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# butterfly valves



**arflu**  
INDUSTRIAL VALVES

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### Butterfly valves

Butterfly valves, like ball and plug valves, are quarter turn valves. Mainly, they are used for low pressure, allowing the flow control and regulation.

The bodies of these valves are very narrow, it generates low weight and as a result, a low cost of manufacturing.



## MANUFACTURING AND DESIGN STANDARDS

Butterfly valves are designed and manufactured according to the following international codes and standards:

### DESIGN AND MANUFACTURING:

API 599 Metal Plug Valves - Flanged, Threaded and Welding Ends  
API-6D ISO 14313:1999, petroleum and natural gas industries-  
pipeline transportation systems-pipeline valves

### INSPECTION AND TEST:

API 598 valve inspection and testing

### FLANGE DIMENSION:

ASME B16.5 pipe flanges and flanged fittings

### WELDED END:

ASME B16.25 butt welding ends

### FACE TO FACE AND END TO END

ASME B16.10 face to face and end-to-end dimensions of valves



# DESIGN FEATURES

## BUTTERFLY VALVES

Butterfly valves are designed with different sealing systems; centered seal, single eccentric seal, double eccentric seal, triple eccentric seal, and variable eccentric seal. The sealing principles of these structures are here down explained.



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## GENERAL DESIGN FEATURES

Butterfly valves are used as ON-OFF valves as well as flow control valves.

Main characteristics are small size, light weight, and low installation dimensions. They can be FLANGED, WAFER, LUG, OR WELDED END.

Sealing materials may be soft or hard, assembled on body, or disc, to work on different conditions and to provide tightness and long service life.

Soft seated valves are applicable for single and double eccentric design, and ratings smaller than 600#. Centered design is suitable for 250# valves. Sealing ring is assembled on the body.

Multilayer hard seal design is suitable for single, double, and triple eccentric valves 600# and lower. Generally these valves are unidirectional. Sealing face is made of stainless steel + graphite type non metallic material. Elastic ring hard seal design is suitable for single and double eccentric valves 300# and lower. These valves are fire proof design.

Fire safe valves can stop expansion of fire. Once the soft material has disappeared the stainless steel sealing ring will start working and make the valve tight.

Comparing to other a quarter turn valves operating torque is very low.

## CENTERED SEAL

In this design disc seal center, and valve rotation center are overlapped. Sealing load is produced between the sealing faces or seat and disc under certain magnitude of interference, to make the valve tight.

Lined with rubber on body, this design is applicable for medium and small size valves. Due to the deformation, during opening and closing, disc is always under extrusion. So the upper and lower shafts are heavily stressed, which may result on a poor service life. Moreover this stress implies torque at the beginning of the opening and closing being very relatively high. These not desirable facts cause scratches on the seal surfaces, high resistant torque, and abrasion on the rubber.

To overcome extrusion and scratches, and to ensure tightness, seats are made of rubber, PTFE, or other elastic materials. However these materials can not stand high working temperatures. So this kind of valves are not suitable for high temperature services.

## SINGLE ECCENTRIC VALVE

In this kind of valve, the rotation center of disc (namely center of valve shaft), and the sealing section of disc form up an 'a' eccentric. This makes disc sealing face gradually separated from the seat sealing surface while opening and closing.

Once the valve has been completely opened, there will appear a gap between the sealing surfaces, which will make the stress on the seat, disc and shaft be much lower than centered seal valves.

However as contact during whole opening exists this kind of valve is not either suitable for high temperature service.

## DOUBLE ECCENTRIC VALVE

In this design apart from the eccentricity between rotation center of disc, and the sealing section of disc, there is a second 'b' eccentricity between the center of the body and the rotation center of disc.

This fact makes the sealing face of disc being separated of sealing surface of seat much faster than single eccentric valve.

So, this kind of valves have a lower torque, and lower stress on seat surfaces, making the performance much better.

