



This volume shows the pictures to provide a reference only. If some technical standards and the model number specification have variety, Forgive and don't go another notice.

## **SUNGO** VALVES GROUP CO.,LTD.

Sungo Park, Dongou Industrial Area, Wenzhou,

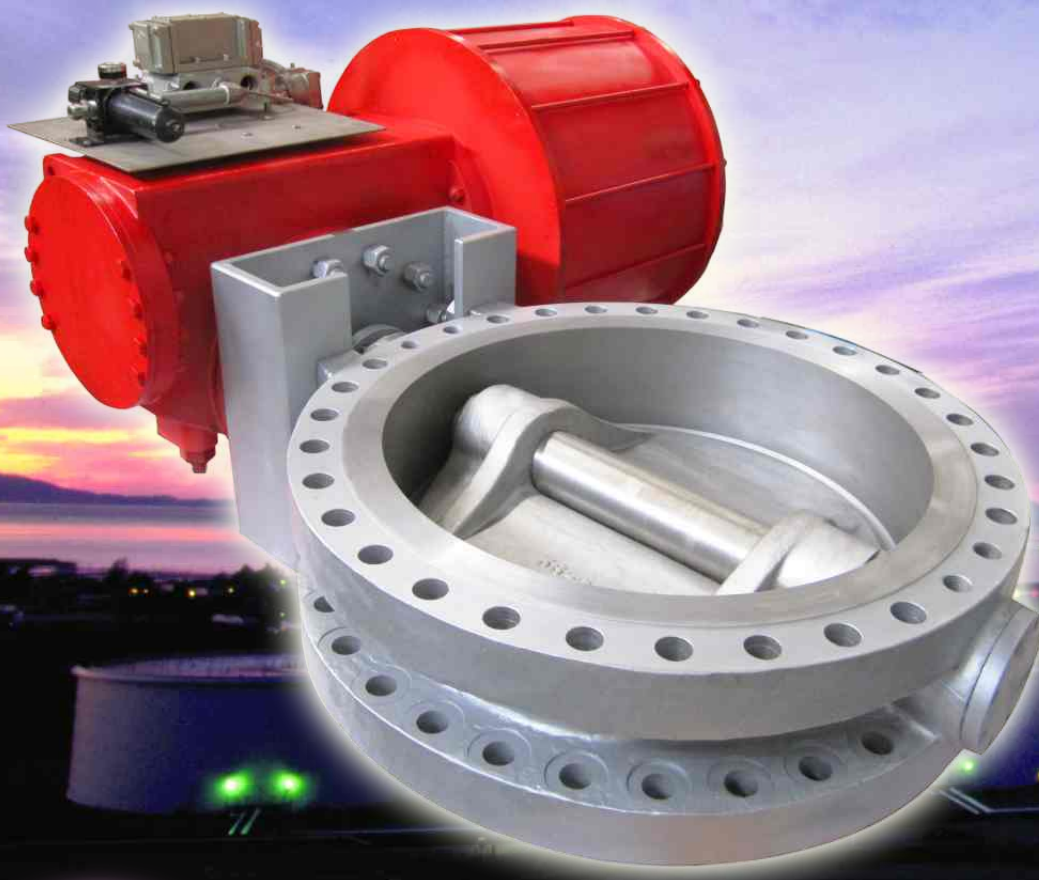
Zhejiang 325105, P.R.China

TEL. 86-577-67318858 66991111

FAX. 86-577-67318858

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

E-mail: [asia@sungovalve.com](mailto:asia@sungovalve.com)



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

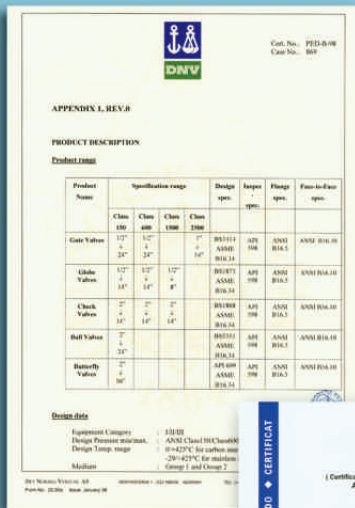
TRIPLE OFFSET  
BUTTERFLY VALVE



\* API 6D



\* CE/PED



\* CE/PED



\* ISO9001



\* Fire Safe Test



\* Fire Safe Test

## • Contents

- 01 • Design Feature
- 04 • Material Specifications
- 05 • Dimensions & Weights
- 06 • Engineering Data
- 07 • Engineering Data





