Shandong Shengfei Machinery Co., Ltd.
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DOUBLE OFFSET HIGH PERFORMANCE BUTTERFLY VALVES

Shandong Shengfei Machinery Co., Ltd. is a professional manufacturer of soft seat, metal seat and fire-safe high performance butterfly valves, our unique seat design is equal to Flowseal and Bray. Under an ISO 9001 Quality Assurance Program, it assures each valve we produce meets or exceeds your application requirements.

SHENGFEI high performance butterfly valves are available in sizes from 2" - 60" in ANSI/ASME, DIN standards etc. and are available with a diverse range of manual and actuated options.

Our high performance butterfly valves are widely used in many industries including heating,ventilating and air conditioning, power generation,hydrocarbon processing, water and waste water treatment, and marine and commercial shipbuilding. Our products are also installed in applications as diverse as food and beverage processing, snow-making and pulp and paper production.

Configurations are available for harsh conditions as well as applications requiring nominal pressure and temperature ratings.

High Performance Applications

Construction
Chemical / Petro-Chemical
Liquified Gas / Refrigeration
Heavy Industrial
Power / Co-Generation Plants
Steel and Iron Works
Commercial
Pulp and Paper Mills
Oil Refineries and Oil Field
Ship Building
Hydrocarbon Processing
Gas Piping
Local Area Energy Supply
Industrial

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STANDARD	PRODUCTION RANGE		
	ANSI Class 150	ANSI Class 300	ANSI Class 600
RATING -PSI	285	740	1440
RATING -BAR	20	50	100
SIZE -INCH	2-60	2-48	2-24
SIZE-MM	50-1500	50-1200	50-600
TESTING	API 598, EN-12266-1		
FACT TO FACE SPECIFICATIONS	ANSIB16.10 / API609 / MSS-SP-68 / ISO 5752 / BS5155 / EN 558		
END FLANGE SPECIFICATIONS	ASME B16.5: Class 150, 300, 600, 900 JIS B2210: 10K, 16K, 20K DIN ISO PN10, PN16, PN25, PN40, PN64, PN100, PN150		
CONNECTION	Wafer, Lugged, Semi-lugged, Double Flanged		
OPERATOR - MANUAL	Bare Stem, Lever Handle, Worm Gear Operator		
OPERATOR -AUTOMATIC	Electric Motor, Pneumatic Double Acting, Pneumatic Spring Return		
MAIN MATERIALS			
BODY	Carbon Steel (A216-WCB) 316 SS(A351-CF8M)		
DISC	316SS(A351-CF8M)		
STEM	17/4PH(A564-630)		
SEAT	PTFE, RTFE, 316 SS, Inconel, PTFE+316 SS, RTFE+316SS		
SHAFT BEARING	316 SS+DuPont PTFE		
PACKING SEAL	PTFE,Graphite		
SEAT MATERIALS and RATING			
PTFE	Class VI, Bubble Tight		
RTFE	Class VI, Bubble Tight		
316 SS	Class VI Bubble Tight (small size), Class V (large size)		
INCONEL	Class VI Bubble Tight (small size), Class V (large size)		
PTFE+316 SS	Class VI Bubble Tight, Class V w/Preferred Flow After Fire		
RTFE+316 SS	Class VI Bubble Tight, Class V w/Preferred Flow After Fire		

