

# Hi-TECH

## Triple Eccentric Butterfly Valves



**Hi-TECH**

*Get the edge in process control.*



## Introduction:

Since last two decades the use of soft-seated rotary valves (Ball valves & Butterfly valves) has increased and now-a-days these valves are being used for most of the process applications.

Especially the soft seated butterfly valves are more popular because it seemingly can provide tight shut-off, due to its soft seal material. Also these valves are lower weight, compact, easy to handle and provided better stem sealing.

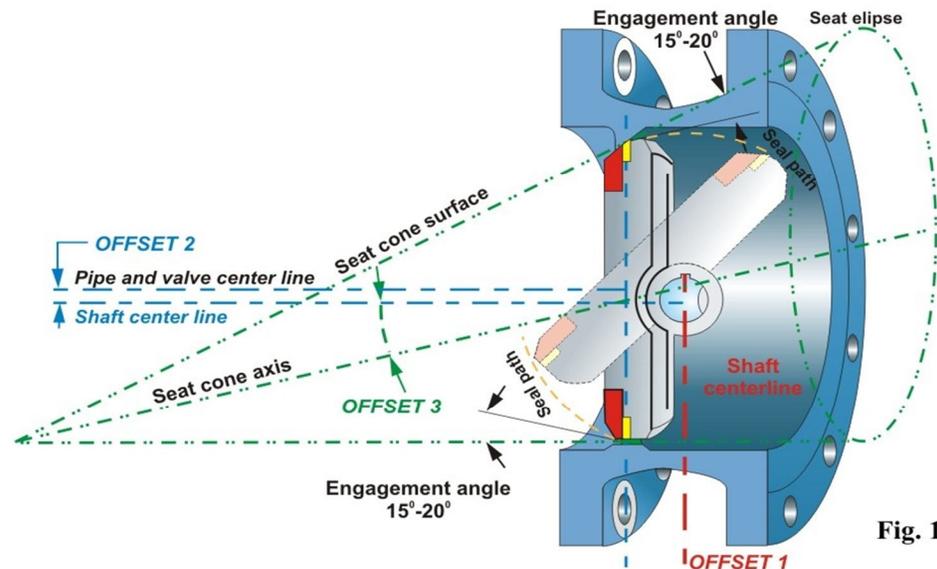
However, soft seated butterfly valves have pressure & temperature limitations. A high performance butterfly valve... double eccentric design with PTFE seat is suitable for maximum temperature of 220°C and pressure of 50 bar.

Some of the process applications (like volatile liquid, steam, high temperature media etc.) call for metal seated tight shutoff valves, but metal seated valve with double eccentric design can not provide tight shutoff or Class VI shutoff. So to overcome these limitations Metal seated triple eccentric butterfly valve was invented.

Metal seated Butterfly valve can ideally replace gate valves also, where tight shutoff is necessary and gate valves can not provide tight shutoff. (Please see the page 3 for general arrangement, construction and difference between Single eccentric, Double eccentric and Triple eccentric).

## Design and Construction:

To accomplish this design, double eccentric together with conical seat is utilized (See Fig. 1). The body seat and seat ring both are given conical shape. The body seat is stellite or alloy steel. The stainless steel seal ring is fitted into the disc with the help of retainer ring F. This gives proper camming action of disc seal ring into the body seat. This design keeps the seal ring away from the body seat except the final shutoff position. This provides non rubbing action. With the valve in closed position after the seal ring touches the body seat, torque is applied to achieve proper sealing.