## Brief Introduction

### COMPLETED SOLUTION FOR INDUSTRIAL VALVES

Today, SUNGO is one of the Asia's leading manufacturers of industrial steel valves with five specialized manufacturing plants, including three in Wenzhou, two in Shanghai. We have 680 employees. We owe much of our success to quality and innovation, which have been the cornerstone of SUNGO since its inception in 1980, and to our philosophy of dynamic leadership. We concentrate on one business—the design, manufacture and marketing of steel valves in a broad range of types and sizes, demanding advanced technology. has fulfilled all the qualifications to manufacture a wide range of industrial valves for the most severe and demanding services of the Oil, Gas, Refinery, Chemical, Marine, Power and Pipeline Industries.

SUNGO's products including: Gate, globe and check valve, We also offer plug valve and a advanced line of highly competitive ball valves with metal and resilient seats, as well as a complete range of cryogenic valves, bellows seal valves and triple offset metal-seated butterfly valves. Size range from 1/2" to 120" (DN15-3000); Class rating from 150LB-2500LB; materials range from conventional cast or forged steel to special alloy material like Monel, Inconel, Hastelloy or Duplex steel. SUNGO are able to produce valves for working temperature -196~ -650°, all available to fully comply with ASTM, ANSI, API, BS, DIN and JIS standards.

### SUNGO FACILITIES

SUNGO's facilities in with five specialized manufacturing plants, one Foundry and the new established Technical Research Center. SUNGO employed a large number of CNC machine for most of valves fabrication and we are among the few manufactures who are able to perform in-house Fire Safe test, cryogenic test, High pressure gas test, High temperature test and Fugitive emission test.

### QUALITY ASSURANCE

SUNGO's Quality Assurance is dedicated to pursuit of zero defect valve, and this has resulted in the company having more quality qualifications than most of our competitors. SUNGO is certified by ISO 9001, API6D, API607, CE/PED and SUNGO ball valve were fire safe tested & certified by TUV.