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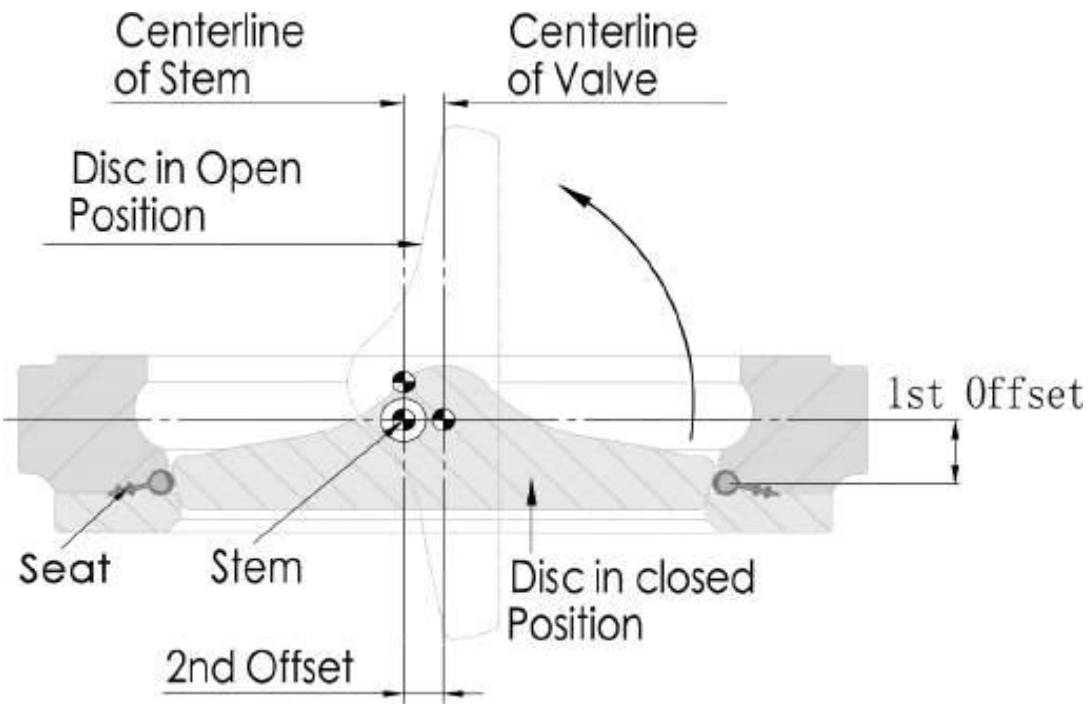
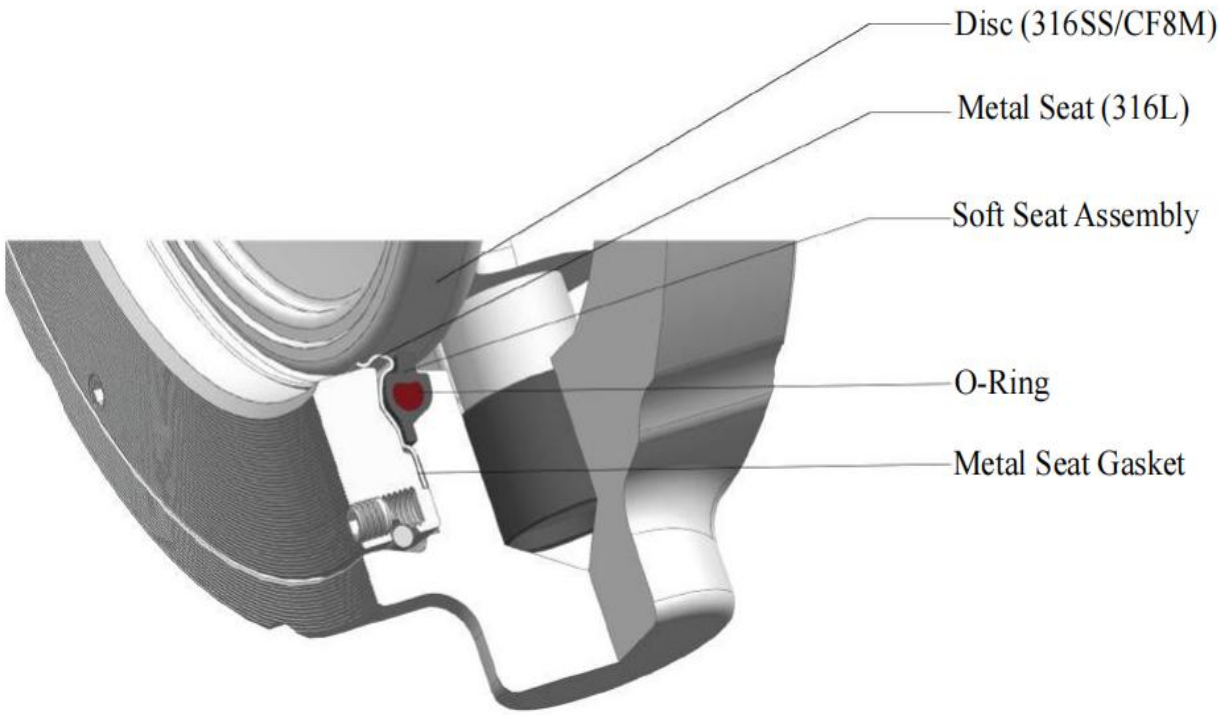
DOUBLE OFFSET/ECCENTRIC DESIGN



The double offset design of the SHENGFEI High Performance Butterfly Valves assures reduced seat wear and bidirectional, zero leakage shut off throughout the full pressure range.
At the initial point of disc opening, the offset disc produces a cam–like action, pulling the disc from the seat. This cam–like action reduces seat wear and eliminates seat deformation when the disc is in the open position. When open, the disc does not contact the seat, therefore seat service life is extended and operating torques are reduced. As the valve closes, the cam–like action converts the rotary motion of the disc to a linear type motion to effectively push the disc onto the seat. The wiping action of the disc against the seat prevents undesirable material build-up from slurry or suspended solids.

UNIQUE VALVE SEAT DESIGN - FIRE SAFE SEAT



The SHENGFEI Fire-Safe high performance butterfly valve (HPBFV) is a fire-safe, soft seat quarter-turn valve. The fire safe design incorporates two seats which function together to seal off pipeline flow. In normal operation, the soft seat provides a bi-directional “bubble tight” shutoff (zero leakage); the metal seat provides bi-directional shutoff in the event of a fire, in conformance to industry fire-safe requirements.

With little or no pressure, the Fire-Safe seat creates a self energized seal against the disc. Higher line pressures act on the geometry of both seats to dynamically load them against the disc, creating higher sealing forces in either direction.

The Fire-Safe metal seat is made of 316L material which is shaped by a proprietary hydro-forming process into its unique design. Stainless steel outer bearings are included for post-fire disc and shaft alignment. Fireproof packing is used to prevent external shaft leakage.

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PRINCIPLE OF SEAT SEALING - FIRE SAFE SEAT

Figure 1, DISC OPEN, Normal Operation

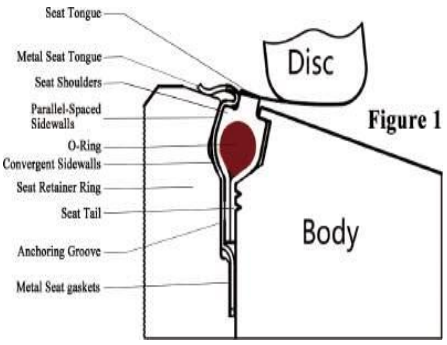

Figure 1

In Figure 1, the disc and seat assembly are not engaged. In this position, the metal seat acts to keep the soft seat inside the seat cavity while the soft seat shoulders seal the cavity from exposure to the process fluid. (The o-ring is under tension and imparts a load against the soft seat.) The soft seat is protected from abrasion and wear because it is recessed inside the seat cavity area. The o-ring is isolated from exposure to the fluid because it is completely encapsulated by the seat tails which act as a (soft) gasket in the anchoring groove area. The metal seat gaskets add further high temperature protection past the anchoring grooves.

