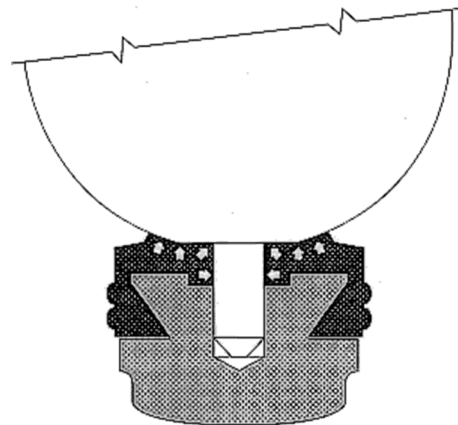
(I & J) STEM AND DISC DRIVE

One piece high strength 416 stainless steel with a close tolerance double “D” disc/stem connection eliminating the need for pins or disc screws.

**(K & L) PRIMARY & SECONDARY SEALING FEATURES**

The primary seal on the Challenger valve is obtained by an interference fit between the moulded flat on the seat and the hub of the disc.

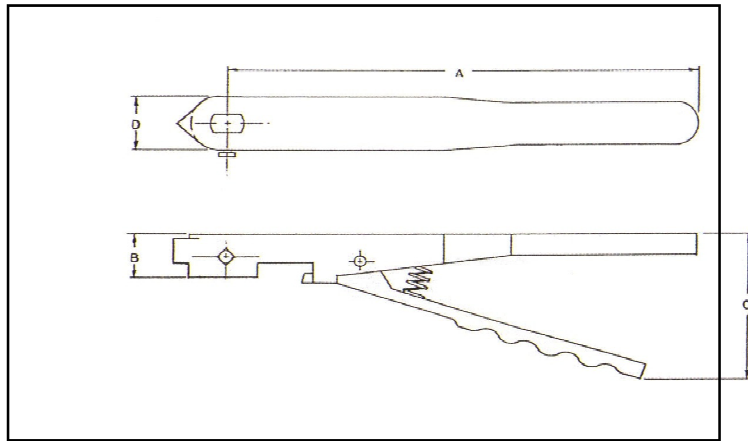
The secondary seal is obtained by an interference fit between the stem and the two moulded in “O” rings on the upper and lower stem journals.



SERIES AVLH LEVER

Selection and Dimensional Information

Series No.	Valve Size	Eff. Lever Length	Dimensions (in./mm)				Weight Lbs./Kgs.
			A	B	C	D	
04AVLH	4"	11.00"	11.00"	1.00"	3.00"	1.62	2.7LB
	100	279	279	25.4	76	41	1.2KG



Materials of Construction

Handle: Ductile Iron
 Trigger: Steel/Plated
 Spring: Stainless Steel
 Notch Plate: Steel Plated

Standard Features

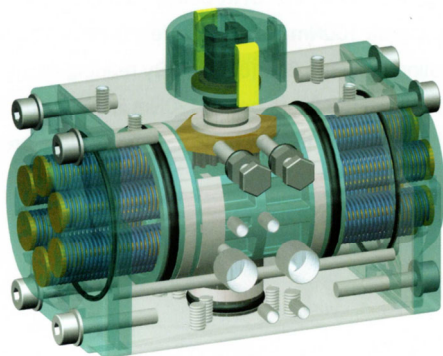
Unique self locking trigger prevents the handle from falling off when installed upside down.

10 position notch plate padlockable fully open, fully closed or in any of the other 8 positions.

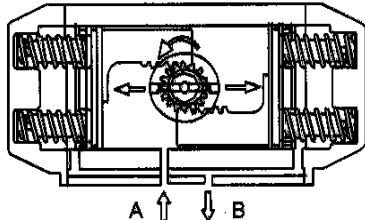
Options:

Infinite position plate.
 Valve Position Transmitter.

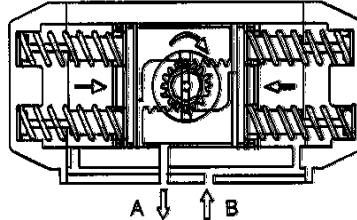
PNEUMATIC ACTUATOR NKS083



CCW-counter-clockwise

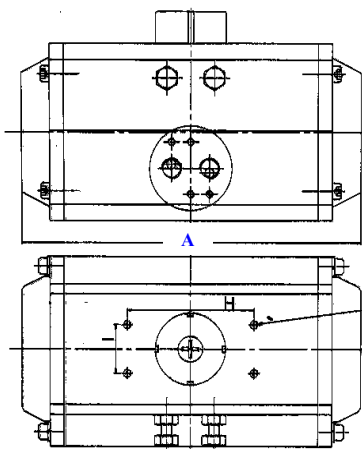
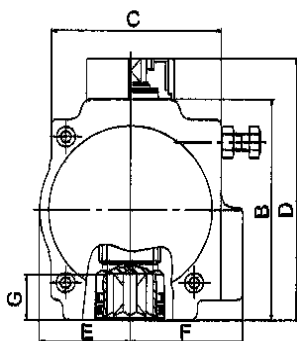


CW-clockwise



PNEUMATOR ACTUATOR - TORQUE TABLE

MODEL	SPRING SET	SPRING TORQUE IN LBS		AIR SUPPLY PRESSURE (UNIT PSIG)													
				40		50		60		70		80		90		100	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
NKS-083	12	313	437									396	273	484	361	573	450



Dimension Table

Model	A	B	C	D	E	F	G	H	I	N	A120°	A180°	BC	BC	L	M	AIR CONNECTION
	208	109	92	129	46	57	31	80	30	17	245	304	F07	F05	M8X13 5/16"-20UNC	M6X10 1/4"-20UNC	1/4" (STND)
	8.20	4.29	3.62	5.08	1.81	2.24	1.20	3.15	1.18	0.67	9.65	12.0					

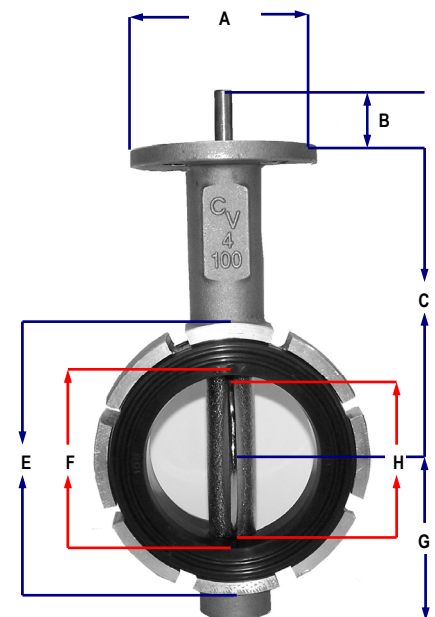
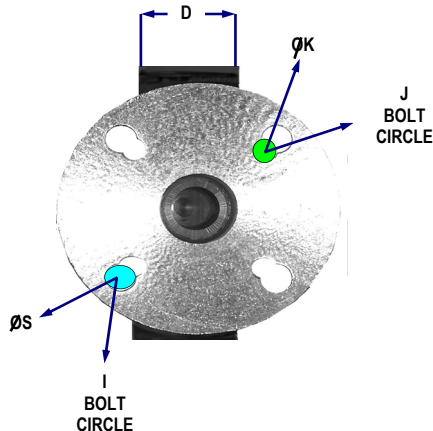
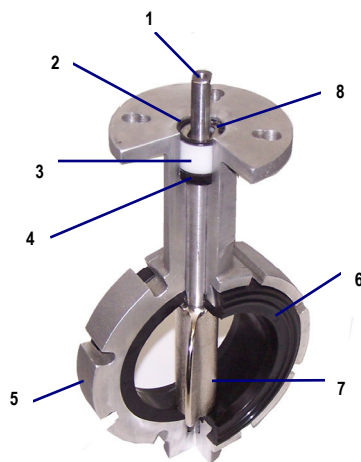
VALVE DIMENSIONS - Inches (Imperial)

Valve Size	A	B	C	D	E	F	G	H	Shaft End		TOP PLATE					WEIGHT LBS.
											DRILLING DIMENSIONS					
									Dia.	x Flat	I	S	J	K	HOLES	
4"	4.25	1.2	7.0	2.1	6.3	4.1	3.7	3.5	.625	.437	3.25	.438	2.75	.375	4	6.8

Note: Dimension "H" is the chordal dimension at face of valve for disc clearance.

Dimension "D" is with the seat fully compressed between the flanges, allow approx. 3/16" / 4.7mm for clearance.

FLANGING	BOLT CIRCLE DIAMETER	NO. OF BOLTS	BOLT DIAMETER
T.T.M.A. -1	5.875	8	0.375
T.T.M.A.-2	7.0	6	0.500
ANSI 125 / 150	7.5	8	0.625



Item No.	Description	Material	Remarks
1	Shaft		
2	C-Clip	Steel	
3	Bushing	Delrin	
4	Shaft Seal		
5	Body		
6	Seat		
7	Disc		
8	Washer	Stainless	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

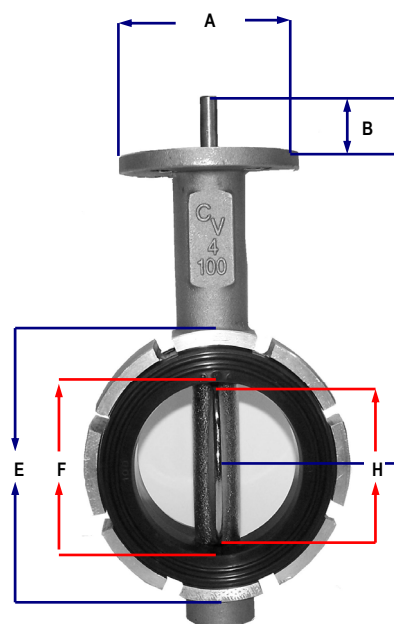
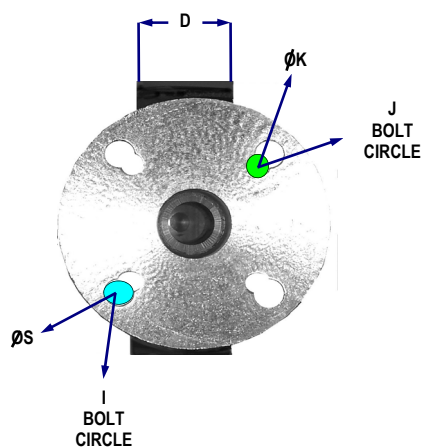
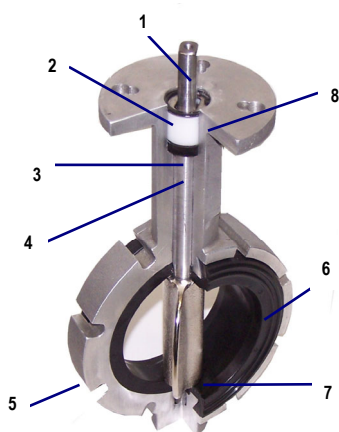
VALVE DIMENSIONS - Millimetres (Metric)

Valve Size	A	B	C	D	E	F	G	H	Shaft End		TOP PLATE					WEIGHT KGS.
									Dia.	x Flat	DRILLING DIMENSIONS					
											I	S	J	K	HOLES	
50	108.0	31.0	178.0	53.0	160.0	104.0	94.0	89.0	15.9	11.1	82.5	11.1	70.0	9.5	4	3.1

Note: Dimension "H" is the chordal dimension at face of valve for disc clearance.

