BUTTERFLY VALVE

All valves shall meet API-609 MSS-SP-67 ISO 5272 face-to-face dimensions. Valve sizes from 2" to 12" are rated at 200 psig WOG service and valve sizes from 14" to 30" are rated at 150 psig WOG service. All valves are full rated on dead-end service. All bodies shall be ductile iron 65-45-12 and bi-directional tested in both directions and be bubble tight with zero leakage. Lug bodies shall be full lug rated and all bodies shall be suitable for ANSI 125/150 lb, JIS, DIN or B.S. Flanges. Secondary seals shall be self-adjusting. All elastomers, all internal bearings shall be non-corrosive and non-metallic. All seats shall be suitable for 250°F sustained high temperature and capable of 2000 PPM on chlorinated applications.

Advantages of Butterfly Valves:

- Open and close easily and quickly, effort, fluid resistance is small, can operate frequently.
- Simple structure, small size and light weight.
- It can carry mud, with the least accumulation of fluid in the pipeline opening.
- Low pressure, it can achieve a good sealing.
- Good regulating performance.

Many different types of valves are used in flow control. They are used for a variety of reasons, such as phase (liquid or gases), pressure, piping restrictions and solids content. Other valves are chosen for their capability to open and close in a quarter turn. Of all the valve types, the butterfly valve is used as a control device for many reasons including some or all of the above.

This article explains the workings of a butterfly valve and its operation. The butterfly valve offers many advantages that include quarter-turn, openness for less plugging and good control capabilities. Both manual and control versions are used.

Rotating disk

A butterfly valve is a flow control device that incorporates a rotational disk to control the flowing media in a process. The disk is always in the passageway, but because it is relatively thin, it offers little resistance to flow.

Butterfly valve technology has evolved dramatically over the past half century, as has its industry popularity. This popularity can be partly attributed to the quarter-turn operation, tight shutoff and its availability in a variety of materials of construction.

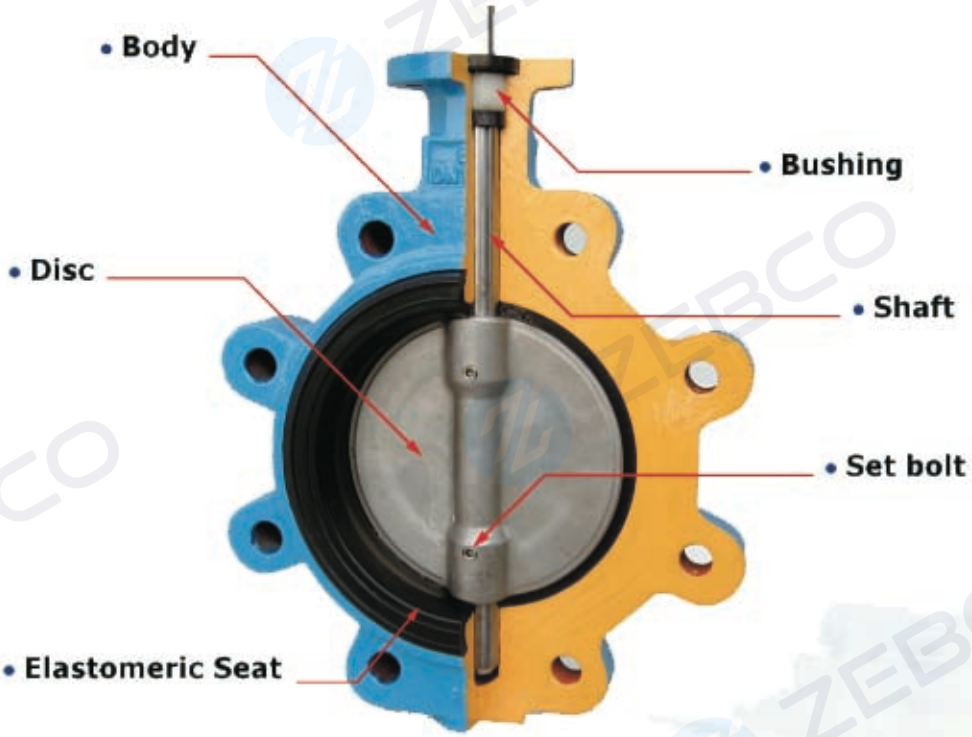
Early use of butterfly valves focused on water applications, but new designs and component materials have allowed them to be utilized in growing industrial fluid applications. Presently, butterfly valves can be found in almost every chemical plant handling a variety of diverse fluids.