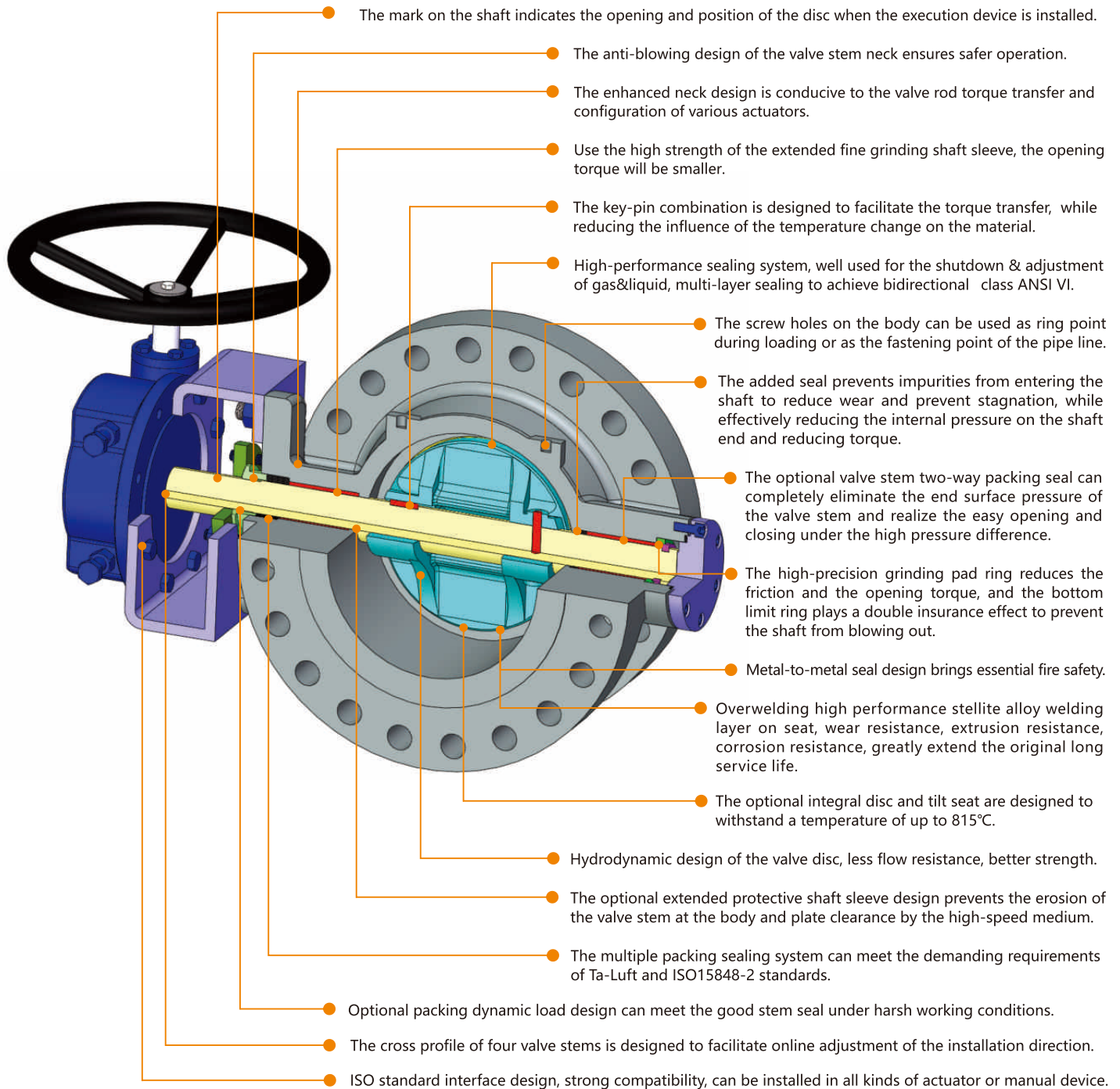
### CORPORATE PHILOSOPHY

The SUNGO corporate philosophy is to bring the market new and innovative valve designs with special emphasis on quality, safety, ease of operation, simple in-line maintenance and most of all, long service life. All this combined with the use of high quality materials, advanced manufacturing technology and automation in all stages of manufacturing ensures the highest possible quality at a competitive price. SUNGO is strongly committed to defending its market position aggressively competing in all countries around the world. The company's impressive growth is testimony to the balanced competence in research, design, production and marketing with a firm determination to maintain its leadership in the valve industry - today and in the future.