Dimension "D" is with the seat fully compressed between the flanges, allow approx. 3/16" / 4.7mm for clearance.

FLANGING	BOLT CIRCLE DIAMETER	NO. OF BOLTS	BOLT DIAMETER
T.T.M.A. -1	149.23	8	9.5
T.T.M.A.-2	177.8.0	6	12.7
ANSI 125 / 150	190.5	8	15.9



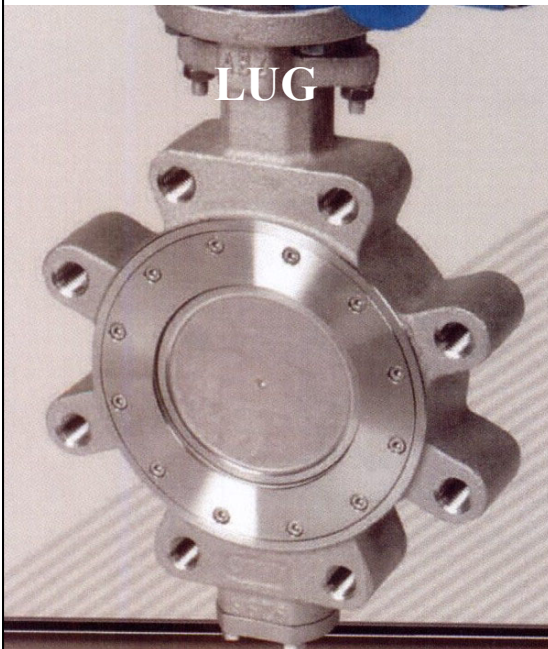
Item No.	Description	Material	Remarks
1	Shaft		
2	C-Clip	Steel	
3	Bushing	Delrin	
4	Shaft Seal		
5	Body		
6	Seat		
7	Disc		
8	Washer	Stainless	

Customer:			
Project:			
Valve Sizes:			
Certified By:		Date:	

CHALLENGER

HIGH PERFORMANCE BUTTERFLY VALVES

SERIES 400



**BULLETIN NO.
HP-100**

DESIGN FEATURES

STEM:

Manufactured as a standard of 17/4PH Stainless Steel to provide maximum strength and stability for high torque applications. Other materials available upon request.

BLOW OUT PROOF STEM:

Blowout proof stem retention system is designed per API 609 standards and is located above the packing area.

UNDERNEATH DRAWN GLAND PACKING:

Allows for direct mounting of actuation and ease of user adjustment. A rocker design gland flange and packing gland is utilized to ensure 360° packing adjustment.

MOUNTING FLANGE:

Designed to direct mount actuation for ease of installation and cost savings. No bracket is needed for manual actuation or automatic automation up to 20 inches.

EXTENDED NECK:

Allows for 2 inches of pipe insulation.

Gland Flange

Gland Packing

PACKING:

PTFE is a cup and cone system. Graphite is die-formed rings for positive seals.

SEAT RETAINER PLATE:

Constructed with the same material as the body, this robust multi-bolted seat retainer contains and supports the seat in both Bi-Directional Flow and Double Dead End Service for all soft seated valves.

SEAT:

An advanced free floating, pressure assisted, solid seat design provides an interference and pressure assisted seal. This achieves a positive seal under both low and high pressure requirements. The 400 Series seat does not rely on secondary located components such as O-Rings, springs, wire, or metal bands to hold the seat in place. This allows for a longer service life with less maintenance.

BODY:

High quality one-piece casting provides consistent uniformity. Body is available in Wafer, Lug, Double Flanged and Butt Welded. Body materials include WCB, CF8M, Duplex 2205, Monel SMO 255 and many others.

DISC:

Standard construction is 316 stainless steel with numerous alloys available. 400 Series disc is engineered for a quick release from the seat which reduces torque and seat wear.

BEARINGS:

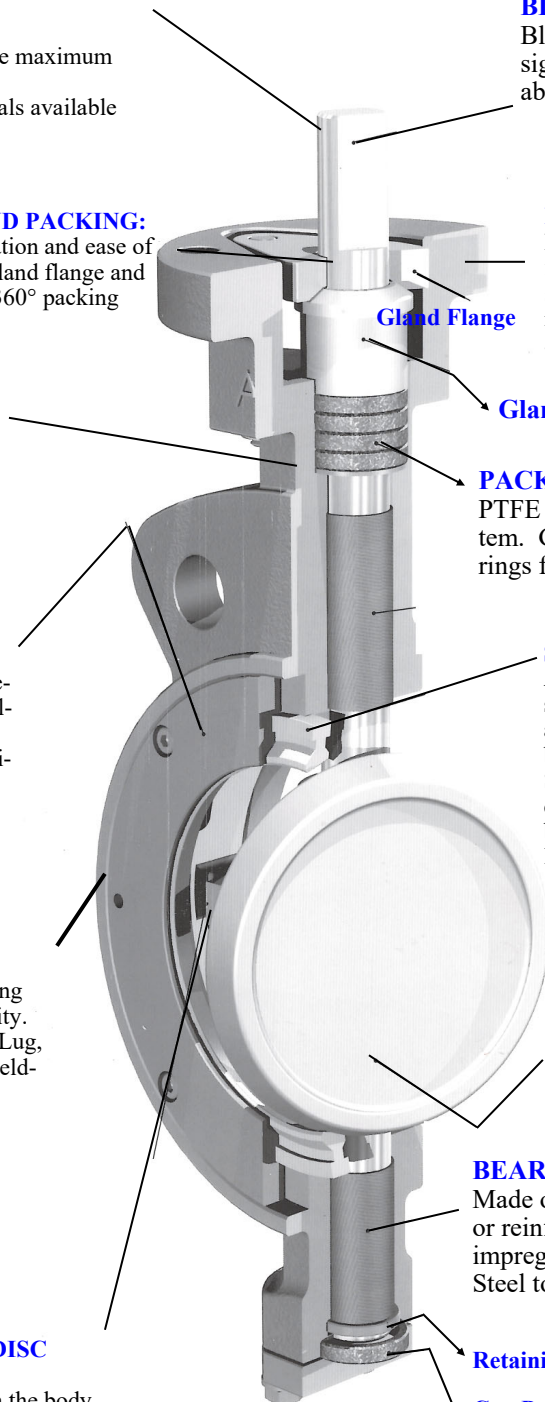
Made of Graphite impregnated or reinforced PTFE impregnated 316 Stainless Steel to ensure long service

INTEGRALLY CAST DISC POSITION STOP:

Machined position stop in the body locates the disc in the seat to achieve maximum sealing and seat life.

Retaining Ring

Cap Packing



Soft Seat Design:

- Solid seat, free floating, pressure assisted seal.
- No additional parts are required to maintain positive seal.
- 400 Series soft seated valves are rated full ANSI pressure.
- Seat and seat retainers are designed for Bi-Directional and Double Dead End Service.
- Class VI Bi-Directional shut off.

Fire Safe Seat Design:

- Solid seat with metal back up seat, free floating, pressure assisted seal.
- No additional parts are required to maintain positive seal.
- 400 Series Fire Safe valves are rated full ANSI pressure.
- API 607 Fire Safe Tested.
- Class VI shut off before fire and Class V shut off after fire.

Metal Seat Design:

- Machined metal seat, free floating, Uni-Directional, pressure Assisted seal.
- 400 Series metal seated valves are rated full ANSI pressure.
- API 607 Fire Safe tested
- Class V Uni-Directional shut off

NOTE: Soft seated and Fire Safe Seated valves are rated for full vacuum. Valves in vacuum service must be installed with vacuum on upstream side of valve. (Retainer Side)