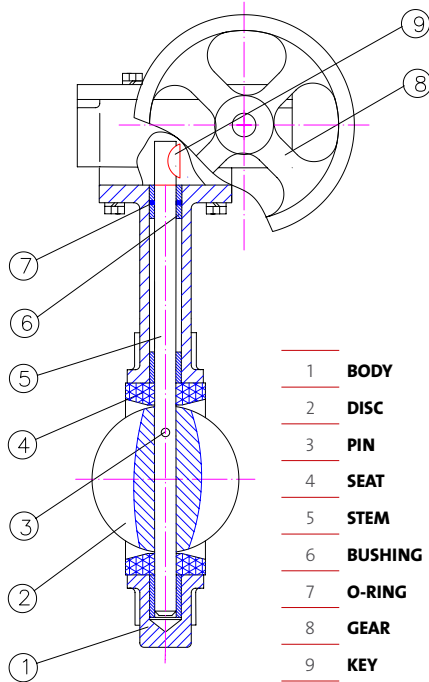
As disc can be quickly separated of seat, unnecessary stress on seat disappears, reducing torque, and scratch possibility.

This valves may be used for metal to metal seat, so they are suitable for high temperature service. But as the tightness is made by elastic deformation of sealing surface, combination of pressure and temperature have a big influence, so the performance of valve with high pressure, or temperature is not so good.

## TRIPLE ECCENTRIC VALVE

Based on double eccentric valve design, an angle is formed between the centre of the seat and the centre of the body. This third eccentricity makes sealing surfaces immediately separated from each other.

With this design scratches and heavy contact have been eliminated, improving sealing performance, and expected service life. As there is no friction during opening and closing abrasion and leakage have been eliminated.



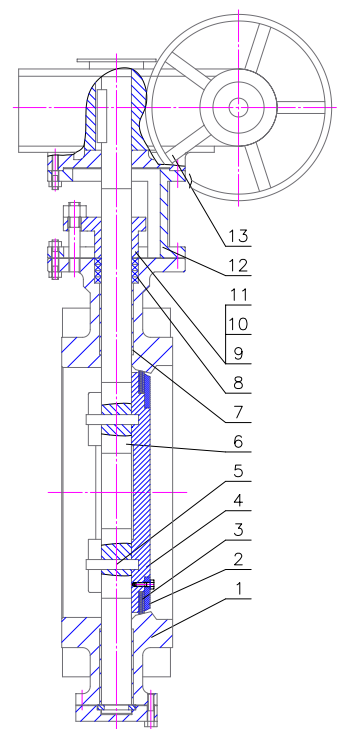
## SOFT SEAT BUTTERFLY VALVES

	D.I / D.I / EPDM	WCB / WCB / EPDM	WCB / CF8M / EPDM	CF8 / 304 / EPDM	CF8M / 316 / EPDM
1 <b>BODY</b>	ASTM A395 (Ductile Iron)	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
2 <b>DISC</b>	ASTM A395 (Ductile Iron)	ASTM A216 WCB	ASTM A351 CF8M	ASTM A351 CF8	ASTM A351 CF8M
3 <b>PIN</b>	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
4 <b>SEAT</b>	EPDM	EPDM	EPDM	EPDM	EPDM
5 <b>STEM</b>	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
6 <b>BUSHING</b>	PTFE	PTFE	PTFE	PTFE	PTFE
7 <b>O-RING</b>	EPDM	EPDM	EPDM	EPDM	EPDM
8 <b>GEAR</b>	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON
9 <b>KEY</b>	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL

# MATERIALS

## METAL TO METAL BUTTERFLY VALVES

	WCB / WCB / MM	WCB / CF8 / MM	CF8 / 304 / MM	CF8M / 316 / MM
1 <b>BODY</b>	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
2 <b>SEAT RING RETAINER</b>	ASTM A182 F6	ASTM A182 F304	ASTM A182 F304	ASTM A182 F316
3 <b>SEAT RING</b>	GRAPHITE+SS304	GRAPHITE+SS304	GRAPHITE+SS304	GRAPHITE+SS316
4 <b>DISC</b>	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8	ASTM A351 CF8M
5 <b>PIN</b>	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
6 <b>STEM</b>	ASTM A182 F6	ASTM A182 F304	ASTM A182 F304	ASTM A182 F316
7 <b>TRUNNION BEARING</b>	STEEL LINER PTFE	STEEL LINER PTFE	STEEL LINER PTFE	STEEL LINER PTFE
8 <b>STEM PACKING</b>	GRAPHITE	GRAPHITE	GRAPHITE	GRAPHITE
9 <b>GLAND</b>	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
10 <b>GLAND BOLT</b>	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8
11 <b>GLAND NUT</b>	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8
12 <b>YOKE</b>	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
13 <b>GEAR</b>	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON



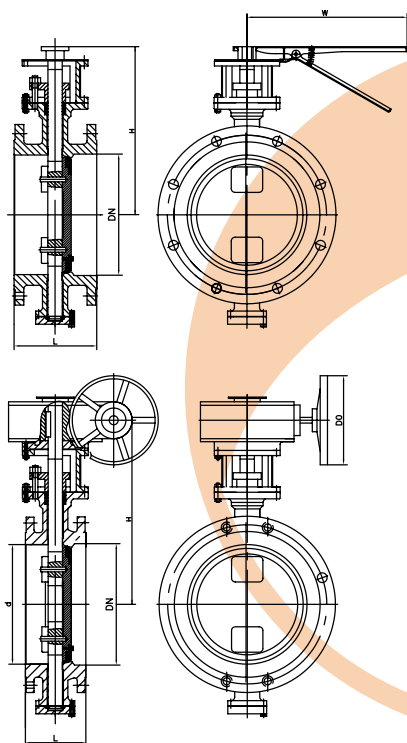
## Butterfly valves API 609 BUTTERFLY VALVE

COD.

AM-1000

### BUTTERFLY VALVES 150 LBS 2" TO 60"

PETROCHEMICAL & ENERGY DIVISION



**DESIGN** API-609 And MSS SP-67 or MSS SP-68

**FACE TO FACE** ANSI B16.10 & API609 Or ISO5752

**FLANGED ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24" Ac c/ANSI B16.47 or MSS SP-44 or upon request

**WAFFER ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24" Ac c/ANSI B16.47 or MSS SP-44 or upon request

**TEST** API-598

**CONSTRUCTION**

- Type of connection: wafer type (including lug wafer type) and flanged.
- Sealing materials:
  - Soft sealing structure
  - Multilayer hard seal structure
  - Elastic ring hard seal structure
- Fireproof butterfly valves
- Low driving moment, easy and quick operation
- Lever
- Manual and operated (gearbox, electric, pneumatic...)
- Other requirements upon request

**MATERIALS** Ac c/ANSI B16.34  
DI, WCB, WCC, WC1, WC6, WC9, C5, C12, LCB, LCC, CF8, CF8M, CF3, CF3M, CF8C, Bronze, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials

**TRIM** 13%Cr, stellite, 304, 304L, 316, 316L, 321, bronze, monel, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials...

**SEATS** Soft ( PTFE, Viton, Neoprene) and Metal to Metal all kind available

**OTHERS** Jacketed, cryogenic services, H.F. services, all kind of operated, all type of painting and coating

#### CLASS 150 DIMENSIONS IN MILLIMETERS

ND.	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
L (WF)	45	48	49	54	57	58	64	71	81	92	102	114	127	154
L (RF)			180	190	200	210	230	250	270	290	310	330	350	390
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
H	172	180	185	195	209	243	263	295	342	385	430	469	500	618
DO	160	160	160	160	300	300	400	400	600	600	600	800	800	800
WEIGHT (KG.) (WF)	3,7	4,3	5	7,7	9,1	13,6	20	32	30	61	83	106	145	229
WEIGHT (KG.) (RF)			47	62	71	83	115	158	233	265	387	454	503	730