## Triple-Offset Butterfly Valve

## Design Feature

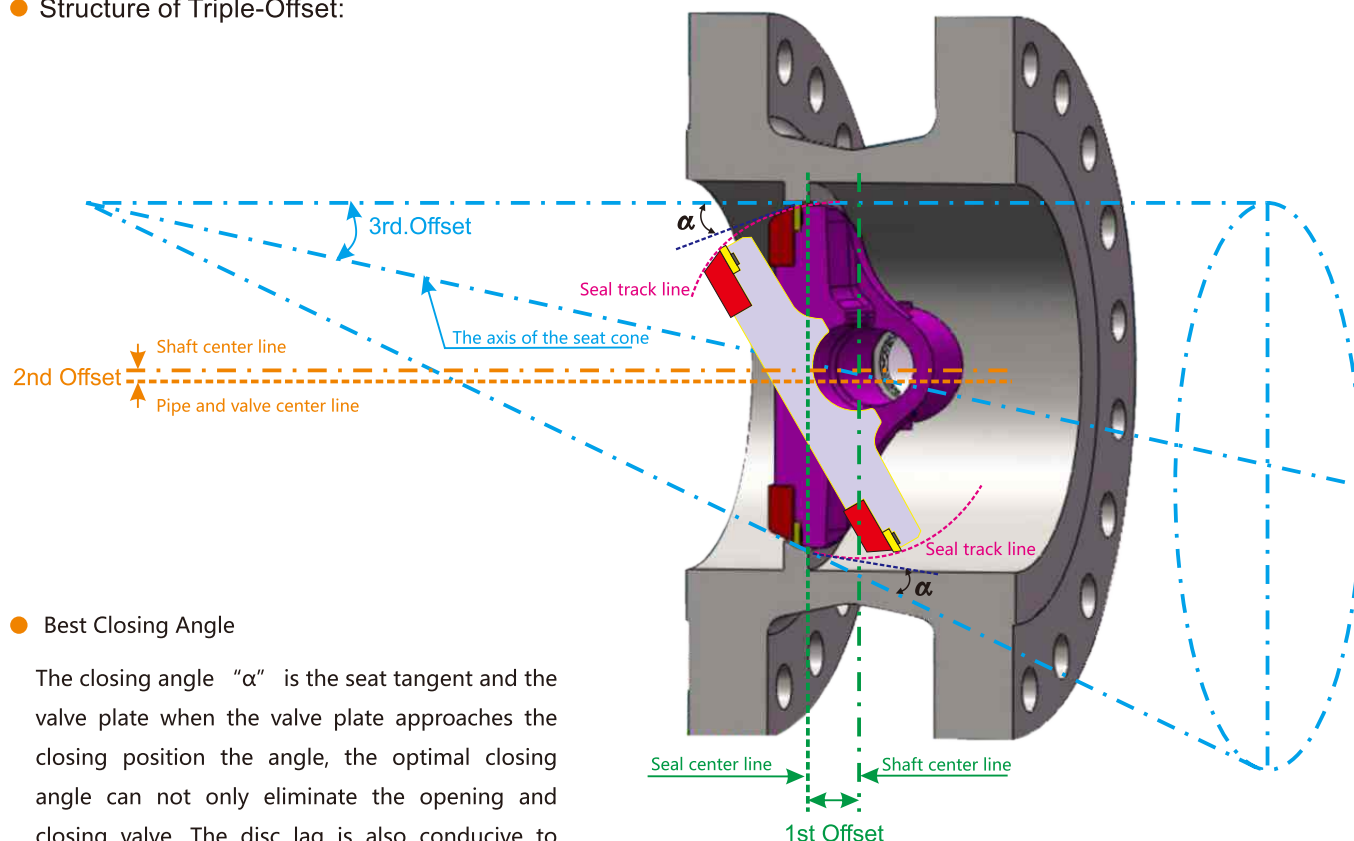
SUNGO MT series butterfly valve is triple off-set design which has a advantage of light weight, compact design and cost effective and low operation torque and can replace traditional gate, globe & ball valve in most of industries application, Include the following design features:



## Triple-Offset Butterfly Valve

## Design Feature

### Structure of Triple-Offset:



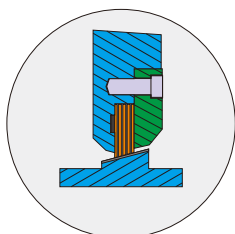
### Best Closing Angle

The closing angle " $\alpha$ " is the seat tangent and the valve plate when the valve plate approaches the closing position the angle, the optimal closing angle can not only eliminate the opening and closing valve, The disc lag is also conducive to reducing the opening and closing moment.

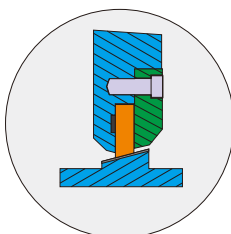
### Close-off and two-way sealing:

The laminated or solid valve seat ring is installed by the pressure ring on the valve plate between the sealing ring and the valve plate through the winding gasket. The contact surface between the valve seat and the sealing ring is the structure of the inclined cone, which produces the block effect under the closing torque, and makes the sealing ring produce elastic deformation, thus forming a tight two-way shut-off.

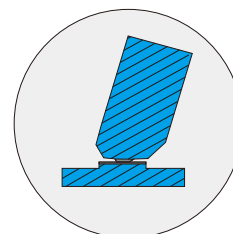
### Optional sealing system:



Renewable multilayer metal seals



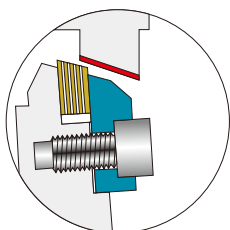
Renewable solid metal seals



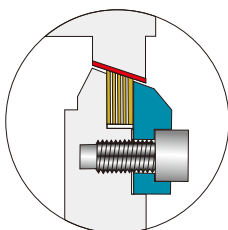
Solid integral metal seal

## Tri-Offset Butterfly Valve

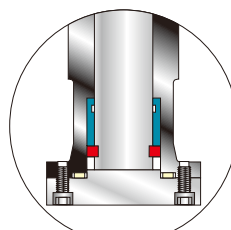
## Design Feature



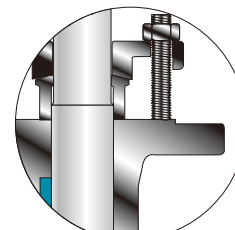
Before seating



After seating



Internally retained



Externally retained

### Laminated Disc Seal

Laminated sealing is mounted in the disc, easily for maintenance and replacement. It consists of 3~5 flexible graphite or PTFE layers self adhere with fine machined stainless seal ring, no need traditional phenol resin adhere joint. There is a reasonable clearance between disc seal and disc, provide a floating resilient seal and self centering tight seal both in low & high temperature application. Conical angle & streamline profile of this laminated disc is optimized by computer finite element analysis to eliminate any potential jamming as well as give a greater Cv.

### Anti-blowout shaft

Internally & Externally retained, double times blowout proof stem design per API 609.

Internal: Lower end shaft is grooved with Hemicycle Ring, prevent stem blowout.

External: Shaft is designed with an integral collar and was blowout prevented by gland follower.

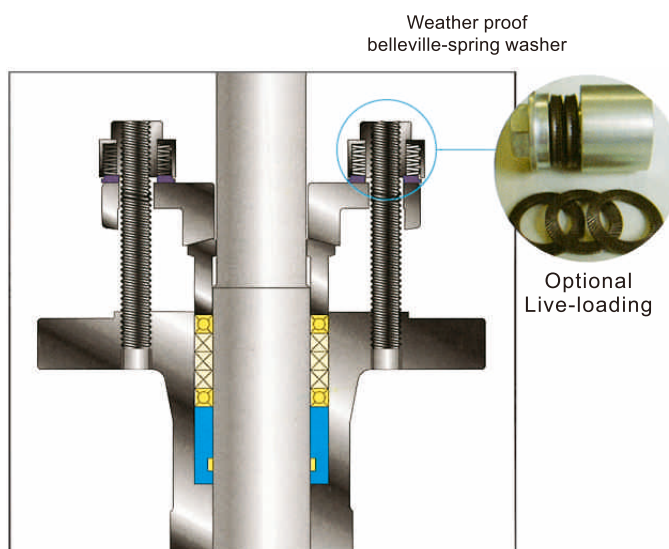
### Inherent Fire Safe

SUNGO triple offset butterfly valves are all metal construction and sealing, it is inherently fire safe design. Fire safe tests to API 607 were successfully performed in SUNGO Research & Development laboratory.