SOFT SEAT
DESIGN

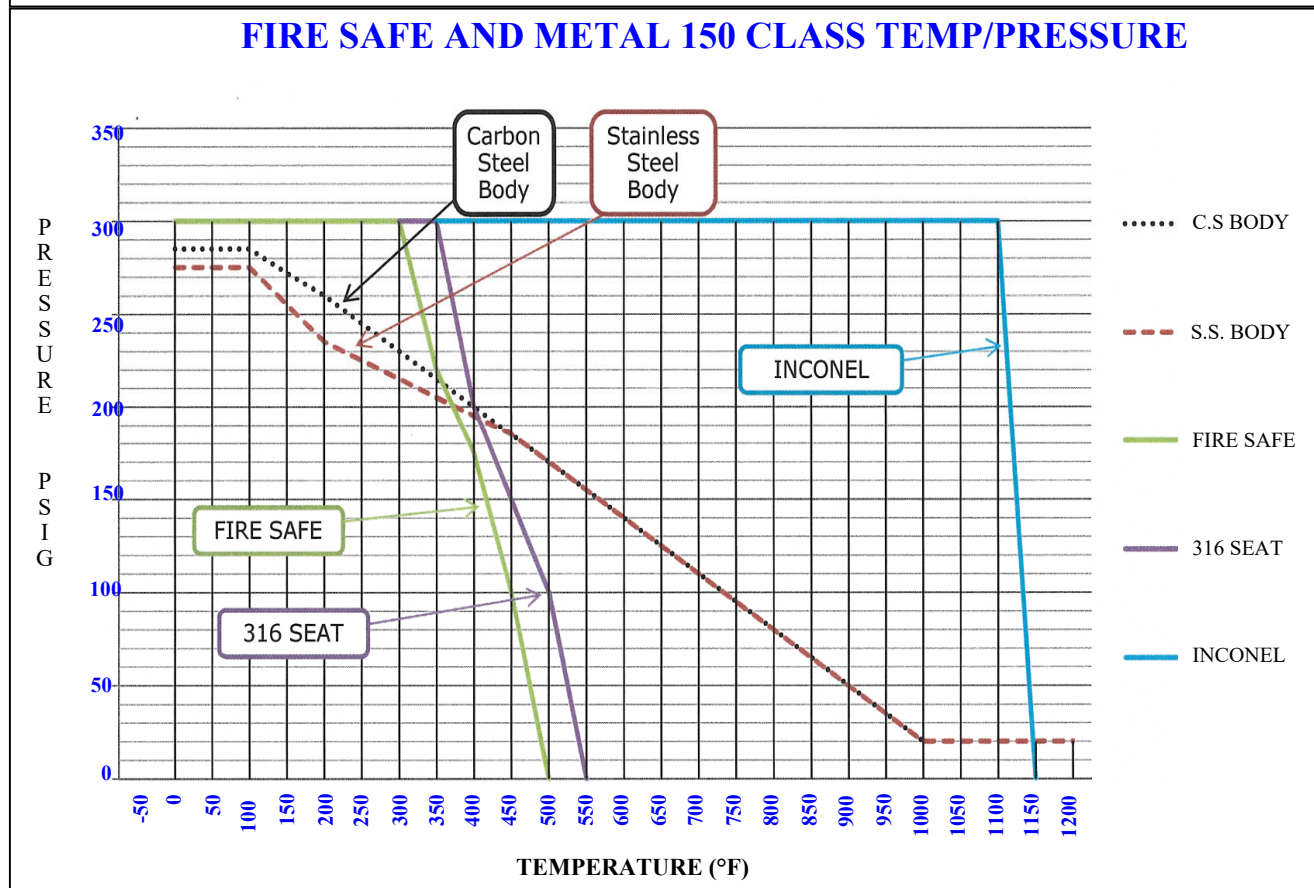
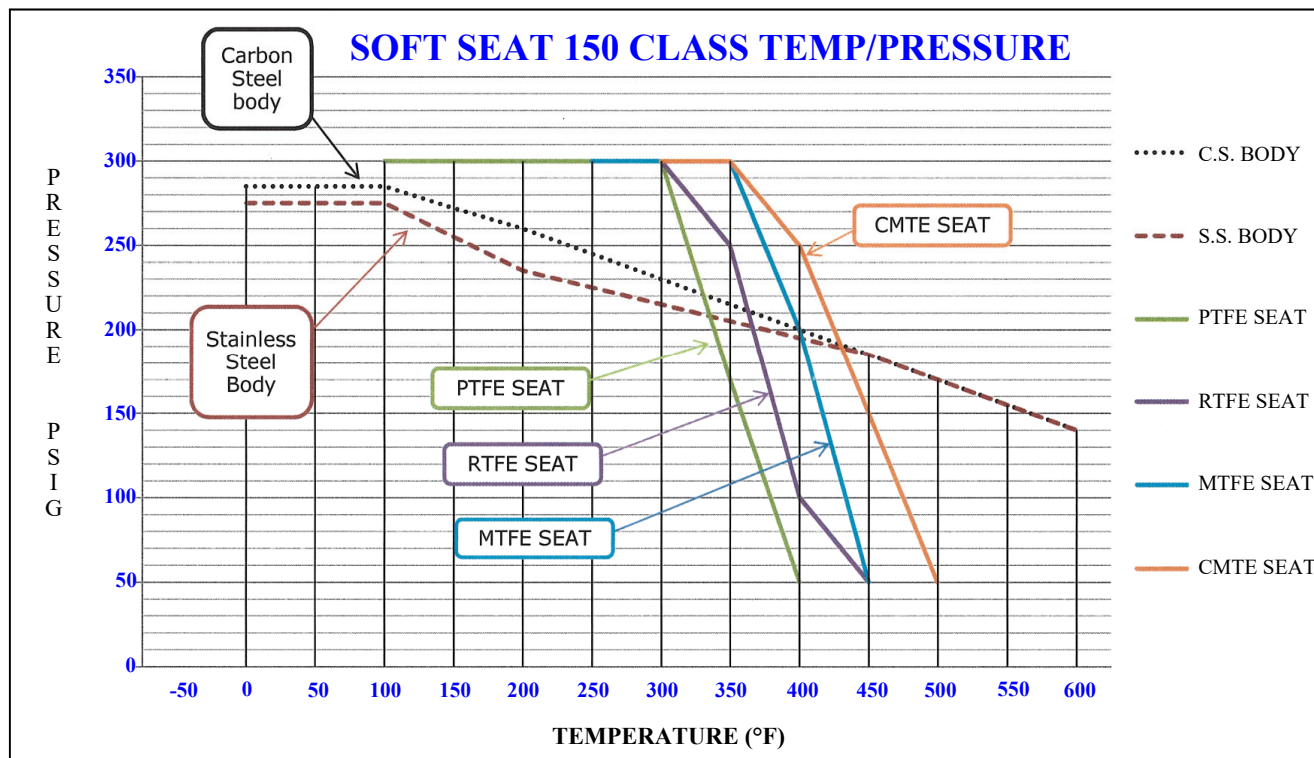
Recommended Flow Direction →

FIRE SAFE SEAT
DESIGN

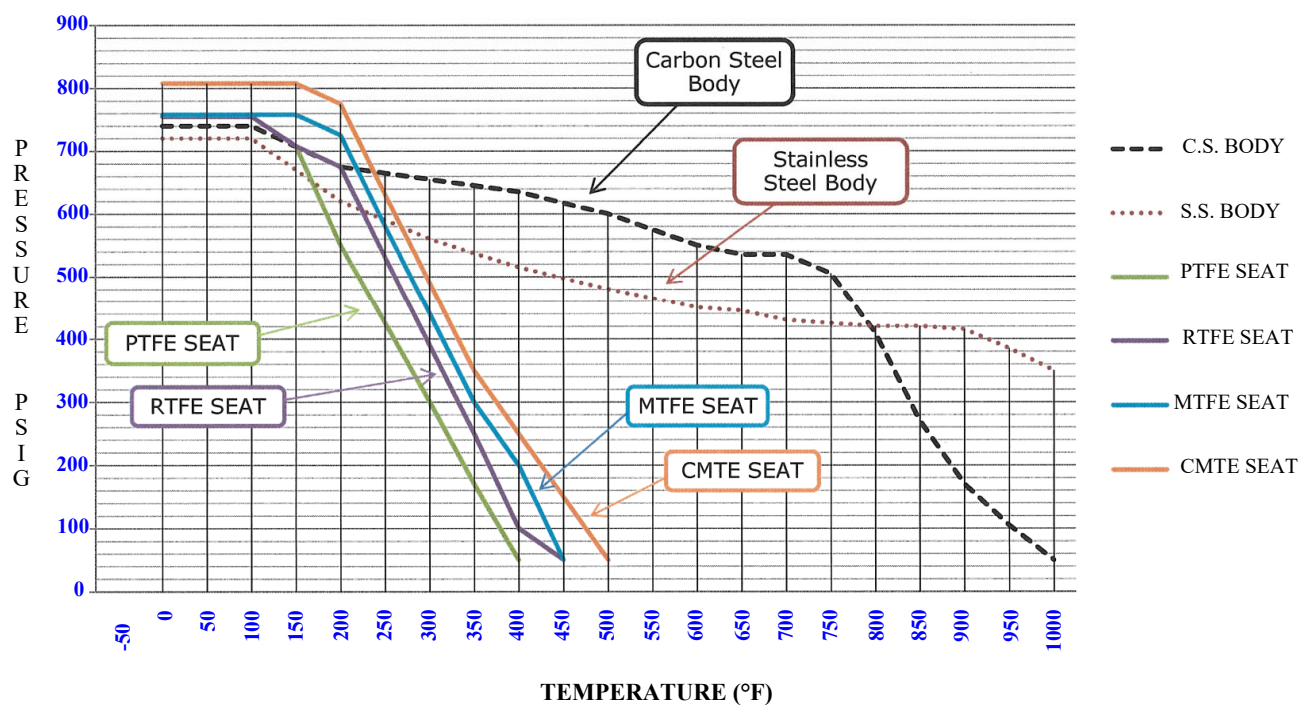
Recommended Flow Direction →

METAL SEAT
DESIGN

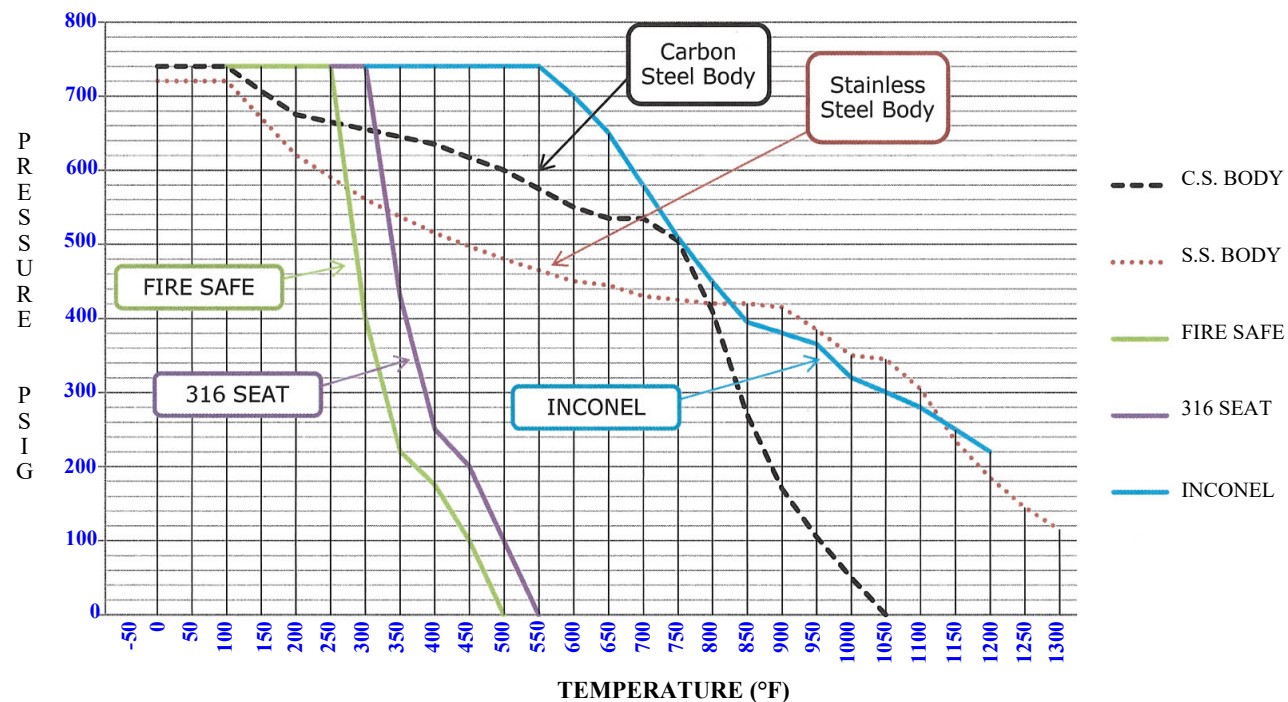
Recommended Flow Direction →



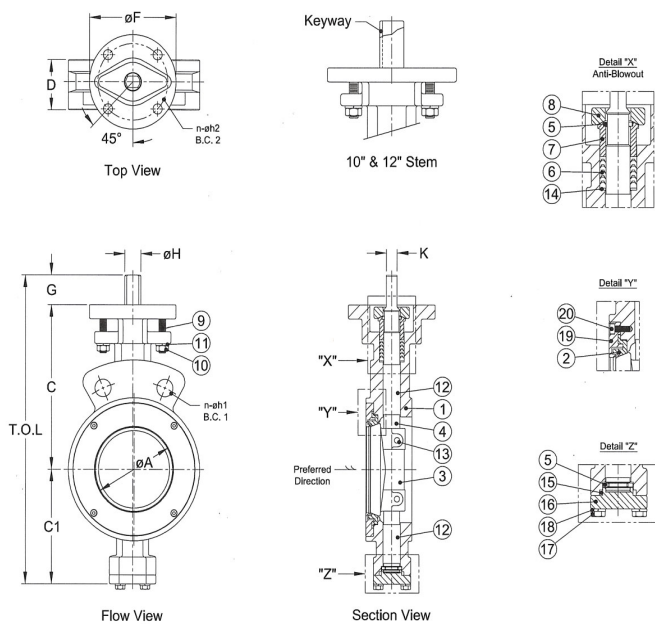
SOFT SEAT 300 CLASS TEMP/PRESSURE



FIRE AND METAL SEAT 300 CLASS TEMP/PRESSURE



SERIES 401 CLASS 150 WAFER 2" TO 12" BARE STEM




NOTES:

1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 150
5. Installation Direction: Bi-Directional/ Not for Dead End Service
6. Rated for full vacuum in non-preferred direction

ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Size		øA	C	C1	D	øF	G	øH	K	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM												B.C. 2	n	øh2	B.C. 1	n	øh1
2"	50	1.85	4.92	3.94	1.69	4.02	1.26	.551	.374	—	10.12	9 lbs	3.25	4	.43	4.75	2	.750
2-1/2"	65	2.40	5.87	4.02	1.85	4.02	1.26	.626	.437	—	11.15	12 lbs	3.25	4	.43	5.50	2	.750
3"	80	2.83	6.30	4.41	1.89	4.02	1.26	.626	.437	—	11.97	13 lbs	3.25	4	.43	6.00	2	.750
4"	100	3.74	7.01	4.88	2.13	4.02	1.26	.748	.500	—	13.15	18 lbs	3.25	4	.43	7.50	2	.750
5"	125	4.65	7.60	5.55	2.24	4.02	1.26	.748	.500	—	14.41	25 lbs	3.25	4	.43	8.50	2	.875
6"	150	5.43	8.39	6.57	2.24	4.02	1.26	.748	.500	—	16.22	28 lbs	3.25	4	.43	9.50	2	.875
8"	200	7.40	9.45	7.68	2.52	5.98	1.26	.874	.626	—	18.39	49 lbs	5.00	4	.55	11.75	2	.875
10"	250	9.25	11.02	8.66	2.83	5.98	2.05	1.126	—	.25 x .25	21.73	68 lbs	5.00	4	.55	14.25	2	1.000
12"	300	10.83	12.20	10.43	3.19	5.98	2.01	1.126	—	.25 x .25	24.64	95 lbs	5.00	4	.55	17.00	2	1.000

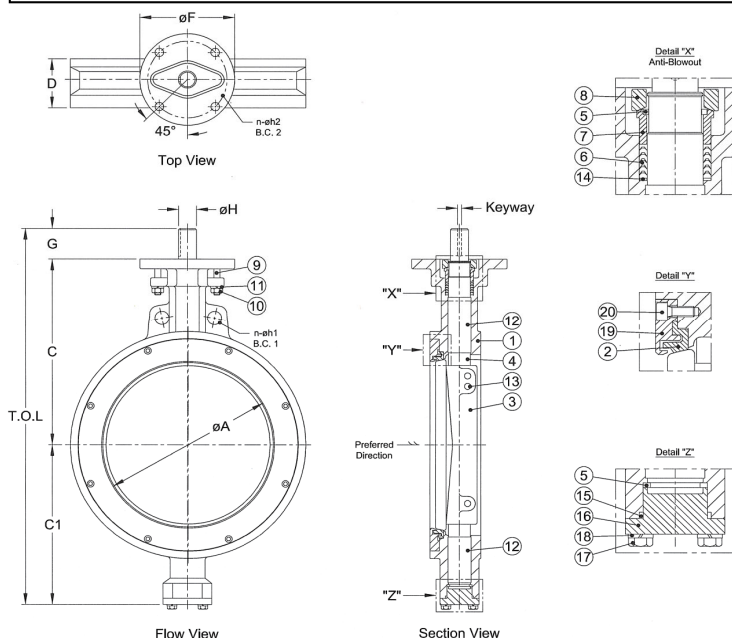
TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	450	SEAT	325	SEAT	-



CHALLENGER VALVES & CONTROLS

DOUBLE OFFSET BUTTERFLY VALVE

SERIES 401 CLASS 150 WAFER 14" To 24" BARE STEM



NOTES:

1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 150
5. Installation Direction: Bi-Directional/ Not for Dead End Service
6. Rated for full vacuum in non-preferred direction

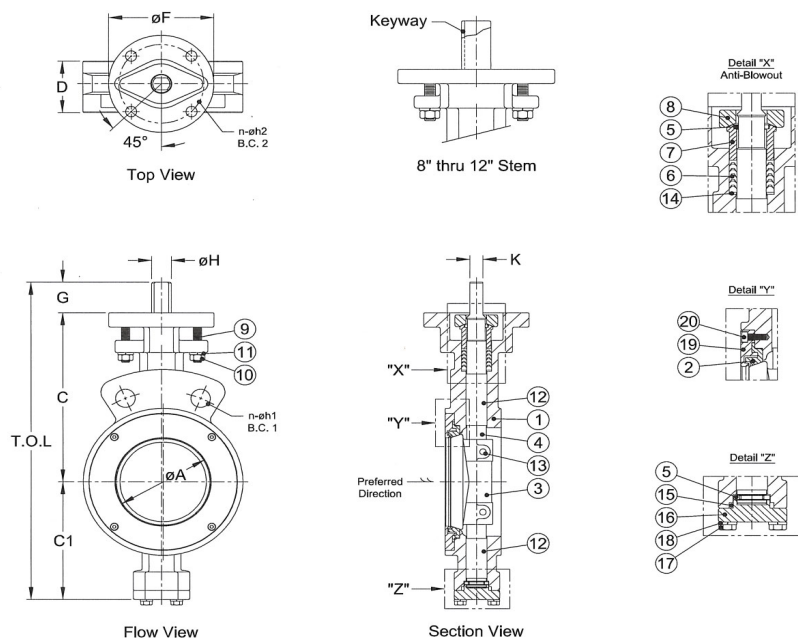
ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions

Valve Size												Mounting Base			Flange Dimension		
Inch	MM	øA	C	C1	D	øF	G	øH	Keyway	T.O.L	Weight	B.C. 2	n	øh2	B.C. 1	n	øh1
14"	350	12.48	13.19	11.81	3.62	5.98	2.24	1.374	.31 x .31	27.24	130 lbs	5.00	4	.55	18.75	2	1.125
16	400	14.13	15.47	13.39	4.02	8.03	2.99	1.874	.50 x .50	31.85	196 lbs	6.50	4	.83	21.25	2	1.125
18"	450	16.38	16.81	14.76	4.49	8.03	2.99	1.874	.50 x .50	34.56	270 lbs	6.50	4	.83	22.75	4	1 1/8"x8un
20"	500	18.39	17.72	15.75	5.00	8.03	2.99	2.126	.50 x .50	36.46	350 lbs	6.50	4	.83	25.00	4	1 1/8"x8un
24"	600	21.57	20.87	18.70	6.06	11.42	4.02	2.555	.75 x .50	43.59	564 lbs	10.00	8	.75	29.50	4	1 1/4"x8un

TEST PRESSURE (Psig) API 598	HYDRAULIC			AIR	
	SHELL	450	SEAT	325	SEAT
					-
CHALLENGER VALVES & CONTROLS					
DOUBLE OFFSET BUTTERFLY VALVE					

SERIES 421 CLASS 300 WAFER 2" TO 12" BARE STEM



NOTES:


1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 300
5. Installation Direction: Bi-Directional/ Not for Dead End Service
6. Rated for full vacuum in non-preferred direction

ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions

Valve Size		øA	C	C1	D	øF	G	øH	K	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM												B.C. 2	n	øh2	B.C. 1	n	øh1
2"	50	1.85	4.92	3.94	1.73	4.02	1.26	.551	.374	—	10.12	9 lbs	3.25	4	.43	5.00	2	.750
2 1/2"	65	2.40	5.87	4.02	1.89	4.02	1.26	.626	.437	—	11.15	13 lbs	3.25	4	.43	5.88	2	.875
3"	80	2.83	6.30	4.41	1.93	4.02	1.26	.626	.437	—	11.97	13 lbs	3.25	4	.43	6.62	2	.875
4"	100	3.74	7.01	4.88	2.13	4.02	1.26	.748	.500	—	13.15	17 lbs	3.25	4	.43	7.88	2	.875
5"	125	4.65	7.60	5.55	2.24	4.02	1.26	.748	.500	—	14.41	23 lbs	3.25	4	.43	9.25	2	.875
6"	150	5.39	8.66	6.93	2.32	4.02	1.26	.748	.500	—	16.85	34 lbs	3.25	4	.43	10.62	2	.875
8"	200	7.32	10.24	8.46	2.87	5.98	2.01	1.126	—	.25 x .25	20.71	62 lbs	5.00	4	.55	13.00	2	1.000
10"	250	9.06	11.42	9.53	3.27	5.98	2.01	1.126	—	.25 x .25	22.96	103 lbs	5.00	4	.55	15.25	4	1"x8unc
12"	300	10.79	12.80	10.75	3.62	5.98	2.01	1.374	—	.31 x .31	25.56	138 lbs	5.00	4	.55	17.75	4	1 1/8"x8unc

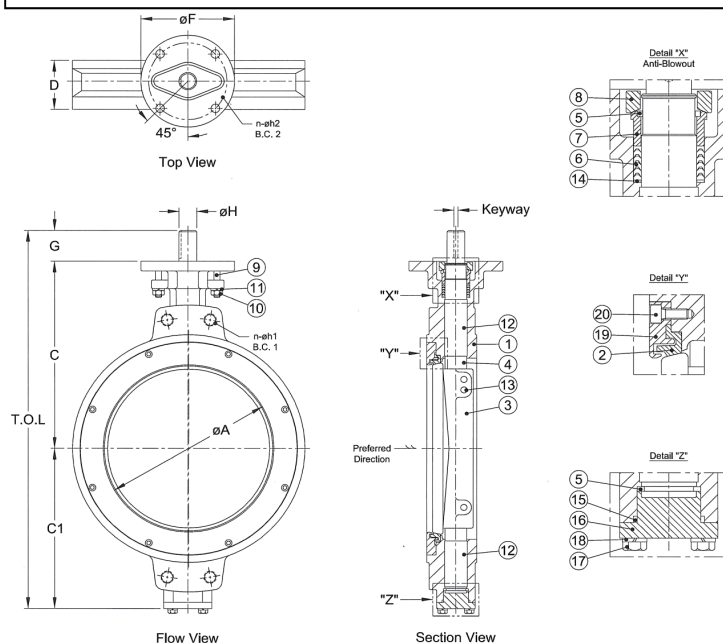
TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	1125	SEAT	825	SEAT	-