**Fig. 1**

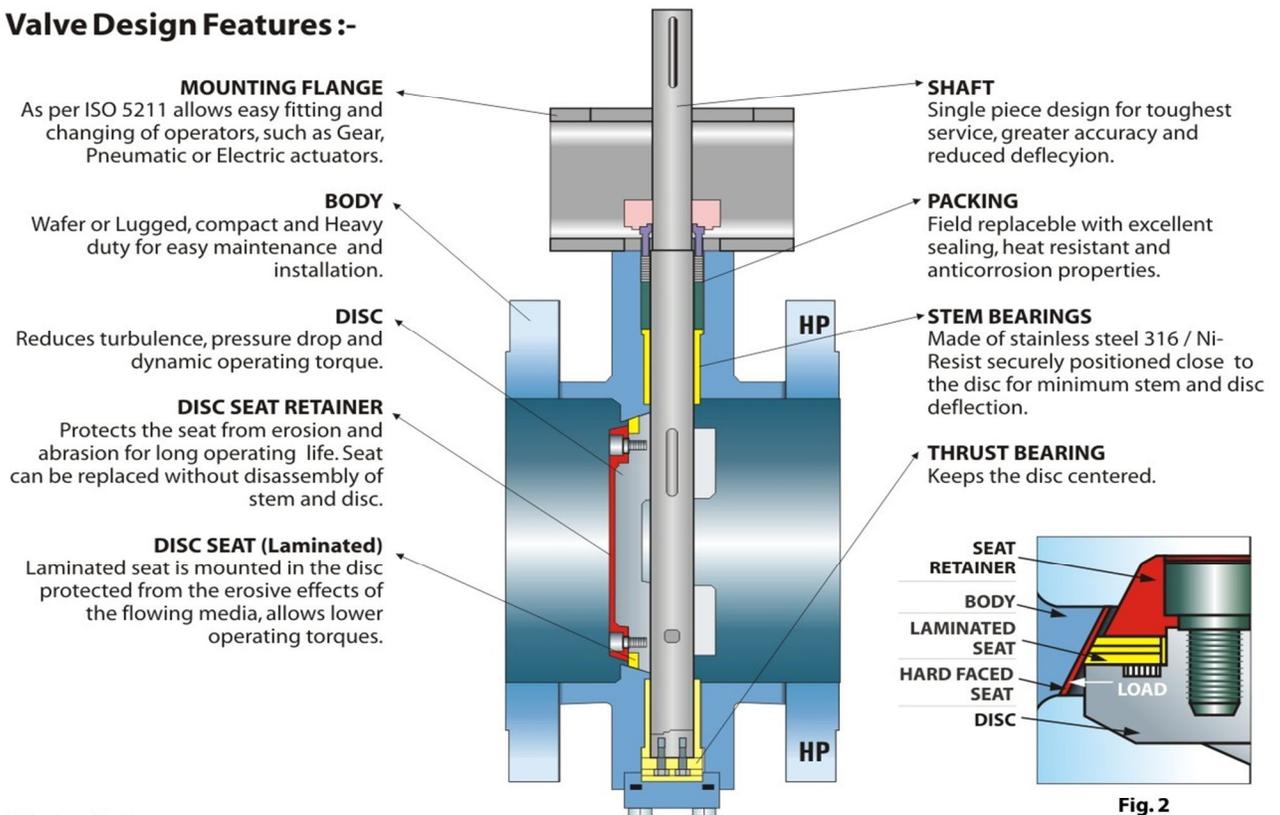
The important part of this valve is the seal ring. The seal ring provided in this valve is usually laminated type (st. steel + graphite) to give flexibility so as to achieve tight shutoff (see the figure 2 for seal ring design and seating arrangement). This sealing is suitable up to 450 deg. C temperature. Depending upon the application the seal ring is provided with VITON or PTFE composite (i.e. laminated seal ring - st. steel + viton or st. steel + ptfе). This seal ring is used when metal tight shut off is required for lower temperature applications.



For very high temperature applications (450 deg, C and higher) these valves can be provided with solid seal ring, however solid seal ring can give Class V shutoff in actual working condition.

Under test condition it is possible to achieve class VI shutoff with solid seal ring, but after few operations the valve gives class V shutoff only, so it is not recommended to use the valve with solid seal ring, where class VI shutoff is essential.

## Valve Design Features :-



## Materials

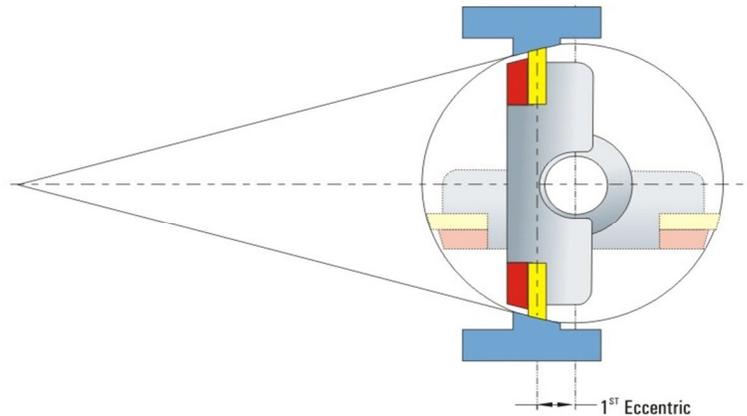
Body	Steel ASTM A 216 Gr. WCB / Stainless Steels ASTM A 351 Gr. CF8 / CF 3M / LCC / LCB / CF 8M
Disc	Steel ASTM A 216 Gr. WCB Electroless Nickel plated / Stainless Steel ASTM A 351 Gr. CF8 / CF8M
Disc Seat	Laminated Stainless Steel TYPE 316 / Graphite, laminated Inconel 600
Disc Seat Retainer Ring	Stainless Steel ASTM A 351 Gr. CF8M
Stem Bearing	Stainless Steel TYPE 316 Hard chrome / ASTM A 439 TYPE D2 (Ni-Resist)
Shaft	Steel ASTM A 276 TYPE 410/304/316/ ASTM A 564 TYPE 630 H 1150 + 1150 (17-4 PH)
Body / Disc seal Gasket	Graphite
Gland / Gland flange	Stainless Steel TYPE 316
Gland Packing	Braided moulded + Die moulded Graphite ring.
Gear Unit	Cast Iron Housing with Gear in S.G. Iron / EN8 and Worm in EN8 / EN19
Surface Protection for	Prime Coat : Chlorine free with modified alkyd resin unobjectionable in physiological and