### Low Emission Shaft Seal

SUNGO standard emission control is 20 PPM

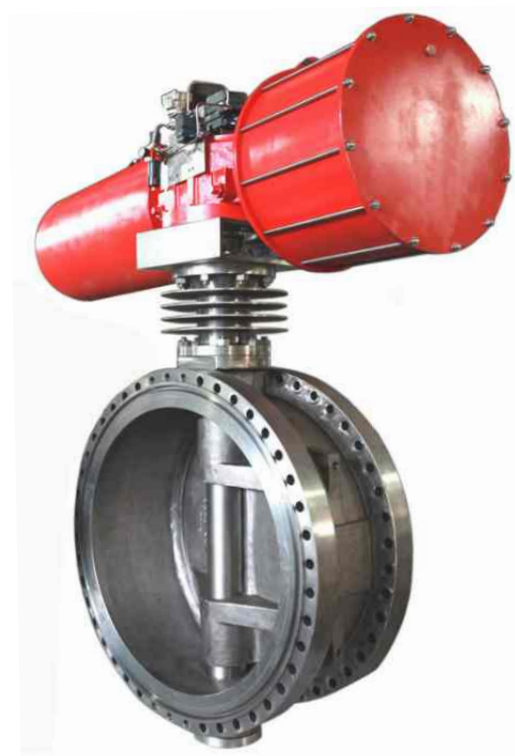
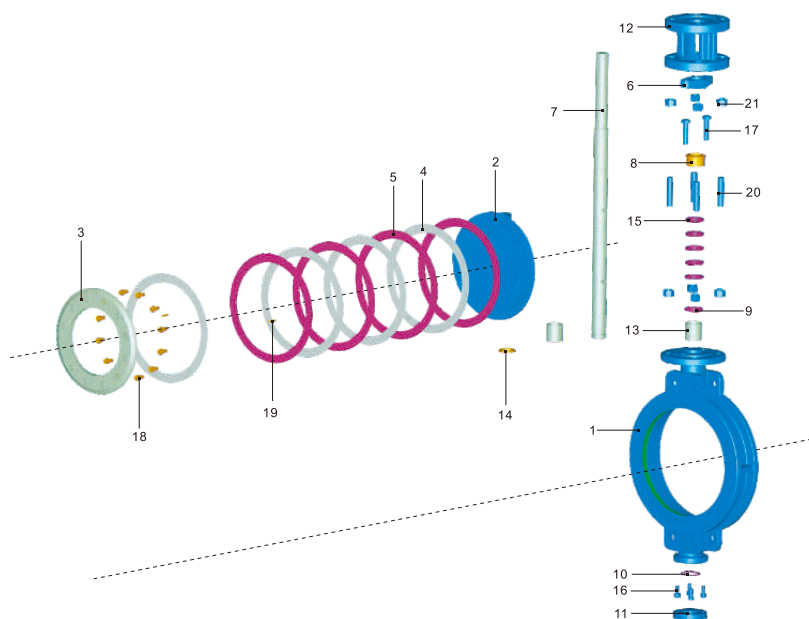
- Shaft is fully guided by shaft bearing & gland follower to avoid any side jiggle due to line pressure thrust.
- The packing set is pre-compressed and is a combination of braided graphite rings top and bottom with die formed flexible graphite rings between.
- Controlled shaft & stuffing box finish with Ra0.4~Ra0.8 on shaft and Ra3.2 on stuffing box which allow a better holding of packing ring and results in a better shaft sealing performance.
- Optional Live Loaded gland flange is available for providing constant packing compression to reduce fugitive emission from shaft seal.
- Optional shaft seal design per Shell MESC 77/312 & TA-Luft is also available upon request.



## Tri-Offset Butterfly Valve

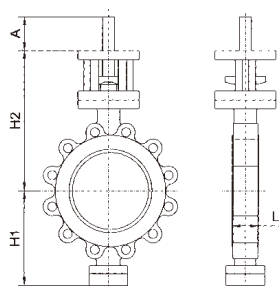
## Material Specifications

No	Part	Standard	Stainless steel
1	Body	ASTM A216-WCB/316 overlay	ASTM A351-CF8M
2	Disc	ASTM A216-WCB	ASTM A351-CF8M
3	Disc Retaining Ring	ASTM A182-F316	ASTM A182-F316
4	Steel Seal Ring	ASTM A182-F316	ASTM A182-F316
5	Seal Ring	Graphite/PTFE	Graphite/PTFE
6	Gland Flange	ASTM A216-WCB	ASTM A351-CF8
7	Shaft	ASTM A182-F316	ASTM A182-F316
8	Gland	ASTM A182-F316	ASTM A182-F316
9	Spacer Ring	ASTM A182-F316	ASTM A182-F316
10	Gasket	316SS+Graphite	316SS+Graphite
11	End Cover	ASTM A105	ASTM A182-F316
12	Yoke	ASTM A216-WCB	ASTM A351-CF8M
13	Bearing	ASTM A182-F316/Cr plated	ASTM A182-F316/Cr plated
14	Hemicycle Ring	ASTM A182-F316	ASTM A182-F316
15	Packing	Graphite/PTFE	Graphite/PTFE
16	Screw	ASTM A193-B7	ASTM A193-B8
17	Gland bolt	ASTM A193-B7	ASTM A193-B8
18	Disc Screw	S.S.	S.S.
19	Disc Pin	S.S.	S.S.
20	Body Stud	ASTM A193-B7	ASTM A193-B8
21	Body Nut	ASTM A194-2H	ASTM A194-8

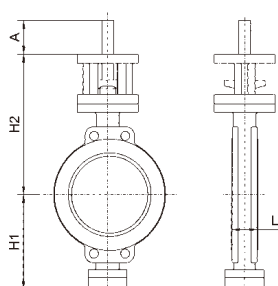


## Tri-Offset Butterfly Valve

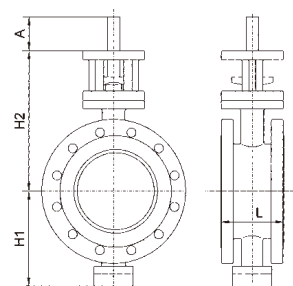
## Dimensions & Weights



**Lug type**



**Wafer type**



**Double Flanged Type**

Class 150-ISO PN20 (PN6, PN10, PN16)