#### CLASS 150 DIMENSIONS IN MILLIMETERS

ND.	26"	28"	30"	32"	34"	36"	40"	42"	48"	56"	60"
L (WF)			167			184	217	222	254		333
L (RF)	410	430	450	470	490	510	550	570	630	690	750
DN	650	700	750	800	850	900	1000	1050	1200	1400	1500
H	701	746	815	874	899	937	965	1092	1213	1355	1562
DO	400	400	400	400	400	600	600	600	600	800	800
WEIGHT (KG.) (WF)			420			739	975	1123	1277		2903
WEIGHT (KG.) (RF)	769	831	907	1190	1299	1463	2112	2217	2992	4470	5080



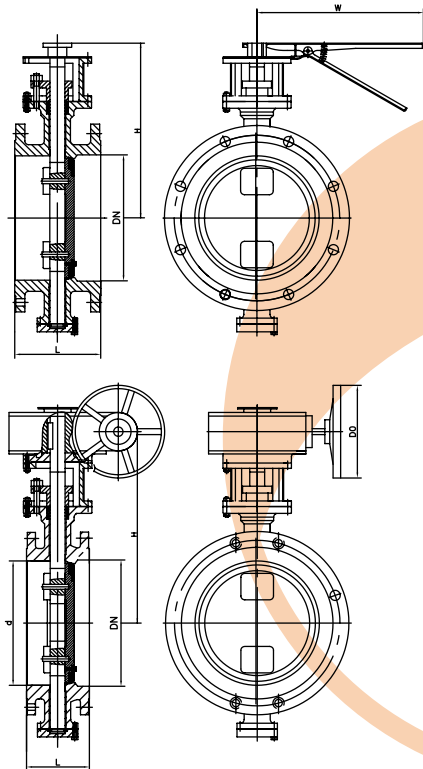
## Butterfly valves API 609 BUTTERFLY VALVE

COD.

AM-3000

### BUTTERFLY VALVES 300 LBS 2" TO 48"

PETROCHEMICAL & ENERGY DIVISION



**DESIGN** API-609 And MSS SP-67 or MSS SP-68

**FACE TO FACE** ANSI B16.10 & API609 Or ISO5752

**FLANGED ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24" Ac c/ANSI B16.47 or MSS SP-44 or upon request

**WAFER ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24" Ac c/ANSI B16.47 or MSS SP-44 or upon request

**TEST** API-598

**CONSTRUCTION**

- Type of connection: wafer type (including lug wafer type) and flanged.
- Sealing materials:
  - Soft sealing structure
  - Multilayer hard seal structure
  - Elastic ring hard seal structure
- Fireproof butterfly valves
- Low driving moment, easy and quick operation
- Lever
- Manual and operated (gearbox, electric, pneumatic...)
- Other requirements upon request

**MATERIALS** Ac c/ANSI B16.34  
 DI, WCB, WCC, WC1, WC6, WC9, C5, C12, LCB, LCC, CF8, CF8M, CF3, CF3M, CF8C, Bronze, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials

**TRIM** 13%Cr, stellite, 304, 304L, 316, 316L, 321, bronze, monel, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials....

**SEATS** Soft (PTFE, Viton, Neoprene) and Metal to Metal all kind available

**OTHERS** Jacketed, cryogenic services, H.F. services, all kind of operated, all type of painting and coating

#### CLASS 300 DIMENSIONS IN MILLIMETERS

ND.	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
L (WF)	45	48	49	54	57	59	73	83	92	117	133	149	159	181
L (RF)			180	190	200	210	230	250	270	290	310	330	350	390
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
H	176	180	241	205	215	260	273	315	362	405	440	525	603	693
DO	160	160	200	200	250	315	315	315	315	400	400	400	400	400
WEIGHT (KG.) (WF)	5	5,6	7,7	10,9	13,6	22,2	36	52	90	147	182	234,5	333	463
WEIGHT (KG.) (RF)			44	58	72	82	142	205	318	379	537	628	869	1133

#### CLASS 300 DIMENSIONS IN MILLIMETERS

ND.	26"	28"	30"	32"	34"	36"	40"	42"	48"
L (WF)									
L (RF)	410	430	450	470	490	510	550	570	630
DN	650	700	750	800	850	900	1000	1050	1200
H	875	959	1095	1129	1162	1261	1342	1385	1570
DO	400	400	400	400	400	630	630	630	630
WEIGHT (KG.) (WF)									
WEIGHT (KG.) (RF)	1506	2040	2304	2636	2915	3636	3797	4172	5403

## Butterfly valves API 609 BUTTERFLY VALVE

COD.