Hi-Tech Valves are certified with fire safe in accordance with BS 6755 - Part - II and API 607. The range has been tested and certified in accordance API Standard 598.



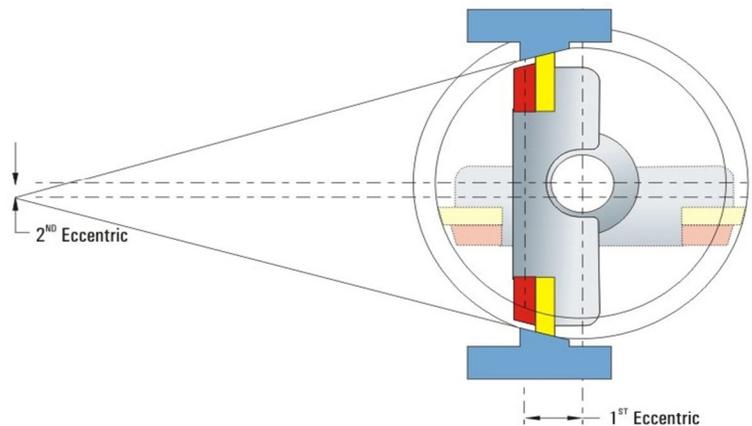
### Single Eccentric

The centre of rotation is moved back from the centreline of the valve disc. The seat and seal are designed conically and on centre. This design relies on a frictional, interference seal and so is applicable only to soft seated valves.



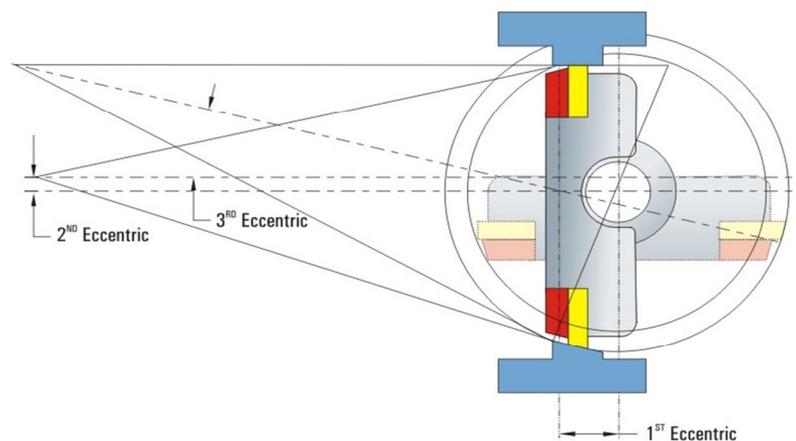
### Double Eccentric

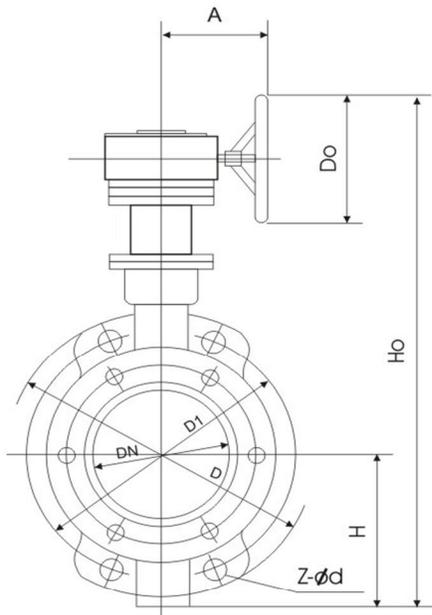
The centre of rotation is moved from the centreline of the valve body. The seat and seal are design remains conical and on centre. This design again relies on a frictional, interference seal, but the length of rotation over which this friction occurs is reduced, allowing a larger of process resistant seat materials to be used. However these materials must be relatively soft or highly elastic to prevent "jamming".