Dimensions (mm)

Valves Size		H1	H2	A	L			Approximate Weight (kg)		
inch	mm				Lug	Wafer	Flanged (Short pattern)	Lug	Wafer	Flanged
3"	80	157	239	45	48	48	114	17	15	22
4"	100	179	280	45	54	54	127	19	17	25
6"	150	194	310	45	57	57	140	30	27	39
8"	200	230	330	75	64	64	152	37	33	48
10"	250	280	380	80	71	71	165	50	45	65
12"	300	310	450	100	81	81	178	81	69	100
14"	350	340	500	110	92	92	190	96	86	125
16"	400	365	510	110	102	102	216	137	122	177
18"	450	436	640	135	114	114	222	158	141	205
20"	500	450	660	150	127	127	229	214	191	277
24"	600	530	820	170	154	154	267	291	260	377
28"	700	600	903	170	165	165	292	426	380	551
30"	750	630	930	170	190	190	318	616	550	798
32"	800	696	967	175	190	190	318	728	650	943
36"	900	760	1105	175	203	203	330	930	830	1204
40"	1000	830	1175	175	216	216	410	1176	1050	1523
42"	1050	860	1210	175	229	229	410	1344	1200	1740
48"	1200	960	1320	200	254	254	470	1568	1400	2030

Class 300-ISO PN50 (PN25, PN40)

Dimensions (mm)

Valves Size		H1	H2	A	L				Approximate Weight (kg)			
inch	mm				Lug	Wafer	Flanged Short(I) Short(II)		Lug	Wafer	Flanged Short(I) Short(II)	
3"	80	157	239	45	48	48	114	180	18	16	23	30
4"	100	179	280	45	54	54	127	190	20	18	26	34
6"	150	220	356	60	59	59	140	210	37	33	48	62
8"	200	260	420	80	73	73	152	230	52	46	67	87
10"	250	310	430	90	83	83	165	250	71	63	91	118
12"	300	345	480	100	92	92	178	270	109	97	141	183
14"	350	370	450	110	117	117	190	290	134	120	174	226
16"	400	390	550	120	133	133	216	310	213	190	276	359
18"	450	490	705	130	149	149	222	330	347	310	450	585
20"	500	520	750	140	159	159	229	350	431	385	558	725
24"	600	590	910	150	181	181	267	390	526	470	682	887

Note: If PN>50 according to the client's request.

# Tri-Offset Butterfly Valve

# Engineering Data

## Valve Operating Torque (N.m)

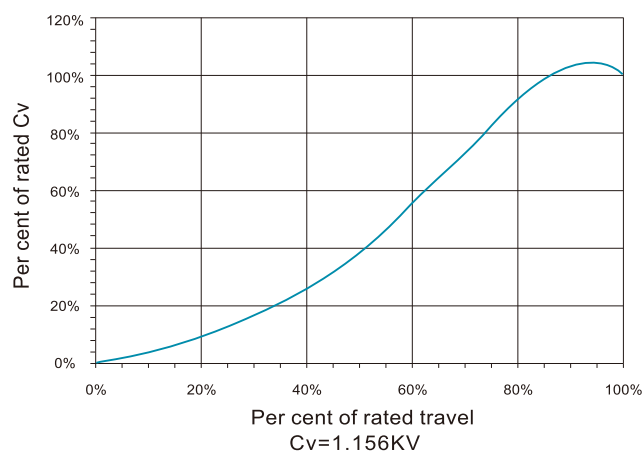
Valve Size		Class 150lb		Class 300lb	
inch	mm	Opening	Closing	Opening	Closing
3"	80	90	80	152	135
4"	100	126	109	218	179
6"	150	193	164	462	354
8"	200	387	258	1007	613
10"	250	675	488	1612	1035
12"	300	1041	738	2594	1486
14"	350	1465	1009	3502	1778
16"	400	2050	1439	5767	2958
18"	450	2842	1636	7703	3685
20"	500	3531	1945	9884	4335
24"	600	5996	2701	15961	6412
28"	700	15104	5979	24202	8046
30"	750	21896	6939	46447	15660
32"	800	23153	7878	51616	15078
36"	900	31912	12206	72961	21194
40"	1000	40362	15544	85865	28619
42"	1050	47524	17365		
48"	1200	65334	25709		