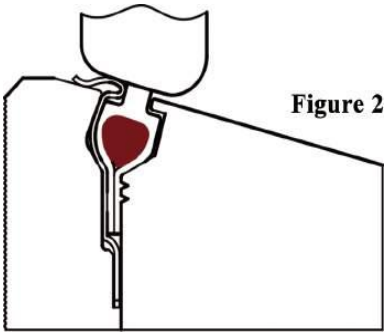
Figure 2

Figure 2 DISC CLOSED, Normal Operation

In Figure 2, the disc and seat assembly are engaged; both the metal seat and the soft seat are in contact with the disc. Under little to no pressure conditions, both seats are self-energized. The disc edge, with a larger diameter than the seat tongues, moves the seats radially outward; the metal seat shape, with a mechanical and dynamic flexibility, is designed to be hoop-loaded and impart a spring force against the disc, while the soft seat o-ring is stretched and flattened (without deformation of the material) and imparts a mechanical pre-load against the disc.

With increased line pressure, the process fluid enters the cavity sidewall area and applies loads against the seat sidewalls. The cavity design allows the seats to move toward the downstream sidewalls, but confines and directs the movement radially inward towards the disc; the higher the pressure the tighter the seal. The symmetrical shape and angle of the cavity permit the seal to be bi-directional.

Figure 3 DISC CLOSED, After Fire (Seat Upstream)

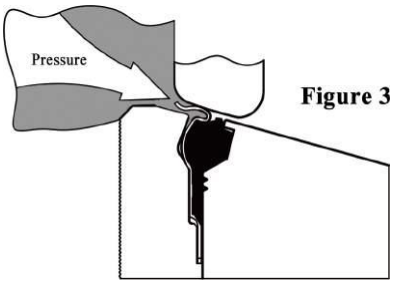

Figure 3

After a fire, with partial or complete destruction of the soft seat, the metal seat maintains metal-to-metal contact with the disc and restricts leakage of the process fluid in conformance to industry fire-safe requirements. With little or no line pressure, the spring force and hoop load of the metal seat maintain a “line contact” seal against the disc edge. Under higher pressures, the process fluid enters the cavity sidewall areas and applies loads against the seat sidewalls (Figure 3). The geometry of the metal seat permits the seat to move axially, but directs the movement radially inward toward the disc. The higher the pressure, the tighter the line contact seal.

Graphite gaskets, on both sides of the metal seat tail, seal the anchoring groove and prevent leakage of the process fluid.

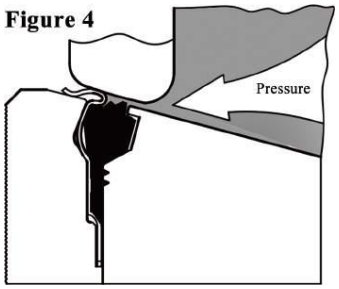

Figure 4

Figure 4 DISC CLOSED, After Fire (Seat Downstream)

The SHENGFEI Fire Safe HPBFV is bi-directional; The angle and shape of the cavity and metal seat maintains metal-to-metal contact in the event of partial or complete soft seat destruction with line pressure in the reverse direction (Figure 4). While the preferred flow direction is “seat upstream” (SUS), the bidirectional seat design is both self-energized and pressure-energized .

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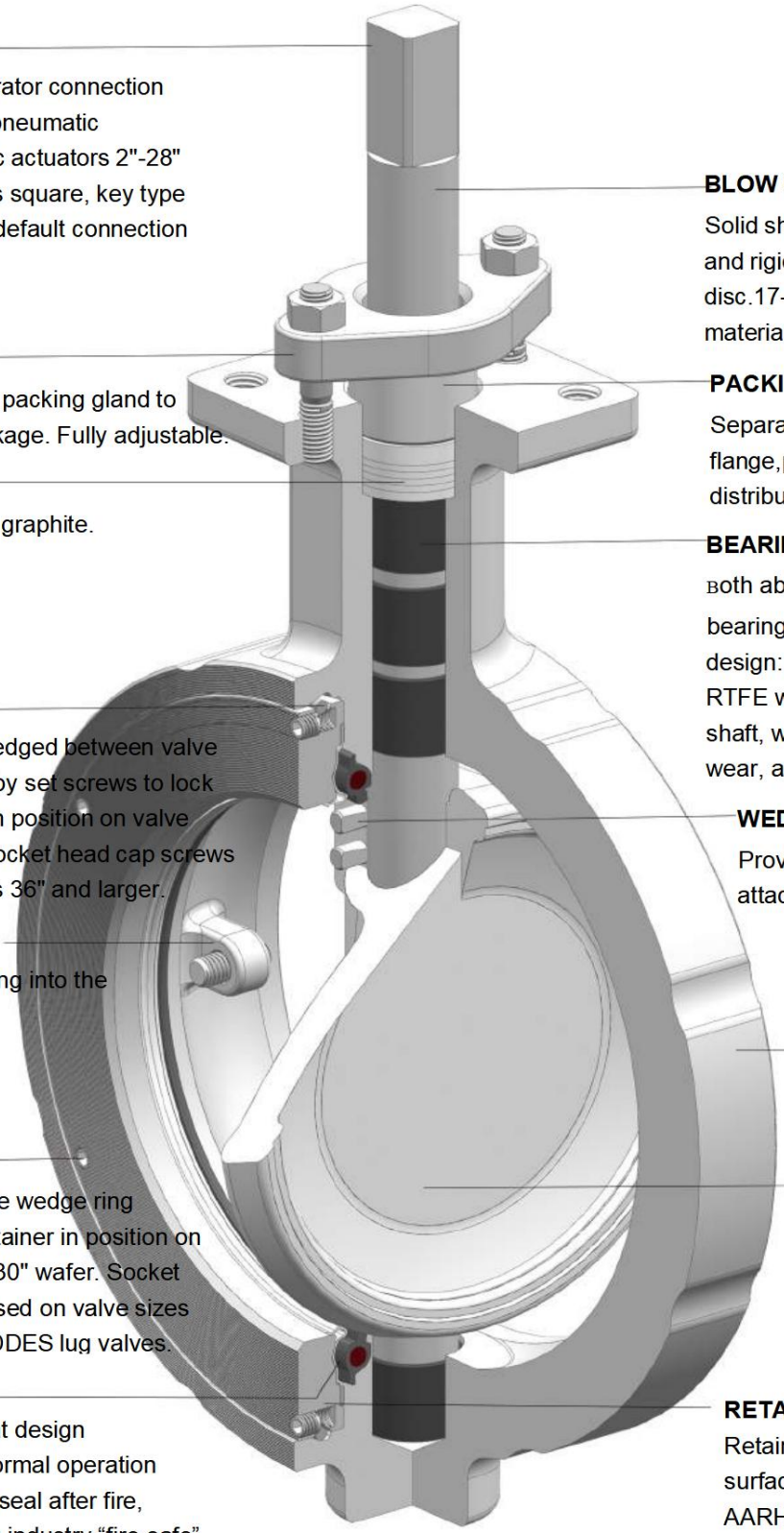
VALVE COMPONENTS - FIRE SAFE SEAT