CHALLENGER VALVES & CONTROLS

DOUBLE OFFSET BUTTERFLY VALVE

SERIES 421 CLASS 300 WAFER 14" TO 24" BARE STEM




NOTES:

1. **Design : ANSI B16.34 & API 609**
2. **Gasket contact surface: Finish 125-250 AARH**
3. **Face to Face Dimensions: API 609 Category B**
4. **Flange connection: ANSI B16.5 Class 300**
5. **Installation Direction: Bi-Directional/ Not for Dead End Service**
6. **Rated for full vacuum in non-preferred direction**

ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions																	
Valve Size		øA	C	C1	D	øF	G	øH	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM											B.C. 2	n	øh2	B.C. 1	n	øh1
14"	350	12.32	14.76	12.80	4.61	8.03	2.99	1.874	.50 x .50	30.55	222 lbs	6.50	4	.83	20.25	4	1 1/8"x8un
16	400	14.02	16.73	14.37	5.24	8.03	2.99	2.122	.50 x .50	34.09	307 lbs	6.50	4	.83	22.50	4	1 1/4"x8un
18"	450	16.26	18.31	16.14	5.87	11.42	4.02	2.555	.75 x .50	38.47	436 lbs	10.00	8	.75	24.75	4	1 1/4"x8un
20"	500	18.35	19.88	17.72	6.26	11.42	4.02	2.555	.75 x .50	41.62	530 lbs	10.00	8	.75	27.00	4	1 1/4"x8un
24"	600	21.50	22.83	20.55	7.13	12.99	4.45	3.146	.87 x .55	47.83	780 lbs	10.00	8	.75	32.00	4	1 1/2"x8un

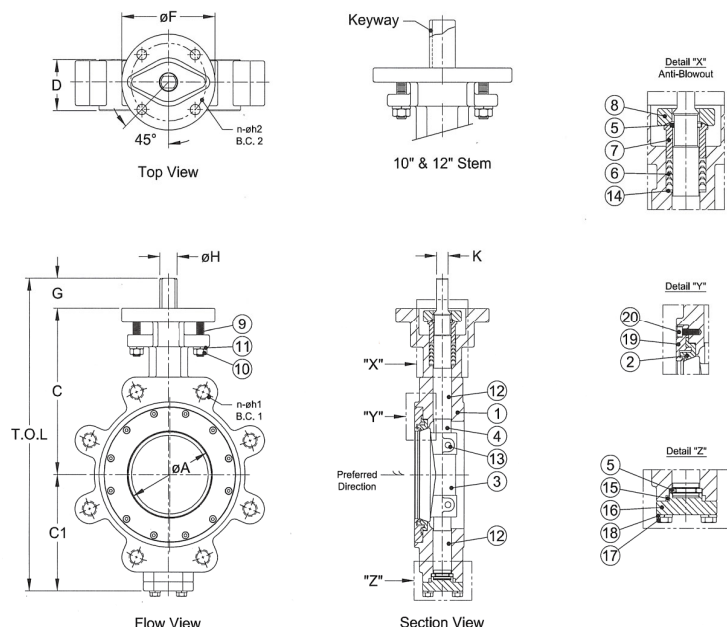
TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	1125	SEAT	825	SEAT	-



CHALLENGER VALVES & CONTROLS

DOUBLE OFFSET BUTTERFLY VALVE

SERIES 402 CLASS 150 LUG 2" TO 12" BARE STEM




NOTES:

1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 150
5. Installation Direction: Bi-Directional/ Double Dead End Service
6. Rated for full vacuum in non-preferred direction

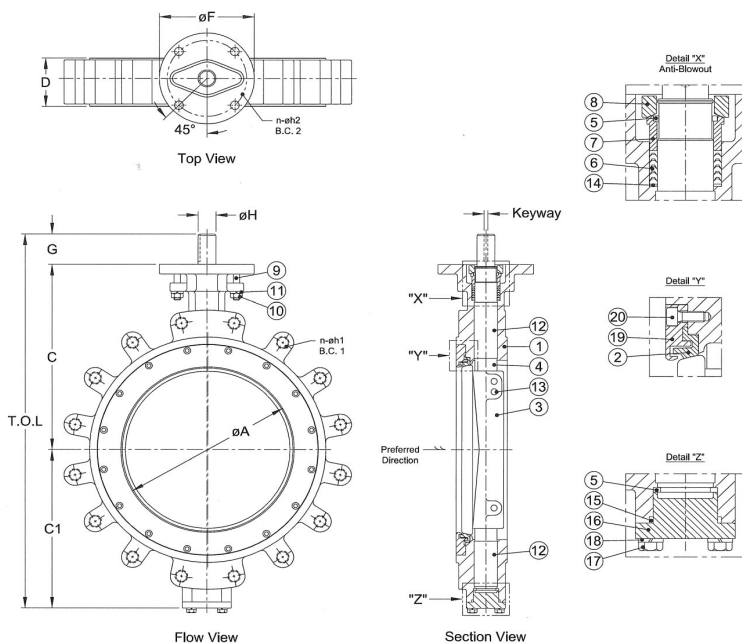
ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions

Valve Size		øA	C	C1	D	øF	G	øH	K	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM												B.C. 2	n	øh2	B.C. 1	n	øh1
2"	50	1.85	4.92	3.94	1.69	4.02	1.26	.551	.374	—	10.12	11 lbs	3.25	4	.43	4.75	4	5/8"x11unc
2 1/2"	65	2.40	5.87	4.02	1.85	4.02	1.26	.626	.437	—	11.15	13 lbs	3.25	4	.43	5.50	4	5/8"x11unc
3"	80	2.83	6.30	4.41	1.89	4.02	1.26	.626	.437	—	11.97	14 lbs	3.25	4	.43	6.00	4	5/8"x11unc
4"	100	3.74	7.01	4.88	2.13	4.02	1.26	.748	.500	—	13.15	23 lbs	3.25	4	.43	7.50	8	5/8"x11unc
5"	125	4.65	7.60	5.55	2.24	4.02	1.26	.748	.500	—	14.41	33 lbs	3.25	4	.43	8.50	8	3/4"x10unc
6"	150	5.43	8.39	6.57	2.24	4.02	1.26	.748	.500	—	16.22	37 lbs	3.25	4	.43	9.50	8	3/4"x10unc
8"	200	7.40	9.45	7.68	2.52	5.98	1.26	.874	.626	—	18.39	60 lbs	5.00	4	.55	11.75	8	3/4"x10unc
10"	250	9.25	11.02	8.66	2.83	5.98	2.05	1.126	—	.25 x .25	21.73	90 lbs	5.00	4	.55	14.25	12	7/8"x9unc
12"	300	10.83	12.20	10.43	3.19	5.98	2.01	1.126	—	.25 x .25	24.64	130 lbs	5.00	4	.55	17.00	12	7/8"x9unc

TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	450	SEAT	325	SEAT	-
	CHALLENGER VALVES & CONTROLS					
	DOUBLE OFFSET BUTTERFLY VALVE					

SERIES 402 CLASS 150 LUG 12" TO 24" BARE SHAFT




NOTES:

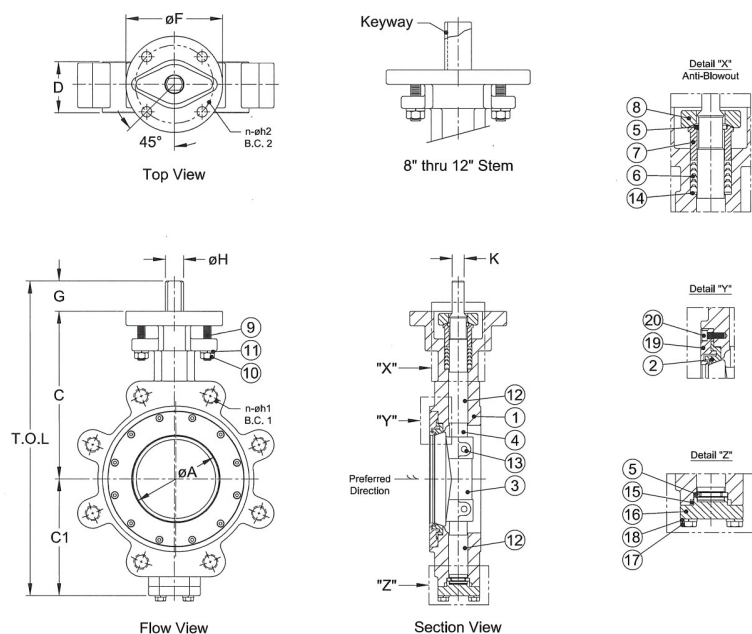
1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 150
5. Installation Direction: Bi-Directional/ Double Dead End Service
6. Rated for full vacuum in non-preferred direction

ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Size		ϕA	C	C1	D	ϕF	G	ϕH	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM											B.C. 2	n	$\phi h2$	B.C. 1	n	$\phi h1$
14"	350	12.48	13.19	11.81	3.62	5.98	2.24	1.374	.31 x .31	27.24	169 lbs	5.00	4	.55	18.75	12	1"x8unc
16	400	14.13	15.47	13.39	4.02	8.03	2.99	1.874	.50 x .50	31.85	262 lbs	6.50	4	.83	21.25	16	1"x8unc
18"	450	16.38	16.81	14.76	4.49	8.03	2.99	1.874	.50 x .50	34.56	326 lbs	6.50	4	.83	22.75	16	1 1/8"x8un
20"	500	18.39	17.72	15.75	5.00	8.03	2.99	2.126	.50 x .50	36.46	405 lbs	6.50	4	.83	25.00	20	1 1/8"x8un
24"	600	21.57	20.87	18.70	6.06	11.42	4.02	2.555	.75 x .50	43.59	675 lbs	10.00	8	.75	29.50	20	1 1/4"x8un

TEST PRESSURE (Psig)		HYDRAULIC				AIR	
API 598		SHELL	450	SEAT	325	SEAT	-
		CHALLENGER VALVES & CONTROLS					
		DOUBLE OFFSET BUTTERFLY VALVE					

SERIES 422 CLASS 300 LUG 2" TO 12" BARE STEM




NOTES:

1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 300
5. Installation Direction: Bi-Directional/ Double Dead End Service
6. Rated for full vacuum in non-preferred direction