### Triple Eccentric

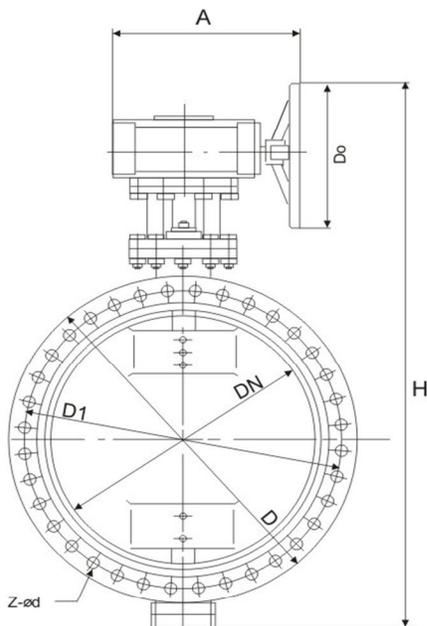
The centreline of the cone is rotated away from the valve centreline resulting in an ellipsoidal profile and providing the third offset. With this geometry, seat seal interference is completely eliminated ensuring long sealing life. The result is a torque seated, process pressure aided FRICTIONLESS seal. The geometry allows the body seat to be used as the closed limit stop, aiding operator adjustment. The Triple eccentric design is ideally suited to metal seated valves providing bubble-tight performance on high temperature, high pressure and firesafe applications.





### Hi-Tech Wafer Type Model - Class 150

NPS	DN	L	D1	D	Z-Ød	H	H0	A	D0	Wt/kg
2"	50	43	121	165	4-19	115	418	128	160	15
2 1/2"	65	46	140	185	4-19	125	442	128	160	17
3"	80	46	152	200	4-19	130	453	128	160	23
4"	100	52	191	235	8-19	145	475	128	160	28
5"	125	56	216	270	8-18	175	522	128	160	35
6"	150	56	241	300	8-22	180	638	178	230	40
8"	200	60	298	360	8-22	215	705	178	230	50
10"	250	68	362	425	12-25	250	775	178	230	68
12"	300	78	432	485	12-25	290	955	209	300	80
14"	350	78	476	533	12-28	305	990	209	300	150
16"	400	102	540	597	16-28	340	1080	269	350	250
18"	450	114	578	635	16-32	380	1145	269	350	300
20"	500	127	635	730	20-32	410	1200	269	350	370
24"	600	154	749	845	20-35	480	1350	269	350	490
30"	700	165	914	960	28-35	535	1550	340	450	630
32"***	800	190	978	1085	28-41	590	1665	340	450	720
36"	900	200	1086	1185	32-41	630	1726	421	500	870
42"	1000	251	1257	1320	36-41	690	1965	421	500	1150
48"	1200	276	1422	1511	44-41	880	2360	1050	600	1800
60"***	1500	440	1759	1854	52-48	1100	2780	1050	600	2500



### Hi-Tech Flanged Type Model - Class 150

NPS	DN	L	D1	D	Z-Ød	H	H0	A	D0	Wt/kg
24"	600	267	725	780	20-30	505	1375	419	350	710
28"	700	292	840	895	24-30	525	1536	540	450	850
32"	800	318	950	1015	24-33	585	1656	540	450	1100
36"	900	330	1050	1115	28-33	635	1761	660	450	1300
40"	1000	410	1160	1230	28-36	705	2110	660	500	1600
48"	1200	470	1380	1455	32-39	835	2910	660	500	1980
56"	1400	530	1590	1675	36-42	975	2560		600	2840
68"	1600	600	1820	1915	40-48	1100	2780		600	4500
72"	1800	670	2020	2115	44-48					5800
80"	2000	760	2230	2325	48-48					8600



## **Hi-TECH BUTTERFLY VALVES INDIA PVT. LTD.**

Corporate Office: 202, Sapna Chambers, Behind Hotel Shreemaya,  
12/1, South Tukoganj, INDORE - 1 (M.P.) INDIA  
Ph : +91-731-2523898, 2511492, Fax : 2517274  
e-mail: [skjangid@sancharnet.in](mailto:skjangid@sancharnet.in)