SQUARE
Square valve-to-operator connection applied to ISO5211 pneumatic actuators and electric actuators 2"-28" default connection as square, key type is available. 28"-60" default connection is KEY type.

GLAND FLANGE
Applies load against packing gland to prevent external leakage. Fully adjustable.

PACKING
Common material is graphite.

WEDGE RING
Stainless steel band wedged between valve body and retainer ring by set screws to lock seat and retainer ring in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.

OVERTRAVEL STOP
Prevents disc from rotating into the wrong quadrant.

SET SCREWS
Cone point screws force wedge ring outward to lock seat retainer in position on valve sizes 2" through 30" wafer. Socket head cap screws are used on valve sizes 36" and larger and all DDES lug valves.

FIRE SAFE SEAT
Bi-directional soft seat design for zero-leakage in normal operation and a metal-to-metal seal after fire, meeting or exceeding industry “fire-safe” specifications.

BLOW OUT PROOF SHAFT
Solid shaft provides alignment and rigid support for disc.17-4PH and 316 materials are available.

PACKING GLAND
Separate part from gland flange,preventing uneven load distribution against packing.

BEARINGS
Both above and below the disc, bearings are of composite design: 316 bonded to DuPont RTFE wound ring. Used to align shaft, with high capacity, low wear, and low friction coefficient.

WEDGE PINS
Provide positive mechanical attachment of disc to shaft.

BODY
Wafer, lug,Semi-Lug or Double Flange configuration.

DISC
360° uninterrupted spherical edge for sealing. Profile is designed for maximum flow and equal percentage control.

RETAINER RING
Retains seat in valve. Standard surface finish is 125 to 200 AARH and is compatible with both standard gaskets and spiral wound gasket designs. Outside diameter is recessed within gasket sealing surface to prevent external leakage.

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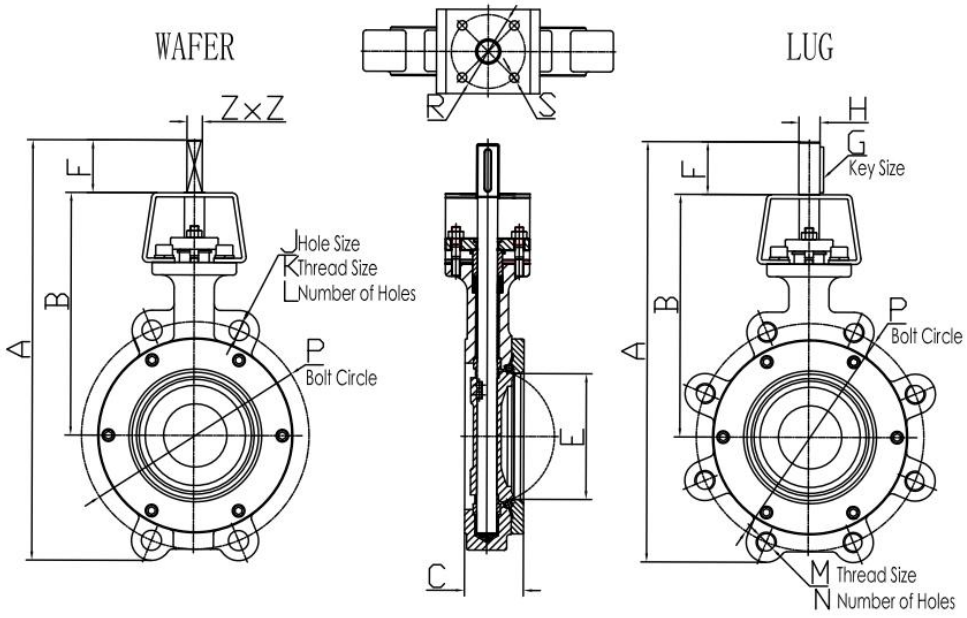
HIGH PERFORMANCE BUTTERLY VALVE DIMENSIONS PN16/PN25