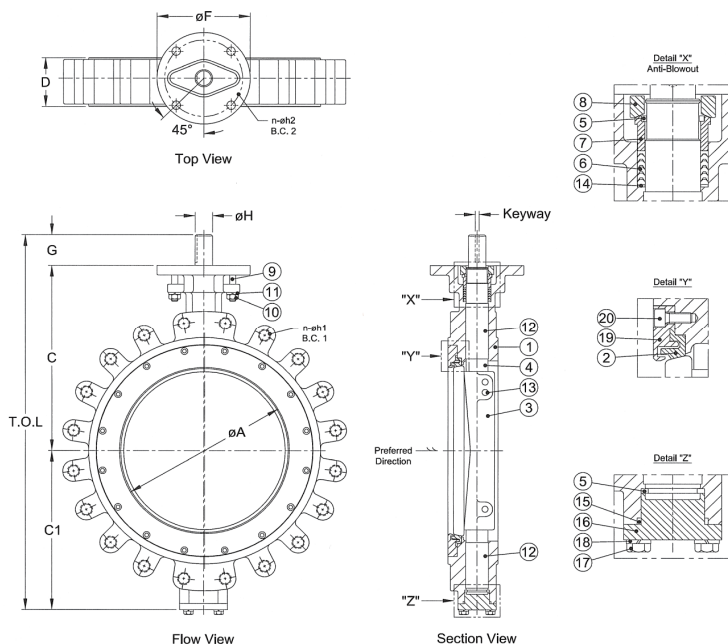
ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions

Valve Size		øA	C	C1	D	øF	G	øH	K	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM												B.C. 2	n	øh2	B.C. 1	n	øh1
2"	50	1.85	4.92	3.94	1.73	4.02	1.26	.551	.374	—	10.12	12 lbs	3.25	4	.43	5.00	8	5/8"x11unc
2 1/2"	65	2.40	5.87	4.02	1.89	4.02	1.26	.626	.437	—	11.15	17 lbs	3.25	4	.43	5.88	8	3/4"x10unc
3"	80	2.83	6.30	4.41	1.93	4.02	1.26	.626	.437	—	11.97	17 lbs	3.25	4	.43	6.62	8	3/4"x10unc
4"	100	3.74	7.01	4.88	2.13	4.02	1.26	.748	.500	—	13.15	24 lbs	3.25	4	.43	7.88	8	3/4"x10unc
5"	125	4.65	7.60	5.55	2.24	4.02	1.26	.748	.500	—	14.41	37 lbs	3.25	4	.43	9.25	8	3/4"x10unc
6"	150	5.39	8.66	6.93	2.32	4.02	1.26	.748	.500	—	16.85	48 lbs	3.25	4	.43	10.62	12	3/4"x10unc
8"	200	7.32	10.24	8.46	2.87	5.98	2.01	1.126	—	.25 x .25	20.71	84 lbs	5.00	4	.55	13.00	12	7/8"x9unc
10"	250	9.06	11.42	9.53	3.27	5.98	2.01	1.126	—	.25 x .25	22.96	128 lbs	5.00	4	.55	15.25	16	1"x8unc
12"	300	10.79	12.80	10.75	3.62	5.98	2.01	1.374	—	.31 x .31	25.56	188 lbs	5.00	4	.55	17.75	16	1 1/8"x8unc

TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	1125	SEAT	825	SEAT	-
	CHALLENGER VALVES & CONTROLS					
	DOUBLE OFFSET BUTTERFLY VALVE					

SERIES 422 CLASS 300 LUG 14" TO 24" BARE STEM



NOTES:


1. Design : ANSI B16.34 & API 609
2. Gasket contact surface: Finish 125-250 AARH
3. Face to Face Dimensions: API 609 Category B
4. Flange connection: ANSI B16.5 Class 300
5. Installation Direction: Bi-Directional/ Double Dead End Service
6. Rated for full vacuum in non-preferred direction

ITEM #	NAME	MATERIAL	NO. REQ'D
1	BODY	-	1
2	SEAT RING	-	1
3	DISC	-	1
4	STEM	-	1
5	RETAINER RING	-	2
6	PACKING	-	1 SET
7	PACKING GLAND	-	1
8	GLAND FLANGE	-	1
9	GLAND BOLT	-	2
10	NUT	-	2
11	SPRING WASHER	-	2
12	BUSH BEARING	-	2
13	DISC PIN	-	1 SET
14	PACKING RETAINER	-	1
15	CAP PACKING	-	1
16	CAP	-	1
17	CAP BOLT	-	1 SET
18	SPRING WASHER	-	1 SET
19	SEAT RETAINER	-	1
20	RETAINER BOLT	-	1 SET

Valve Dimensions

Valve Dimensions																	
Valve Size		øA	C	C1	D	øF	G	øH	Keyway	T.O.L	Weight	Mounting Base			Flange Dimension		
Inch	MM											B.C. 2	n	øh2	B.C. 1	n	øh1
14"	350	12.32	14.76	12.80	4.61	8.03	2.99	1.874	.50 x .50	30.55	314 lbs	6.50	4	.83	20.25	20	1 1/8"x8un
16	400	14.02	16.73	14.37	5.24	8.03	2.99	2.122	.50 x .50	34.09	433 lbs	6.50	4	.83	22.50	20	1 1/4"x8un
18"	450	16.26	18.31	16.14	5.87	11.42	4.02	2.555	.75 x .50	38.47	618 lbs	10.00	8	.75	24.75	24	1 1/4"x8un
20"	500	18.35	19.88	17.72	6.26	11.42	4.02	2.555	.75 x .50	41.62	779 lbs	10.00	8	.75	27.00	24	1 1/4"x8un
24"	600	21.50	22.83	20.55	7.13	12.99	4.45	3.146	.87 x .55	47.83	1185 lbs	10.00	8	.75	32.00	24	1 1/2"x8un

TEST PRESSURE (Psig) API 598	HYDRAULIC				AIR	
	SHELL	1125	SEAT	825	SEAT	-



CHALLENGER VALVES & CONTROLS

DOUBLE OFFSET BUTTERFLY VALVE



CLASS 150 WAFER BODY BOLT CHART

SIZE INCH MM		BOLT SIZE	LONG BOLT LENGTH			SHORT STUD LENGTH		
			QTY	MACHINE INCH	STUD INCH	QTY		STUD INCH
2	50	5/8"-11 UNC	4	4 1/2				
2.5	65	5/8"-11 UNC	4	4 1/2				
3	80	5/8"-11 UNC	4	5				
4	100	5/8"-11 UNC	8	5 1/4				
5	125	3/4"-10 UNC	8	5 1/2				
6	150	3/4"-10 UNC	8	5 1/2				
8	200	3/4"-10 UNC	8	6				
10	250	7/8"-9 UNC	12					
12	300	7/8"-9 UNC	12					
14	350	1"-8 UNC	12					
16	400	1"-8 UNC	16					
18	450	1-1/8"-8 UN	16					
20	500	1-1/8"-8 UN	16					4 1/2
22	550	1-1/4"-8 UN	16					5
24	600	1-1/4"-8 UN	16					5

CLASS 300 WAFER BODY BOLT CHART

SIZE INCH MM		BOLT SIZE	LONG BOLT LENGTH			SHORT STUD LENGTH		
			QTY	MACHINE INCH	STUD INCH	QTY		STUD INCH
2	50	5/8"-11 UNC	8	4 3/4	5 3/4			
2.5	65	3/4"-10 UNC	8	5 1/4	6 1/2			
3	80	3/4"-10UNC	8	5 1/2	6 3/4			
4	100	3/4"-10 UNC	8	6 1/4	7 1/4			
5	125	3/4"-10 UNC	8	6 3/4	8			
6	150	3/4"-10 UNC	12	7	8 1/4			
8	200	7/8"-9 UNC	12	8	9 1/4			
10	250	1"-8 UNC	12	9	10 1/2	8		4 1/2
12	300	1-1/8" UNC	12	9 3/4	11 1/4	8		4 1/2
14	350	1-1/8" UNC	16	11	12 1/2	8		4 3/4
16	400	1-1/4"-8 UN	16	12	13 3/4	8		5
18	450	1-1/4"-8 UN	20	13	14 3/4	8		5
20	500	1-1/4"-8 UN	20	13 3/4	15 1/2	8		5 1/4
22	550	1-1/2"-8 UN	20	14 1/4	17 1/2	8		5 3/4
24	600	1-1/2"-8 UN	20	14 1/2	17 1/2	8		6



CLASS 150 LUG BODY BOLT CHART

SIZE INCH MM		BOLT SIZE	LONG BOLT LENGTH			SHORT STUD LENGTH		
			QTY	MACHINE INCH	STUD INCH	QTY		STUD INCH
2	50	5/8"-11UNC	8	1 1/2	2 3/4			
2.5	65	5/8"-11 UNC	8	1 3/4	2 3/4			
3	80	5/8"-11 UNC	8	1 3/4	2 3/4			
4	100	5/8"-11 UNC	16	2	3			
5	125	3/4"-10 UNC	16	2	3			
6	150	3/4"-10 UNC	16	2	3			
8	200	3/4"-10 UNC	16	2 1/4	3 1/4			
10	250	7/8"-9 UNC	24	2 1/4	3 3/4			
12	300	7/8"-9 UNC	24	2 3/4	4			
14	350	1"-8 UNC	24	3	4 1/2			
16	400	1"-8 UNC	32	3	4 1/2			
18	450	1-1/8"-8 UN	32	3 1/4	4 3/4			
20	500	1-1/8"-8 UN	32	3 1/2	4 3/4	8		4 1/2
22	550	1-1/4"-8 UN	32	4	5 1/2	8		5
24	600	1-1/4"-8 UN	32	4	5 1/2	8		5

CLASS 300 LUG BODY BOLT CHART

SIZE INCH MM		BOLT SIZE	LONG BOLT LENGTH			SHORT STUD LENGTH		
			QTY	MACHINE INCH	STUD INCH	QTY		STUD INCH
2	50	5/8"-11 UNC	16	1 3/4	2 3/4			
2.5	65	3/4"-10 UNC	16	1 3/4	3			
3	80	3/4"-10 UNC	16	2	3 1/2			
4	100	3/4"-10 UNC	16	2 1/4	3 3/4			
5	125	3/4"-10 UNC	16	2 1/2	3 3/4			
6	150	3/4"-10 UNC	24	2 1/2	3 3/4			
8	200	7/8"-9 UNC	24	3	4 1/2			
10	250	1"-8 UNC	24	3 1/2	5 1/4	8		4 1/2
12	300	1-1/8"-8 UN	24	3 3/4	5 1/2	8		4 1/2
14	350	1-1/8"-8 UN	32	4	5 1/2	8		4 3/4
16	400	1-1/4"-8 UN	32	4	5 3/4	8		4 3/4
18	450	1-1/4"-8 UN	40	5	6	8		5 1/4
20	500	1-1/4"-8 UN	40	5	6	8		5 1/4
22	550	1-1/2"-8 UN	40	5 3/4	7	8		5 3/4
24	600	1-1/2"-8 UN	40	5 3/4	7	8		6



CLASS (ANSI) 150

SIZE	SIZE	RATED FLOW CO-EFFICIENT C_v								
In.	MM	10	20	30	40	50	60	70	80	90
2"	50	2	5	12	19	32	45	65	81	88
2.5"	65	3	9	21	33	54	77	111	138	150
3"	80	5	14	32	50	82	116	168	209	227
4"	100	9	25	57	90	148	209	303	377	410
5"	125	16	44	104	163	266	377	548	681	740
6"	150	25	65	150	235	380	540	785	975	1060
8"	200	55	130	305	480	785	1110	1615	2005	2200
10"	250	85	205	475	750	1225	1735	2520	3135	3400
12"	300	115	280	655	1025	1680	2380	3450	4290	4700
14"	350	150	355	830	1305	2140	3030	4395	5465	5900
16"	400	200	475	1115	1750	2860	4055	5880	7310	7900
18"	450	265	630	1475	2315	3790	5365	7790	9680	10500
20"	500	345	830	1935	3040	4975	7050	10230	12715	13800
22"	550	375	975	2275	3580	5855	8295	12035	14960	16300
24"	600	485	1265	2955	4640	7590	10755	15605	19405	21100
26"	650	550	1450	3350	5300	8650	12250	17800	22100	24000
28"	700	650	1750	4050	6350	10350	14650	21300	26450	28800
30"	750	750	2000	4600	7250	11900	16850	24400	30350	33000
32"	800	850	2350	5450	8600	14050	19900	28850	35850	39000
34"	850	1000	2750	6450	10150	16650	23550	34200	42500	46200
36"	900	1100	2950	6900	10900	17800	25200	36600	45500	49400
40"	1000	1550	4000	9300	14650	23950	33900	49200	60500	66500
42"	1050	1650	4350	10100	15900	26000	36850	53450	65000	72200
48"	1200	2350	6100	14200	22350	36350	51800	75150	91450	101600

C_v =

The volume of water in U.S.G.P.M. that will flow through a given restriction or valve opening with a pressure drop of 1 p.s.i.