### Notes:

- 1) Torque shown are based on normal temperature with flow direction from shaft side.
- 2) Torque shown in this table is to be used as a guide for actuator selection. A safety factor of 1.2~1.4 is recommended for actuator sizing.
- 3) Torque may be changed according to differedt medium and trim material.
- 4) The relationship between values are liner, therefore it can be interpolated between nominated values.

## Flow Coefficient (Cv value)

Valve Size		150lb		300lb	
mm	inch	Cv	Kv	Cv	Kv
80	3	165	143	165	143
100	4	290	251	290	251
150	6	790	684	725	628
200	8	1460	1264	1330	1152
250	10	2200	1905	2110	1827
300	12	3780	3273	3500	3030
350	14	5140	4450	4620	4000
400	16	6940	6009	6280	5437
450	18	9500	8225	8590	7437
500	20	13000	11255	11500	9957
600	24	18800	16277	16180	14009
700	28	27200	23550	23400	20260
750	30	30700	26580	29000	25108
800	32	35000	30303	32600	28225
900	36	43000	37229	41500	35931
1000	40	56900	49264	49900	43203
1050	42	61700	53419	57100	49437
1200	48	81000	70130	74000	64069



### Notes:

- 1) Definition:
  - Cv: The volume of water in gpm at 15°C that will pass through a valve with differential pressure of 1 PSI.
  - Kv: The vloume of water in m³/hr at 15°C that will pass through a valve with differential pressure of 1 bar.
- 2) Flow direction from shaft side.

## Tri-Offset Butterfly Valve

## Engineering Data

### Metal Body Material

Material	ASTM Ref.	Recommended Temperature Limits		Application
		°C	°F	
Cast Iron	A126-B	-15 to 200	5 to 390	Steam, water oil, oil vapour, gas and general service
Ductile Iron	A339-80-45-10	-30 to 350	-22 to 650	
WCB	A216 Grade WCB	-29 to 425	-20 to 800	Steam, water oil, oil vapour, gas and general service
LCB	A352 Grade LCB	-46 to 350	-50 to 650	Low temperature
LCC	A352 Grade LCC	-46 to 350	-50 to 650	
CF8M	A351 Grade CF8M	-196 to 537	-320 to 1000	High and low temperature corrosion resistance Cryogenic service is also available upon request
CF8	A351 Grade CF8	-196 to 537	-320 to 1000	
CF3M	A351 Grade CF3M	-196 to 537	-320 to 1000	
CF3	A351 Grade CF3	-196 to 537	-320 to 1000	
CN7M Alloy 20	A351 Grade CN7M	-196 to 425	-320 to 800	Corrosion resistance

### Soft Sealing Material

Material	Recommended Temperature Limits		Application
	°C	°F	
EPDM	-35 to 135	-30 to 275	General water, oil low pressure applications but not suitable for hydrocarbon and high pressure services
NBR	-12 to 82	+10 to 180	Food, beverage and sanitary service
Viton	-12 to 200	+10 to 400	Wide range of water, oil, chemicals except Amine service
PTFE	-196 to 218	-320 to 425	Various chemical and cryogenic services
Neoprene	-7 to 93	+20 to 200	Various chemicals, intermediate oil and solvent.
Hypalon	-18 to 135	0 to 275	Wide range of aggressive chemicals, intermediate oil and solvent



# PRODUCT WARRANTY

Seller will replace without charge or refund the purchase price of products provided by Seller which prove to be defective in material or workmanship, provided in each case that the product is properly installed and is used in the service for which Seller recommends it and that written claim, specifying the alleged defect, is presented to the Seller within 18 months from the date of shipment or 12 months after installation, whichever occurs first. Seller shall in no event bear any labor, equipment, engineering or other costs incurred in connection with repair or replacement. The warranty stated in this paragraph is in lieu of all other warranties, either expressed or implied. With respect to warranties, this paragraph states Buyer's exclusive remedy and seller's exclusive liability.