PN1.6MPa / PN2.5MPa

VALVE SIZE		WAFER	LUG	B	C	E	F	Z×Z		J	K	L	M x N	P	R	S	WEIGHT (Kg)	
DN	ins	A	A					G	H				PN1.6 / PN2.5	PN1.6 / PN2.5	mm	mm	WAFER	LUG
50	2"	257	258	193	43	60.12	27	11*11					M16X4 / M16X4	125	Φ70	4XΦ9	4.4	4.8
65	2½"	260	260	193	46	69.5	27	11*11					M16X4 / M16X8	145	Φ70	4XΦ9	4.9	5.3
80	3"	294	289	218	49	82.44	27	11*11					M16X8 / M16X8	160	Φ70	4XΦ9	5.6	6.5
100	4"	335	338	239	52	105.7	27	14*14					M16X8 / M20X8	180 / 190	Φ70	4XΦ9	8	11.5
125	5"	373	375	263	56	128.06	30	17*17					M16X8 / M24X8	210 / 220	Φ70	4XΦ9	10.5	13.5
150	6"	402	408	277	61	151.8	32	17*17					M20X8 / M24X8	240 / 250	Φ70	4XΦ9	13.5	16.5
200	8"	466	471	317	63.5	195.3	45	17*17					M20X12 / M27X12	295 / 310	Φ70	4XΦ9	20.6	24.5
250	10"	535	544	348	71	244.7	50	22*22		oval		2	M24X12 / M21X12	355 / 370	Φ102	4XΦ11	39	45.5
300	12"	625	630	400	82	291.9	60	27*27		oval		2	M24X12 / M27X16	410 / 430	Φ140	4XΦ18	55	67.5
350	14"	712	701	417	92	339.2	60	27*27		oval		4	M24X16 / M30X16	470 / 490	Φ140	4XΦ18	68	115
400	16"	792	792	476	101.8	387.4	70	27*27		oval		4	M27X16 / M33X16	525 / 550	Φ165	4XΦ21	116	132
500	20"	965	965	598	127	489.8	90	36*36			M30 / M33	4	M30X20 / M33X20	650 / 660	Φ165	4XΦ21	185	220
600	24"	1097	1097	672	153.5	585.4	110	46*46			M33 / M36	4	M33X20 / M36X20	770 / 770	Φ165	4XΦ21	290	310
700	28"	1232	1232	738	165	689.9	148.7	46*46			M33 / M39	4	M33X24 / M39X24	840 / 875	Φ165	4XΦ21	495	579
800	32"	1357	1357	796	191	767.1	148.7	22	80		M36 / M45	4	M36X24 / M45X24	950 / 990	Φ165	4XΦ21	736	922
900	36"	1502	1502	925	210	864.0	158.2	22	80		M36 / M45	4	M36X28 / M45X28	1050 / 1090	Φ254	8XΦ17	871	1160
1000	40"	1634	1634	953	241	940.0	158.2	25	105		M39 / M52	4	M39X28 / M52X28	1170 / 1210	Φ254	8XΦ17	1728	1779
1200	48"	1897	1897	1102	254	1171.0	178.2	32	115		M45 / M52	4	M45X32 / M52X32	1390 / 1420	Φ298	8XΦ22	2074	2548
1350	54"	2090	2090	1209	273	1332.0	178.2	36	140		M45 / M56	4	M45X36 / M56X36	1590 / 1640	Φ298	8XΦ22	3175	3210

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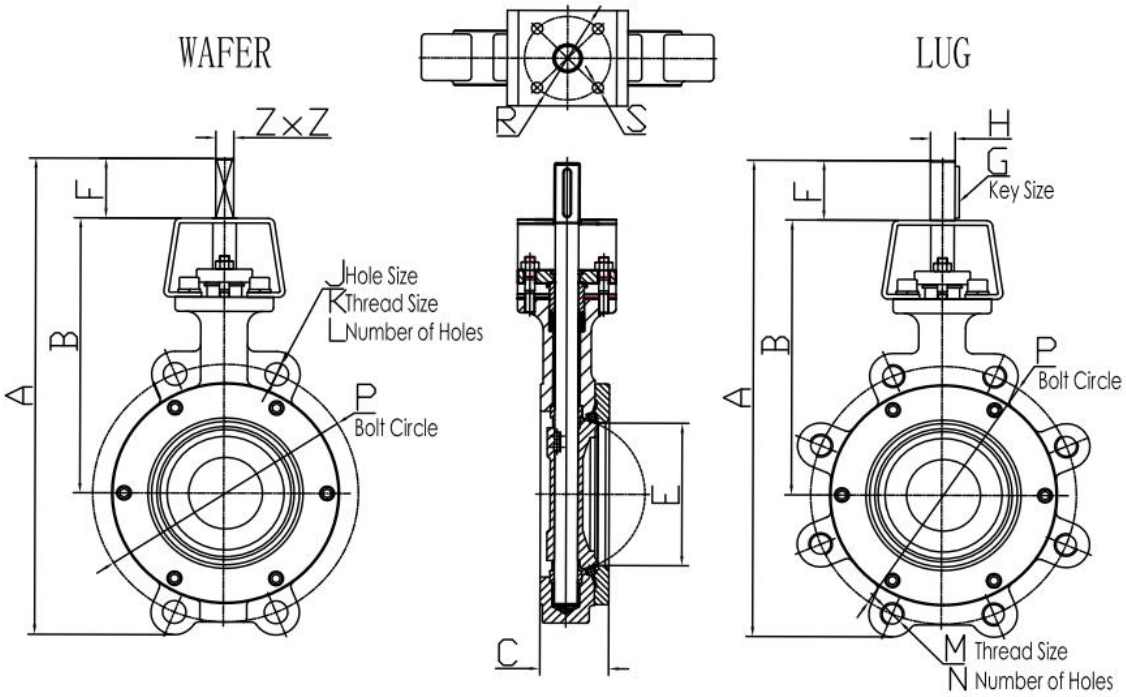
HIGH PERFORMANCE BUTTERLY VALVE DIMENSIONS PN40