CLASS (ANSI) 300

SIZE	SIZE	RATED FLOW CO-EFFICIENT C_v								
In.	MM	10	20	30	40	50	60	70	80	90
2"	50	2	5	12	19	32	45	65	81	88
2.5"	65	3	9	21	33	54	77	111	138	150
3"	80	5	14	32	50	82	116	168	209	227
4"	100	9	25	57	90	148	209	303	377	410
5"	125	16	44	104	163	266	377	548	681	740
6"	150	24	60	139	218	357	506	735	914	995
8"	200	45	110	260	410	670	945	1375	1710	1900
10"	250	75	175	415	650	1065	1505	2185	2720	3000
12"	300	105	250	580	910	1495	2115	3070	3815	4100
14"	350	135	325	755	1185	1940	2750	3985	4955	5400
16"	400	175	415	970	1520	2490	3525	5120	6365	6900
18"	450	245	590	1375	2165	3540	5015	7275	9045	9800
20"	500	315	760	1770	2780	4555	6450	9360	11635	12600
24"	600	435	1135	2645	4155	6800	9635	13980	17380	18900
30"	750	650	1750	4050	6400	10450	14800	21500	26700	29000
36"	900	1000	2700	6300	9900	16200	22900	33250	41350	44900

C_v = The volume of water in U.S.G.P.M. that will flow through a given restriction or valve opening with a pressure drop of 1 p.s.i.

INTRODUCTION

General Note:

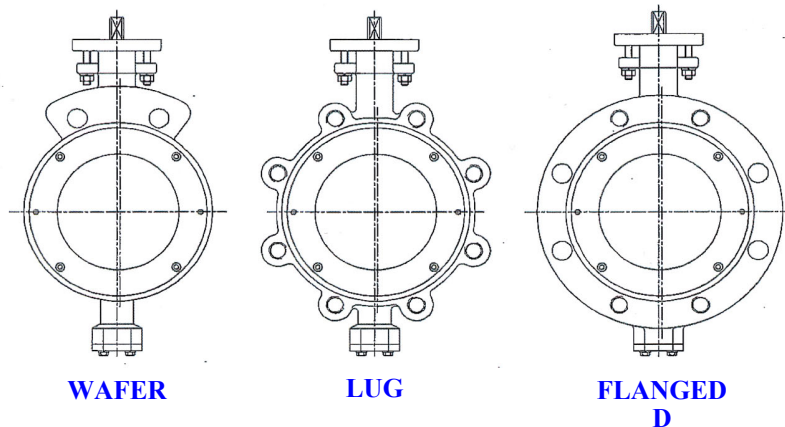
High Performance Butterfly Valves having a double eccentricity can be widely used for automatic proportion control. Simple and clear valve structure enables user to assemble and disassemble easily.

Type:

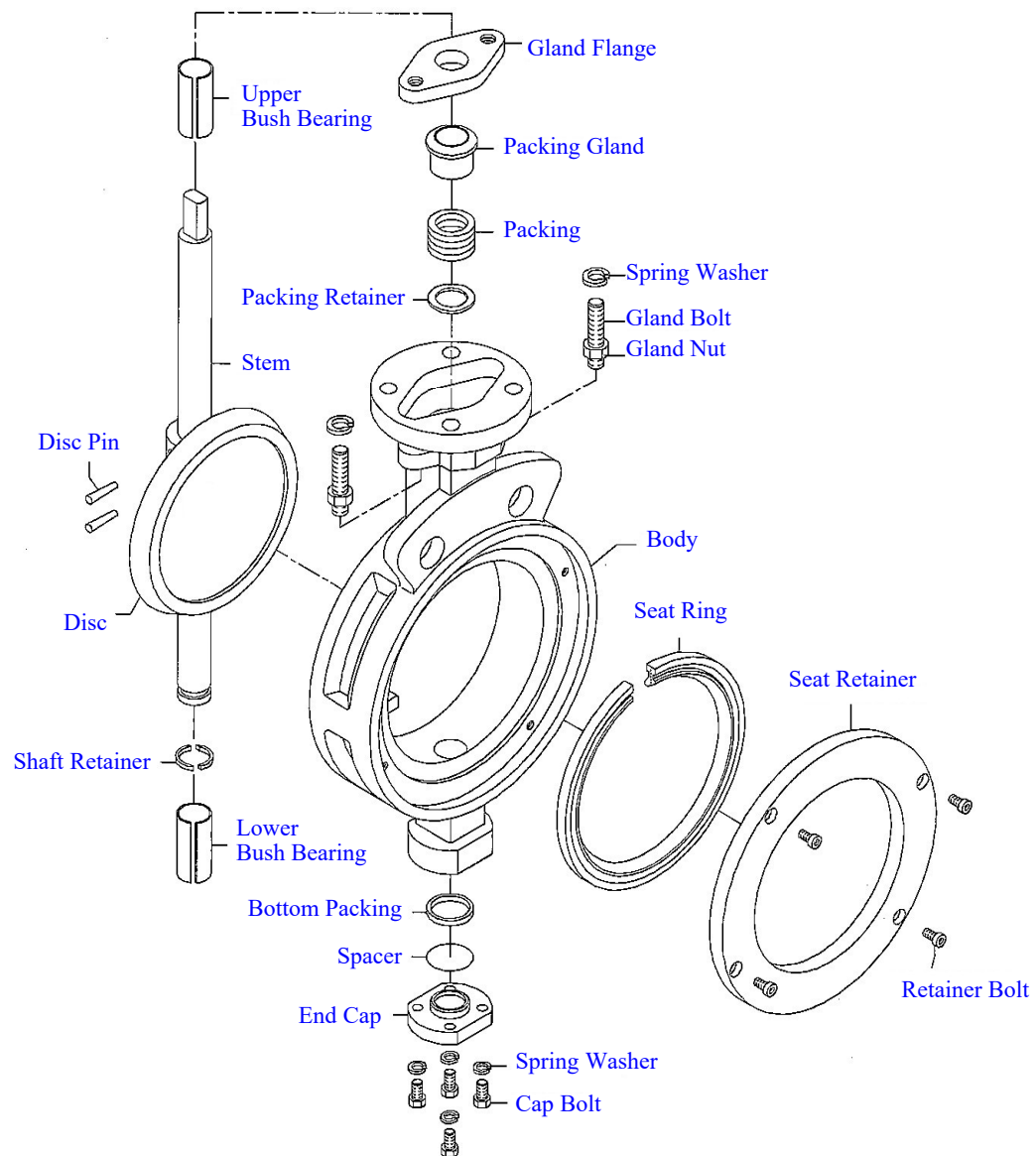
Our valves are classified as Wafer type, Lug type and Flanged end type by their shape. Their principal parts consist of body, disc, seat, and stem. Materials used for each part is determined by the application and working condition of the valve.

Operation:

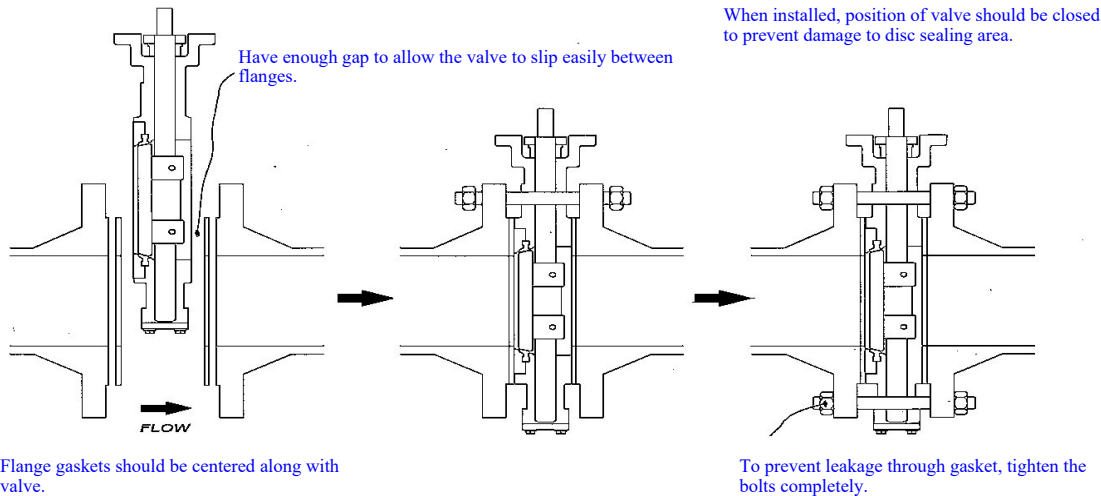
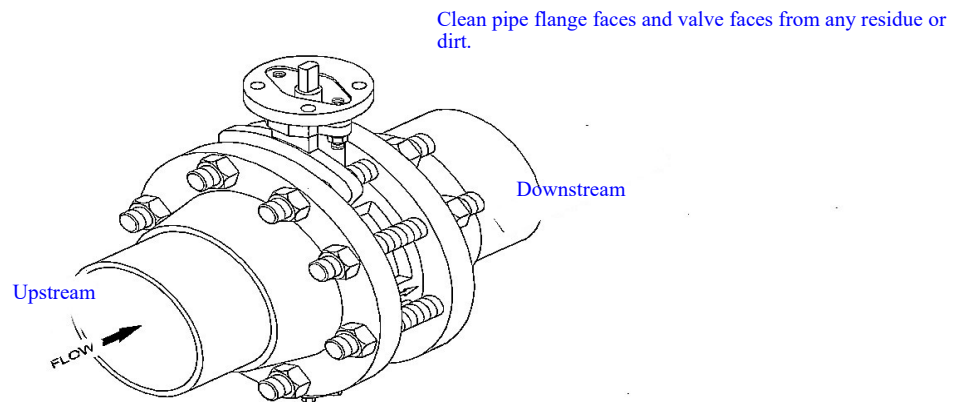
The valve operator could be classified into a level handle, manual gear, pneumatic actuator and electric motor operated actuator. By rotating or closing the valves' disc you can control flow through the pipe line by regulating the flow or shutting it off. (Generally, on-off direction is indicated on the operator.)