Butterfly valves range in size from 1 in to more than 200 in and most have a pressure capability of 150-psi to 740-psi cold working pressure. The general temperature rating for a resilient seated valve is 25 Degrees F to 300 Degrees F and 400 Degrees F to 450 Degrees F for a high-performance butterfly valve.

The butterfly valve can be used for on-off service or modulating service. Actuation is typically achieved either manually (handle, wrench, gear operator) or through an external power source to cycle the valve automatically.

Automatic actuators include electric, pneumatic and hydraulic operators.

There are many advantages offered by butterfly valves compared to other types of valves including an inherently simple, economic design that consists of fewer parts, which makes butterfly valves easy to repair and maintain. The wafer-shaped body and relatively light weight offer a savings in the initial cost of the valve and installation costs -- in person-hours, equipment and piping support.



BODY : The body flange is mage to standards JIS10K - PN10 - PN16 - ANSI125# - ANSI150#; the flange top is made to standards ISO-5211 or DIN-3337 for easy interface with pneumatic actuator and electric motor actuator.

DISC : The semi-circular disc design provides tight shut-off, low torque requirements and prolongs seat life.

EIASTOMERIC SEAT : The seat is a one-piece full liner design covering the entire valve body.

The liner keeps process fluid from the valve body and prevents corrosion.

The valve liner also provides a face seal gasket for the mating piping flange.

SET BOLT : Set bolt is provided to ensure the disc is correctly positioned and assists in ease of maintenance.

BUSHING : Bushing is provided to reduce friction and prevent leakage from shaft.

Basic components

The Butterfly valve consists of only four main components: body, disk, stem and seat.

Body: Butterfly valves generally have bodies that fit between two pipe flanges. The most common body designs are lug and wafer. The lug body has protruding lugs that provide bolt holes matching those in the pipe flange. A wafer body does not have protruding lugs. The wafer valve is sandwiched between the pipe flanges, and the flange bolts surround the body.
Each type of body has advantages, some of which are listed:
The wafer style is less expensive than a lug style.
Wafer designs do not transfer the weight of the piping system directly through the valve body.
A lug body allows dead-end service or removal of downstream piping.

Disk: The flow closure member of a butterfly valve is the disk. Many variations of the disk design have evolved relative to the orientation of the disk and stem in an attempt to improve flow, sealing and/or operating torque.
The disk is the equivalent of a plug in a plug valve, gate in a gate valve or a ball in a ball valve. Rotating the disk one-quarter turn or 90 Degrees opens and closes the butterfly valve.