PN4.0MPa

VALVE SIZE		WAFER	LUG	B	C	E	F	Z×Z		J	K	L	M x N	P	R	S	WEIGHT (Kg)	
DN	ins	A	A					G	H					mm	mm	mm	WAFER	LUG
50	2"	257	266	190	43	60	27	11*11		oval		4	M16X4	125	Φ70	4XΦ9	4.5	6.1
65	2½"	260	277	190	46	69	27	11*11					M16X8	145	Φ70	4XΦ9	5	7
80	3"	294	311	216	49	82	27	11*11					M16X8	160	Φ70	4XΦ9	6.5	9
100	4"	335	349	235	52	106	27	14*14					M20X8	190	Φ70	4XΦ9	8	14
125	5"	373	384	254	57	128	30	17*17					M24X8	220	Φ70	4XΦ9	10.5	16.5
150	6"	403	428	278	61	152	32	17*17					M24X8	250	Φ70	4XΦ9	16.5	22
200	8"	485	500	324	72	195	50	22*22					M27X12	320	Φ102	4XΦ11	35	41
250	10"	549	574	356	83	247	60	27*27		oval		2	M30X12	385	Φ102	4XΦ11	53	64
300	12"	668	668	427	92	294	70	27*27		oval		2	M30X16	450	Φ140	4XΦ18	77	90
350	14"	773	773	467.1	118	342	80	36*36			M33	4	M33X16	510	Φ165	4XΦ21	124	146
400	16"	902	902	586.5	136	387	80	36*36			M36	4	M36X16	585	Φ165	4XΦ21	165	220
450	18"	970	970	626	152	440	90	36*36			M36	4	M36X20	610	Φ165	4XΦ21	218	315
500	20"	1134	1134	674	161	492.1	100	45*45			M39	4	M39X20	670	Φ165	4XΦ21	298	410
600	24"	1229	1229	780	182	587	120	22	80		M45	4	M45X20	795	Φ254	8XΦ17	340	495
700	28"	1355	1355	840	225	667	130	25	105		M45	4	M45X24	900	Φ254	8XΦ17	530	660
900	36"	1661	1661	1030	271	864	150	32	115		M52	4	M52X28	1140	Φ298	8XΦ22	1230	1540
1000	40"	1710	1710	1055	292	910	160	36	140		M52	4	M52X28	1250	Φ298	8XΦ22	1450	1980
1200	48"	1918	1918	1205	318	1180	180	40	160		M56	4	M56X32	1371.6	Φ356	8XΦ32	2270	2890

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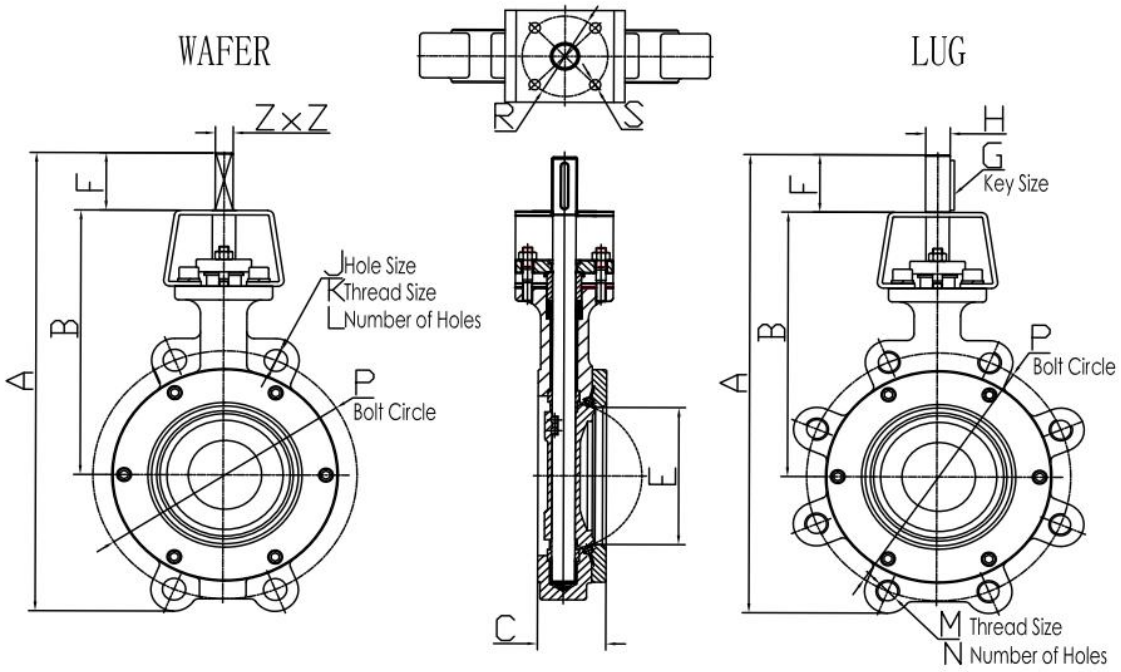
HIGH PERFORMANCE BUTTERLY VALVE DIMENSIONS PN100