EXPLODED VIEW



VALVE VIEW ON THE LINE



MAINTENANCE/INSPECTION

Maintenance:

- Our High Performance valve does not need maintenance unless a leakage is found. However, some routine inspection is recommended for safety and a longer lifetime.
- Visual inspection of the body, disc and packing of the valve at the time of initial service or at the re-operation after a long term recess.
- Check the valve when abnormal sound is perceived during operation or at any other time.
- Regularly ensure the tightness of each bolt.

Inspection/Minor Treatment

Packing:

- Most leakage from the packing parts of the valve can be prevented by effective tightening of gland flanges' nuts and bolts. If the leakage doesn't stop, packing replacement shall be required instead of re-tightening bolts. In case, see the reference figure and the method of packing replacement.

Seat Ring/Seat Retainer:

- Before installation in the line, check the condition of the seat ring and the bolting degree of seat retainer.

INSTALLATION

Pre-Installation:

Before installation of the valve to the “Pipe Line”, it is recommended for user to inspect a valve as below.

Inspecting Valve & Accessory:

- Ensure that there has been no damage to the valve during transportation.
- Remove the protection cover from the valve just before installation and clean with an air blaster or with a clean dust cloth.
- Check the tightness of all the bolts and nuts.

Inspecting Pipeline:

- Remove foreign materials such as a rust, welding chip etc., which remain in the pipeline.
- Make sure the clearness of pipe flange and gasket surface.

***Caution:

When the fluid is flowing through the line, any foreign materials are subject to scratch the disc, seat, and inner body, which may cause leakage and shortening of the valves’ lifetime.

Installation:

- Make sure the valve disc is fully closed. (Usually, valve is delivered with disc closed tightly to protect seat ring)
- Check the preferred flow direction indicated by the arrow on the valve body.
- Be sure to place a gasket at centre of valve and pipe flange.

***Caution:

- For long lifetime of the valve, please check that the arrow on valve and fluid direction are correct.
- Over torque on the bolts might cause damage of gasket.

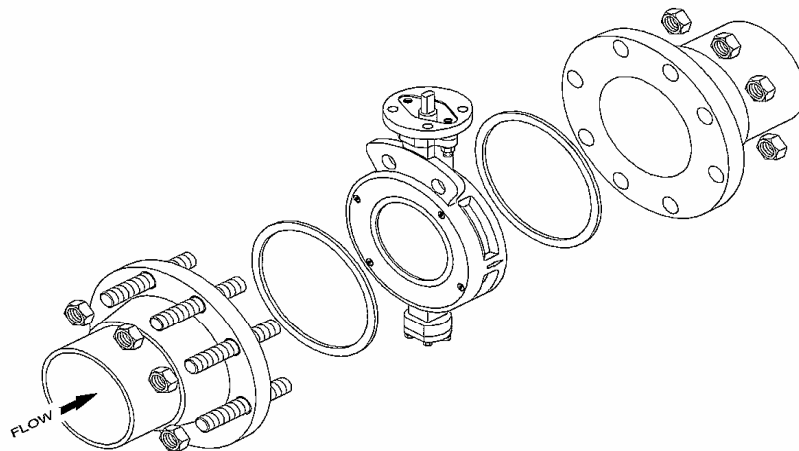
REPLACEMENT (ASSEMBLY/DISASSEMBLY)

*** All the repair works (disassembly and replacement etc.) of our valve should be performed by well-trained maintenance personnel.

Separation of Valve from the Pipe:

To repair a leaking valve, the valve must be removed from the pipeline and the parts must be dismantled as below:

- Shut down the line and ensure that there is no pressure in the pipeline.
- Drain all mediums from the pipe.
- Completely close the disc of the valve.
- Remove the parts and the valve from pipe.



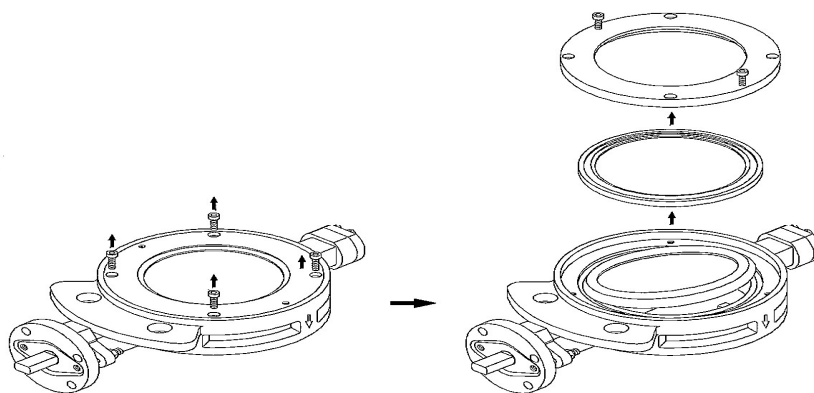
REPLACEMENT (ASSEMBLY/DISASSEMBLY)

DISMANTLE THE SEAT RING & SEAT RETAINER:

- Open the disc of valve (10-15 degrees) with operating article.
- Remove the tightened retainer bolts on the seat retainer plate.
- Remove the seat retainer by lifting it up with jacking tap.

Please see the following pictures:

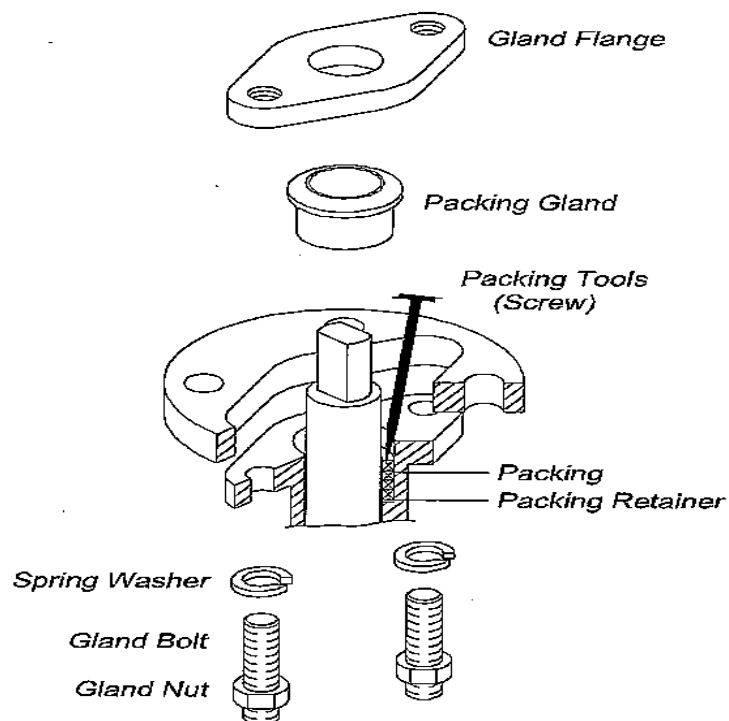
- Take out the inner seat. At this time be careful not to scratch or damage the seat ring.
- Clean the retainer plate and seat as well as the other parts of the valve with a soft dust cloth or air blaster.
- Refer to the below picture for disassembling of the seat retainer & seat ring.



REPLACEMENT (ASSEMBLY/DISASSEMBLY)

PACKING REPLACEMENT:

- Remove the Gland Flange after loosening the nuts of the gland flange.
- Slightly lift the packing gland up and remove it.
- Remove the packing stuffs using a packing extractor such as a cork screw, awl and gimlet.
- When you remove the packing with tools (packing extractor), please be careful not to scratch and damage the packing housing wall or the valve stem because the damage may cause a leakage.
- Insert the new set of packing in the packing housing after carefully cleaning the packing housing.
- After inserting the packing, assemble the packing gland and gland flange.
- The nuts of gland flange should be tightened sufficiently. Be careful no to over tighten the nuts as this may cause a higher torque for the valve.



REPLACEMENT (ASSEMBLY/DISASSEMBLY)

End Cap Replacement:

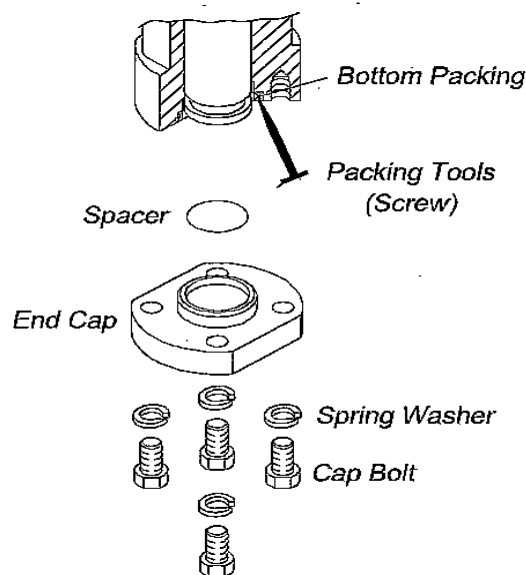
- Remove the bolts and end cap.
- By using a packing extractor such as a corkscrew, awl and gimlet, remove the packing. At this time, please be careful not to scratch and damage the wall of packing housing and the valve shaft.
- After removing the packing, clean the neck of the body prior to replacement of new packing.
- Insert the new packing with sharp tool.
- Put retainer ring on and tighten end cap bolts.

***Warning:

- Over tightening on the bolt might cause damage at the threaded parts and bolt head.

Seat Ring Replacement: (If the fluid cannot be shut-off under the full closing position of disc, then seat damage is suspected. In case of seat damage, replacement should be followed as below.)

- See the disassembly of seat ring/seat retainer for removing of seat ring and seat retainer(HP-IOM-106).
- Replace the damaged seat ring with a new one.
- New seat ring should be seated with the 10-15 degree of disc opening angle.



REPLACEMENT (ASSEMBLY/DISASSEMBLY)

Seat Ring Replacement Cont'd:

- For assembling of the seat retainer, please apply the reverse steps of the previous disassembly. Therefore it is important to identify that the location of each part is the same location as when disassembled.
- Slightly tighten the bolt of seat retainer up to the closing position and rotate the disc a couple of times.
- Rotate the disc a couple of times and then tighten the bolt completely with the 10-15 degree of disc opening angle.
- Finally, rotate the disc several times to get the good position of seat. This is required to get the seat settled in position.
- Install the valve on the pipe line with disc fully closed.

***Caution:

- Over tightening of bolts may cause a damage at the threaded parts.