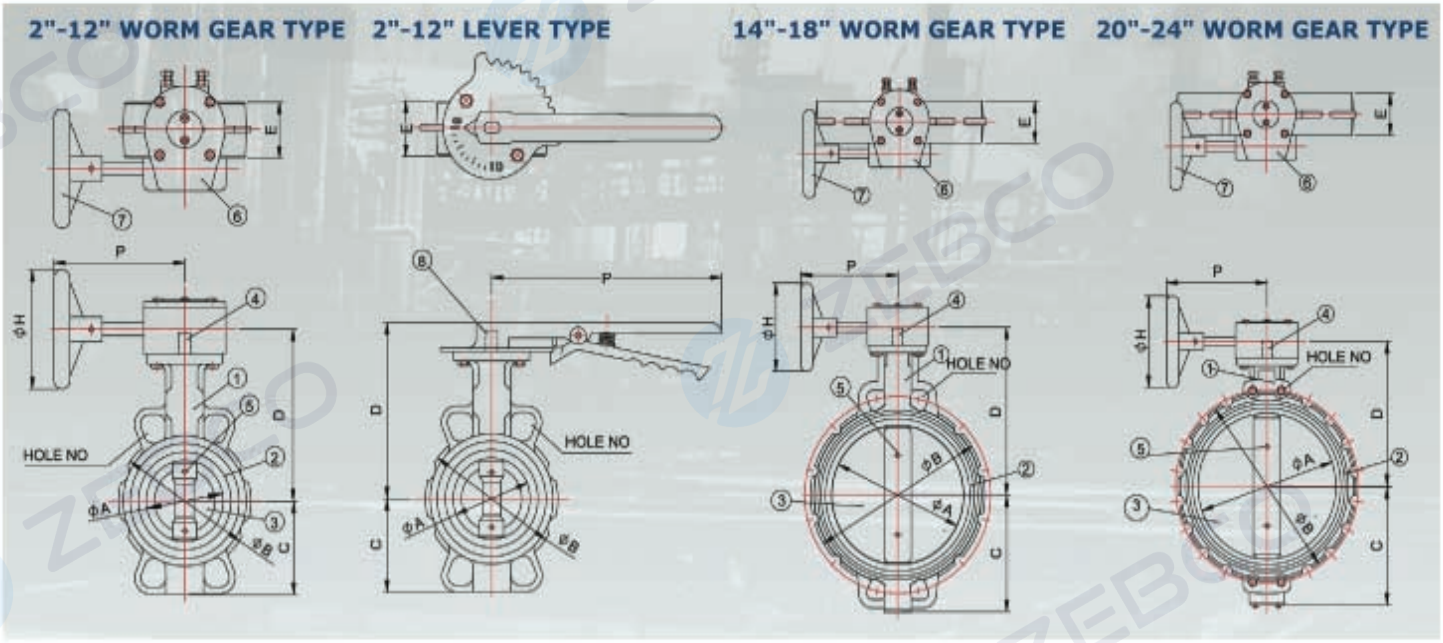
Stem: The stem of the butterfly valve may be a one-piece shaft or a two-piece (split-stem) design. The stem in most resilient seated designs is protected from the media, thus allowing an efficient selection of material with respect to cost and mechanical properties.
In high-performance designs, the stems are in contact with the media and, therefore, must be compatible, as well as provide the required strength for seating and unseating the disk from the seat.

Seat: The seat of a resilient-seat butterfly valve utilizes an interference fit between the disk edge and the seat to provide shutoff. The material of the seat can be made from many different elastomers or polymers. The seat may be bonded to the body or it may be pressed or locked in. In high-performance butterfly valves, the shutoff may be provided by an interference-fit seat design or a line-energized seat design, where the pressure in the pipeline is used to increase the interference between the seat and disk edge. The most common seat material is polytetrafluoroethylene (PTFE) or reinforced PTFE (RTFE) because of the wider range of compatibility and temperature range.
Metal seats are also offered in high-performance butterfly valves. These metal seats allow a butterfly valve to be used in even higher temperatures to 1,000 Degrees F. Fire-safe designs are offered that provide the shutoff of a polymer seat valve before a fire, and the metal seal backup provides shutoff during and after a fire.

"Non-wetted" and "wetted"

Lined butterfly valves rely on elastomers (rubber) and/or polymers (PTFE) to completely isolate the valve body and stem journal area from the corrosive and/or erosive effects of the line media. When the body and stem journal area are isolated from the line media, the valve is considered a "non-wetted" design. By isolating the valve body and stem with rubber or PTFE, it is not necessary for the valve body to be made of expensive corrosion-resistant materials such as stainless steel, Alloy 20 and C-276.