PN10.0MPa

VALVE SIZE		WAFER	LUG	B	C	E	F	Z×Z		J	K	L	M×N	P	R	S	WEIGHT (Kg)	
DN	ins	A	A					G	H					mm	mm	mm	WAFER	LUG
50	2"	267	267	199	49	54.1	27	14*14		oval		4	M24X8	145	φ70	4Xφ9	7.5	8.5
65	2½"	267	277	199	52	64.6	27	14*14					M24X8	170	φ70	4Xφ9	8.2	9.5
80	3"	309	319	226	56	77.4	30	17*17					M24X8	180	φ70	4Xφ9	10.5	13
100	4"	360	365	247	70	101.8	30	17*17					M27X8	210	φ70	4Xφ9	18.5	25
150	6"	459	459	300	85	145.6	55	27*27			M30	2	M30X12	290	φ102	4Xφ11	35	53
200	8"	582	582	354	107	188.7	60	27*27			M33	4	M33X12	360	φ102	4Xφ11	67	101
250	10"	668	668	392	122	235.1	60	32*32			M36	4	M36X12	430	φ165	4Xφ21	120	175
300	12"	770	770	465	140	285.7	60	32*32			M39	4	M39X16	500	φ165	4Xφ21	170	230
350	14"	896	896	568	155	326.2	75	36*36			M45	4	M45X16	560	φ165	4Xφ21	231	327
400	16"	1005	1005	631	178	377.3	90	46*46			M45	4	M45X16	620	φ165	4Xφ21	325	482
500	20"	1254	1254	806	216	468.6	120	25	105		M52	4	M52X20	760	φ254	8Xφ17	605	815
600	24"	1493	1493	794	232	565.5	150	32	115		M56	4	M56X20	875	φ298	8Xφ22	950	1285

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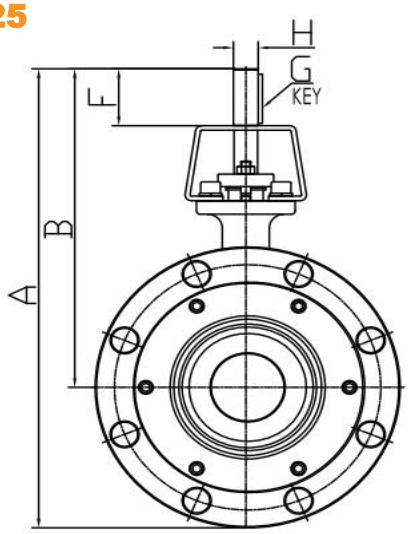
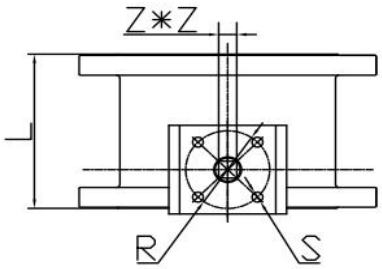
HIGH PERFORMANCE BUTTERLY VALVE DIMENSIONS DOUBLE FLANGE

PN16/PN25





PN1. 6MP/PN2. 5MPa

VALVE SIZE		A	B	L		F	Z x Z		R	S	WEIGHT (Kg)	
DN	ins			Long	Short		H	G	mm	mm	Long	Short
80	3"	323	227	205	114	27	11*11		Φ70	4XΦ9	26	19
100	4"	373	259	229	127	27	14*14		Φ70	4XΦ9	34	25
125	5"	404	277	254	140	30	17*17		Φ70	4XΦ9	42	30
150	6"	431	291	267	140	32	17*17		Φ70	4XΦ9	49	34
200	8"	504	332	292	140	45	17*17		Φ70	4XΦ9	77	51
250	10"	551	348.2	300	165	50	22*22		Φ102	4XΦ11	102	78
300	12"	642	400	356	178	60	27*27		Φ140	4XΦ18	160	112
350	14"	738	462	381	191	60	27*27		Φ140	4XΦ18	198	141
400	16"	771	473	406	216	80	27*27		Φ165	4XΦ21	233	175
450	18"	906	589	432	223	90	36*36		Φ165	4XΦ21	272	213
500	20"	968	618	457	229	90	36*36		Φ165	4XΦ21	351	262
600	24"	1098	691	508	267	110	46*46		Φ165	4XΦ21	493	386
700	28"	1243	736		292	110	46*46		Φ165	4XΦ21		420
750	30"	1293	801	610	318	120	80	22	Φ165	4XΦ21	652	598
800	32"	1368	820		318	120	80	22	Φ165	4XΦ21		660
900	36"	1509	925	711	330	120	80	22	Φ254	8XΦ17	869	789