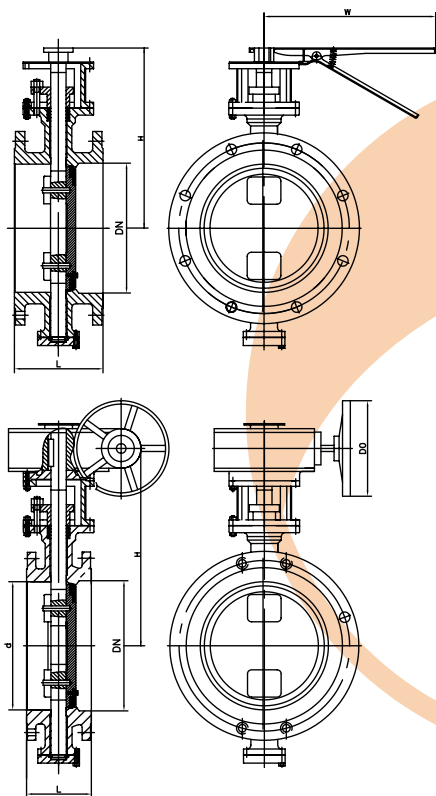
AM-6000

### BUTTERFLY VALVES 600 LBS 2" TO 24"

PETROCHEMICAL  
& ENERGY DIVISION

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**DESIGN** API-609 And MSS SP-67 or MSS SP-68

**FACE TO FACE** ANSI B16.10 & API609 Or ISO5752

**FLANGED ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24"  
Ac c/ANSI B16.47 or MSS SP-44 or upon request

**WAFER ENDS** From 2" to 24" Ac c/ANSI B16.5, upper than 24"  
Ac c/ANSI B16.47 or MSS SP-44 or upon request

**TEST** API-598

**CONSTRUCTION**

- Type of connection: wafer type (including lug wafer type) and flanged.
- Sealing materials:
  - Soft sealing structure
  - Multilayer hard seal structure
  - Elastic ring hard seal structure
- Fireproof butterfly valves
- Low driving moment, easy and quick operation
- Lever
- Manual and operated (gearbox, electric, pneumatic...)
- Other requirements upon request

**MATERIALS** Ac c/ANSI B16.34  
DI, WCB, WCC, WC1, WC6, WC9, C5, C12, LCB, LCC, CF8, CF8M, CF3, CF3M, CF8C, Bronze, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials

**TRIM** 13%Cr, stellite, 304, 304L, 316, 316L, 321, bronze, monel, 4A, 6A, AISI-904L, CK3MCUN, Duplex, Superduplex, exotic materials....

**SEATS** Soft (PTFE, Viton, Neoprene) and Metal to Metal all kind available

**OTHERS** Jacketed, cryogenic services, H.F. services, all kind of operated, all type of painting and coating

#### CLASS 600 DIMENSIONS IN MILIMETERS

ND.	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
L (RF)			180	190	200	210	230	250	270	290	310	330	350	390
L (WF)	45	48	64	64	70	78	102	117	140	155	178			
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
H	179	193	250	340	395	423	445	536	614	674	823	841	978	1069
DO	160	160	250	250	315	315	315	315	400	400	400	400	400	400
WEIGHT (KG.) (RF)			82	125	165	191	247	413	576	664	971	1117	1639	2082
WEIGHT (KG.) (WF)	5	5	5,9	13,6	27	32	54	77	111	200	286			