WAFER TYPE BUTTERFLY VALVE



Parts & Material List

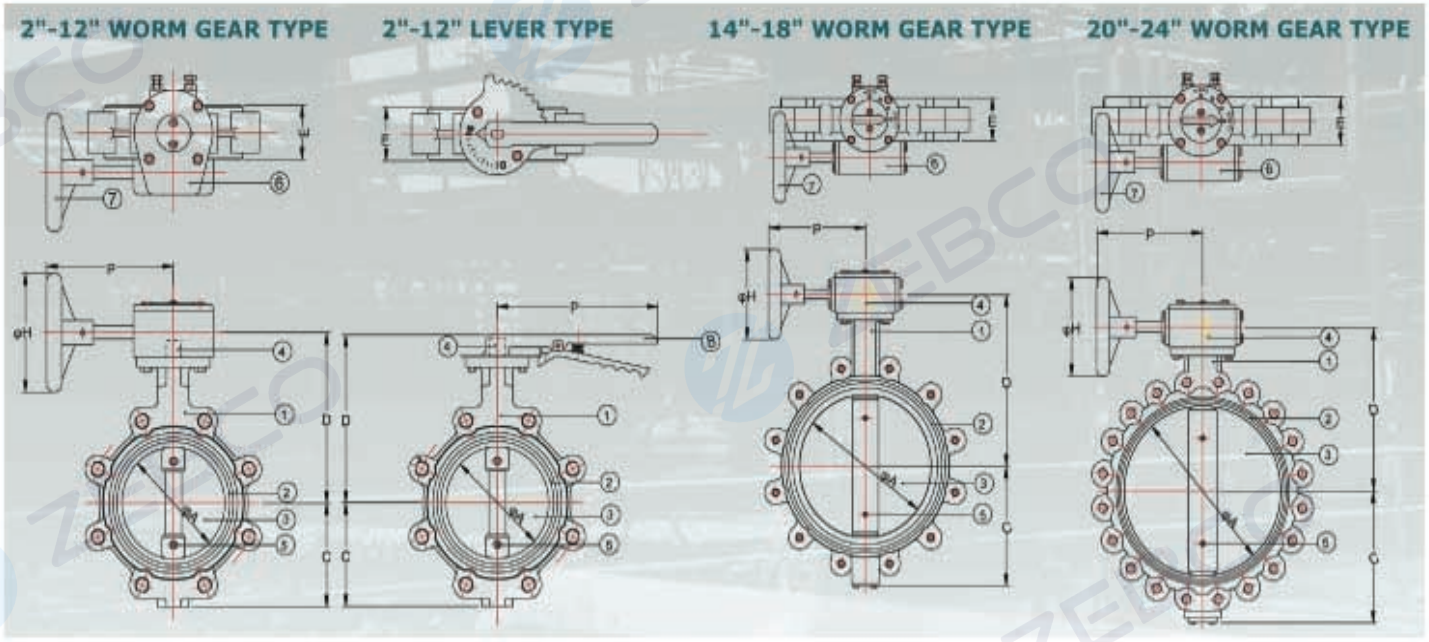
ITEM	PART NAME	MATERIAL	DESCRIPTION	
			JIS	ASTM
1	BODY	CAST IRON	FC 200	A126 CLASS B
		DUCTILE IRON	FCD 450	A536-65-45-12
2	SEAT	RUBBER	BUNA-N(NBR)	
			EPDM	
3	DISC	DUCTILE IRON	FCD 450	A536-65-45-12
		STAINLESS STEEL	SCS 13	A351 CF8
			SCS 14	A351 CF8M
4	SHAFT	STAINLESS STEEL	SUS 410	A182 F410
			SUS 316	A182 F316
			SUS 304	A182 F304
5	SET BOLT	STAINLESS STEEL	SUS 316	A182 F316
6	WORM GEAR BOX	CAST IRON	FC 200	A126 CLASS B
7	HAND WHEEL	CAST IRON	FC 200, SGP	A126 CLASS B, A53
8	LEVER HANDEL	CAST IRON	FC 200	A126 CLASS B