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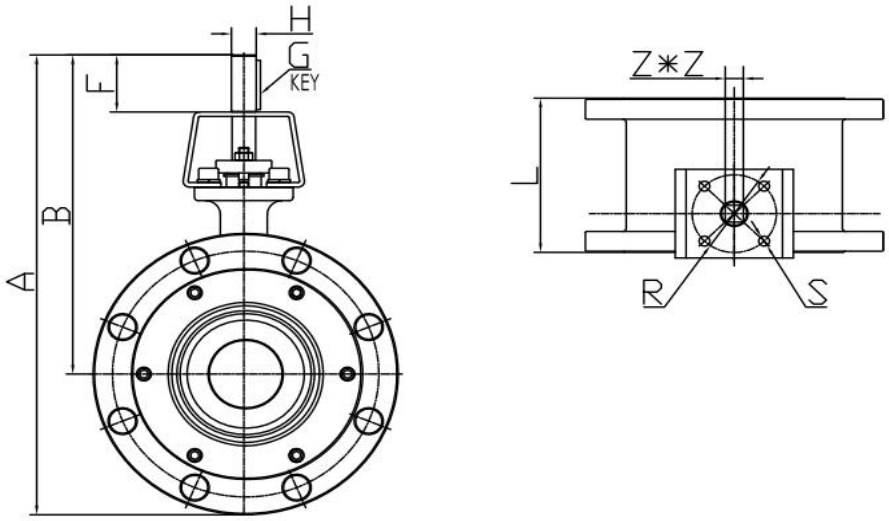
HIGH PERFORMANCE BUTTERLY VALVE DIMENSIONS DOUBLE FLANGE

PN40



PN4. 0MPa

VALVE SIZE		A	B	L		F	Z x Z		R	S	WEIGHT (Kg)	
DN	ins			Long	Short		H	G	mm	mm	Long	Short
80	3"	332	228	202	114	27	11*11		Φ70	4XΦ9	30	21
100	4"	385	258	305	127	27	14*14		Φ70	4XΦ9	46	25
125	5"	418	277	381	140	30	17*17		Φ70	4XΦ9	59	42
150	6"	453	295	403	140	32	17*17		Φ70	4XΦ9	79	51
200	8"	520	330	419	152	50	22*22		Φ102	4XΦ11	109	83
250	10"	583	361	475	165	60	27*27		Φ102	4XΦ11	135	124
300	12"	694	433	502	178	70	27*27		Φ140	4XΦ18	211	173
350	14"	759	467	762	191	80	36*36		Φ165	4XΦ21	330	235
400	16"	910	586	838	216	80	36*36		Φ165	4XΦ21	423	329
450	18"	981	625	914	225	90	36*36		Φ165	4XΦ21	574	457
500	20"	1349	674	991	229	100	46*46		Φ165	4XΦ21	660	522
600	24"	1238	780	1143	265	120	80	22	Φ254	8XΦ17	862	808

NOTE:
Drawings are for reference only. Please contact factory for separate drawing for each size at sales@shengfeimachinery.com. SHENGFEI Machinery reserves the right to change product dimensions without notice.

INSTALLATION INSTRUCTIONS

PRE – INSTALLATION PROCEDURE

1. Remove the protective face covers from the valve.

2. Inspect the valve to be certain the waterway is free from dirt and foreign matter. Be certain the adjoining pipeline is free from any foreign material such as rust and pipe scale or welding slag that could damage the seat and disc sealing surfaces.

3. Actuators should be mounted on the valve prior to installation to facilitate proper alignment of the disc in the valve seat.

4. *The valve should be in the closed position.* Make sure the open and closed positions of the actuator correspond to the counter-clockwise to open direction of rotation of the valve.

5. Cycle the valve to the fully open position, then back to the fully closed position, checking the actuator travel stop settings for proper disc alignment.

6. Check the valve identification tag for valve class, materials, and operating pressure to be sure they are correct for the application.

WARNING: Injury or property damage may result if the valve is installed where service conditions could exceed the valve ratings.

7. Check the flange bolts or studs on both sides of the valve for proper size, threading, and length.

VALVE INSTALLATION PROCEDURE

The SHENGFEI High Performance Butterfly Valve can be installed in the pipeline with the shaft in the vertical, horizontal, or other intermediate position. Based on applications experience, however, in media with concentrations of solid or abrasive particles or media subject to solidification buildup, valve performance and service life will be enhanced by mounting the valve with the shaft in the horizontal position.

All SHENGFEI valves are bi-directional and can be mounted in the pipeline in either flow direction; however, the preferred flow direction for all seat styles and materials is with the seat retainer ring located upstream (sus) to provide maximum seat protection.

1. For Wafer style (flangeless) valves:

a. Loosely install the lower flange bolts to form a cradle between the flanges. See Figure 1.

b. Note the flow direction arrow on the tag, place the valve and flange gaskets between the flanges, making sure the arrow on the tag points in the direction of the flow.

c. Install the remaining flange bolts, shifting the valve as necessary to permit the bolts to pass by or through the valve body.

2. For Lug style (single flange) valves:

a. Note the flow direction arrow on the tag, place the valve between the flanges, making sure the arrow on the tag points in the direction of the flow.

b. Install the lower flange bolts loosely, leaving space for the flange gaskets.

c. After inserting the flange gaskets, install the remaining bolts.

3. Using the sequence shown in Figure 2, tighten the flange bolts evenly to assure uniform gasket compression.

Caution: The SHENGFEI valve should be centered between the flanges and gaskets to prevent damage to the disc edge and shaft as a result of the disc striking the flange, gasket, or pipe.

4. If an actuator is to be used, air hoses or electricity should be connected to the unit as specified by the actuator manufacturer.

5. The valve is now ready for operation.

Remember: **Install the valve with the disc in the full closed position!** For more assistance, please feel free to contact SHENGFEI Machinery

Figure 1

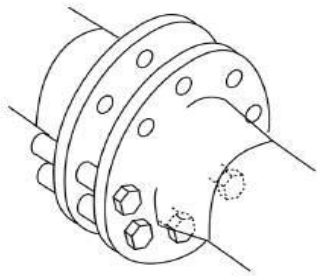


Figure 2