Dimension List

Unit : mm

SIZE	IN	2	2.5	3	4	6	8	10	12	14	16	18	20	24
	MM	50	65	80	100	150	200	250	300	350	400	450	500	600
VALVE	A	50	65	80	99	149	199	250	299	328	380	431	489	588
	B	98	118	128	153	214	265	327	371	421	481	535	625	695
	C	66	79	91	110	140	176	210	240	274	315	345	390	465
	HOLE NO	2	2	2	2	2	4	4	4	4	4	4	8	8
	E	43	46	46	52	56	60	68	78	78	102	114	127	154
LEVER	D	168	178	186	200	232	263	298	333	---	---	---	---	---
	P	170	170	170	250	250	410	410	410	---	---	---	---	---
	N	107	107	107	107	107	135	135	135	---	---	---	---	---
WORM GEAR	D	168	178	186	203	237	289	321	373	390	400	430	498	575
	P	170	170	170	170	170	260	260	260	280	300	300	330	330
	H	160	160	160	160	160	250	250	250	305	305	305	457	457

LUG TYPE BUTTERFLY VALVE



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	MM	50	65	80	100	150	200	250	300	350	400	450	500	600
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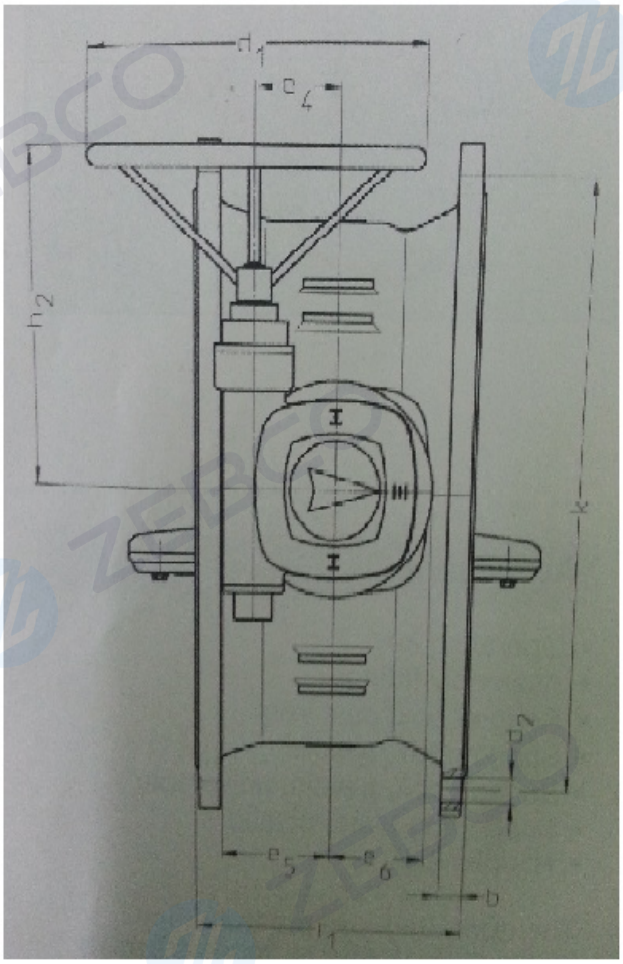
	C	66	79	91	110	140	176	210	240	274	315	345	390	465
	E	43	46	46	52	56	60	68	78	78	102	114	127	154
LEVER	D	168	178	186	200	232	263	298	333	---	---	---	---	---
	P	170	170	170	250	250	410	410	410	---	---	---	---	---
	N	107	107	107	107	107	135	135	135	---	---	---	---	---
WORM GEAR	D	168	178	186	203	237	289	321	373	390	400	430	498	575
	P	170	170	170	170	170	260	260	260	280	300	300	330	330
	H	160	160	160	160	160	250	250	250	305	305	305	457	457



Product Features

- Acc. To EN 593
- Disc double offset on shaft
- Disk with closed bearing eyes
- Soft sealing due to chambered sealing ring on the disk
- Sealing ring can be exchanged without dismantling the disk
- Body seat of nickel welded overlay, micro finished
- With Mounted gear unit, irreversible, with adjustable, metallic limit sports and position indicator.
- Face to face length acc. To EN 558-1, series 14 (DIN 3202, F4)
- DVGW tested and registered
- Pressure test acc. To EN 12266 (DIN 3230 part 4)

Materials

- Body and disk of ductile cast iron EN – JS 10300 (GGG-40)
- Valve shaft of stainless steel 1.4021
- Sealing of butterfly valve and O-rings of EPDM
- Bearing bushes of bronze

Corrosion Protection

- Body inside and outside and disk epoxy powder-coated (EP-P) in acc. With GSK guidelines
- > DN 600 epoxy coating (EP-F)

Field of application

- Permitted operating temperatures for neutral fluids : 50 ^{0}C
- Plants and underground installation

Versions

- Pressure rate : PN 6 DN 900…2400 – PN 10 DN 200…2000
  PN 16 DN 150…1800 – PN 25 DN 150…1200
- With gearing
  On request
  - Pressure rate : PN 16 DN 100/125 – PN 40 DN 150…600
  - With electrical actuator
  - With pneumatic or hydraulic actuator
  - With brake and lift cylinder

Construction Lengths and flange dimensions in mm

Nominal diameter **DN**		**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**
Face to face length in acc. With EN 558-1 14 l_1		210	230	250	270	290	310	330	350	390	430	470	510	550	590	630
PN 6…10	D	285	340	400	455	505	565	615	670	780	900	1020	1120	1245	1340	1470
	K	240	295	350	400	460	515	565	620	725	840	950	1050	1160	1270	1380
	Holes	8	8	12	12	16	16	20	20	20	24	24	28	28	32	32
	d_2	23	23	23	23	23	28	28	28	31	31	34	34	37	37	41
	b	19	20	22	24.5	24.5	24.5	26.5	26.5	30	32.5	35	37.5	40	43	45
PN 16	D	285	340	400	455	520	580	640	715	840	910	1025	1125	1255	-	1485
	K	240	295	355	410	470	525	585	650	770	840	950	1050	1170	-	1390
	Holes	8	12	12	12	16	16	20	20	20	24	24	28	28	-	32
	d_2	23	23	28	28	28	31	31	34	37	37	41	41	44	-	50
	b	19	20	22	24.5	26.5	28	31.5	31.5	36	39.5	43	46.5	50	-	57
PN 25	D	300	360	425	485	555	620	670	730	845	960	1085	1185	1320	-	1530
	K	250	310	370	430	490	550	600	660	770	875	990	1090	1210	-	1420
	Holes	8	12	12	16	16	16	20	20	20	24	24	28	28	-	32
	d_2	28	28	31	31	34	37	37	37	41	44	50	50	57	-	57
	b	20	22	24.5	27.5	30	32	34.5	36.5	42	46.5	51	59.5	60	-	74
PN 40	D	300	375	450	515	580	660	685	755	390	995	1140	1250	1360	-	1575
	K	250	320	385	450	510	585	610	670	795	900	1030	1140	1250	-	1460
	Holes	8	12	12	16	16	16	20	20	20	24	24	28	28	-	32
	d_2	28	31	34	34	37	41	41	44	50	48	56	56	56	-	62
	b	20	30	34	39.5	44	48	49	52	58	64	65	70	75	-	80

Flange for the actuator connection between gear unit and valve in acc. With DIN EN ISO 5211.