

Triple Eccentric Metal Seated Butterfly Valves



ACE VALVE



Triple Eccentric Metal Seated Butterfly Valves



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Specification of Triple Eccentric Metal Seated Butterfly Valve

Triple eccentric metal seated butterfly valves are widely used in plants and high pressure piping system.

The metal seat shall be consisted of laminated seat or solid seat.

The valve shall be capable of bi-directional flow bubble tight shut-off at full rated pressure.

TYPE NUMBERING SYSTEM

- AV-TMW Triple Eccentric wafer type metal seated butterfly valves.
- AV-TML Triple Eccentric lug type metal seated butterfly valves.
- AV-TMF Triple Eccentric flange type metal seated butterfly valves.

STANDARD COMPLIANCE

- The face to face dimension shall be in accordance with API 609, ISO 5752, AWWA, BS, JIS, KS.
- Fire safe design shall be in accordance with API607.

PRODUCTION RANGE

- SIZE : DN 50mm (2 inch) ~ DN 3000mm (120 inch)
- WORKING PRESSURE : Up to 300 bar depend on related size
- WORKING TEMPERATURE : -196°C ~ +815°C

APPLICABLE FLANGE

KS/JIS 5K, 10K, 16K, 20K, 30K, 40K, 63K
 ASME B 16.5, 16.47 Class 150LB, 300LB, 600LB, 900LB, 1500LB, 2500LB
 EN 1092 PN6, PN10, PN16, PN25, PN40, PN63
 ISO 7005 PN6, PN10, PN16, PN20, PN25, PN40

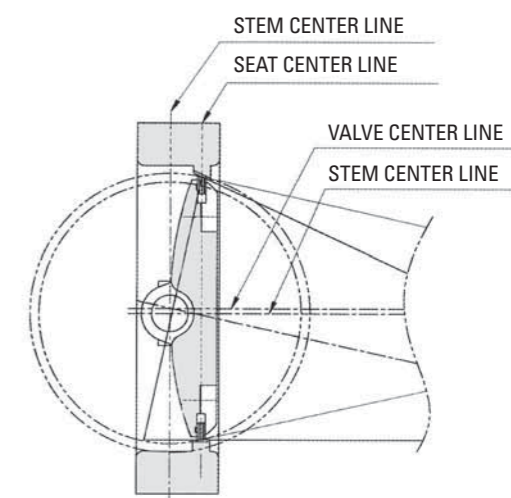


Triple Eccentric Metal Seated Butterfly valves

Triple eccentric design principle

Metal seated high pressure butterfly valves provide bi-directional bubble tight shut off which achieved by introducing state of the triple eccentric disc geometry.

The valve shaft is off set against the seat and the centre line of the valve body respectively. The seating edges are machined with a continuously changing slope from an angle on top of the oval seat ring to an angle at the opposite side. This geometry ensures that the seat ring stays clear of the seat except at the final shut off position which results long life seat.



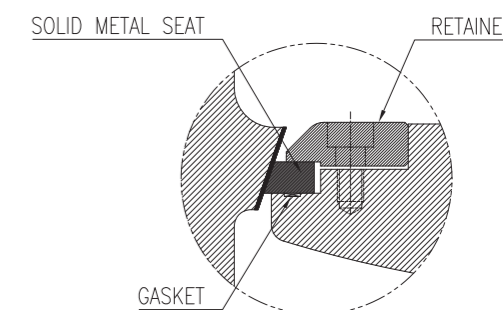
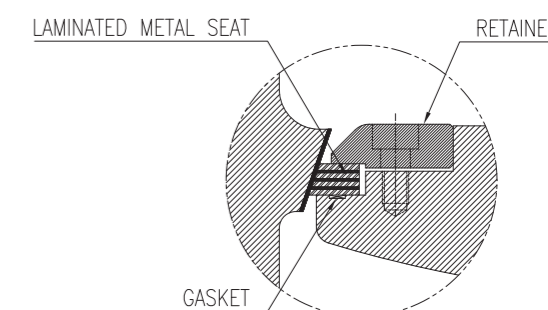
Metal to metal seat

Various disc seals are available to comply with each temperature and pressure service applications. Solid metal seals are often used for temperatures above 510°C and up to 815°C or low temperature service. The laminated metal seal consisted of stainless steel with intermediate material of graphite or ceramic fiber layers is used widely. The laminated seal is secured to the disc with a bolt-on stainless steel clamp ring, and easily accessible for replacement. The graphite laminated seal Ring is suitable for temperatures between -40°C and 650°C in general.

The seal leakage meets API 598 or API 6D.

The solid metal seating valve can be operated in a temperature range of -196°C ~ 815°C.

Valve for cryogenic application shall be provided with extended stem.



Triple Eccentric Metal Seated Butterfly valves

Application

- Petroleum refinery
- Nuclear power plants
- Fossil power plants
- Cryogenic services
- Petrochemical plants
- Exhaust gas line & Steam line
- Fire safe line

Classification by Connection

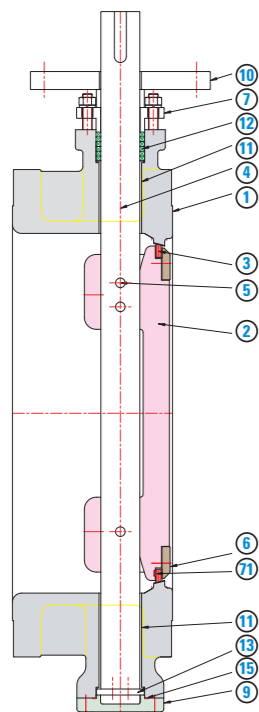
- AV-TMW Series (WAFER) : The valve to be installed with long bolts between the flanges at adjacent pipe without flange on the valve.
- AV-TML Series (LUG) : A pair of thread bolt holes to be provided upper and lower side in order to hold the valve.
- AV-TMF Series (FLANGE) : Both end with complete flange suitable to connect with general pipe flange.

Operations

The various operator of the valve is available depend on the valve location, driving medium and dedicated service of the valve to be provided.

- Manual lever operation
- Manual worm gear operation
- Single or double acting pneumatic actuator operation
- Hydraulic actuator operation
- Electric motor actuator operation

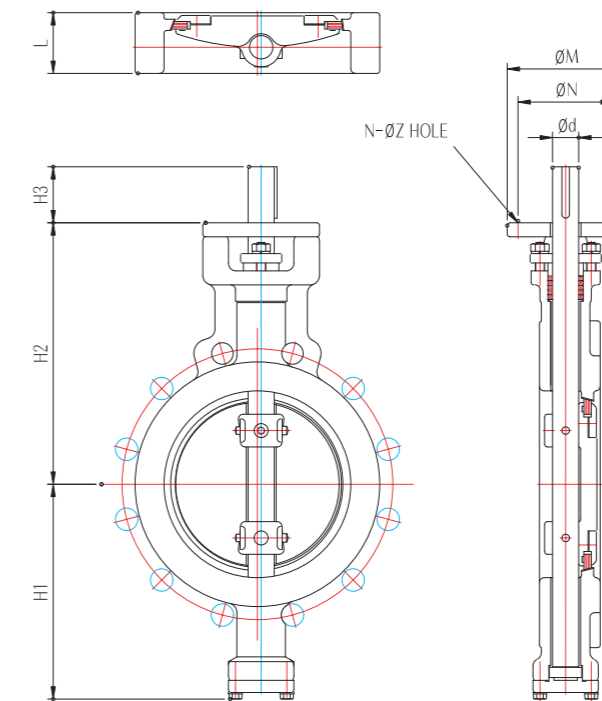
Construction and material



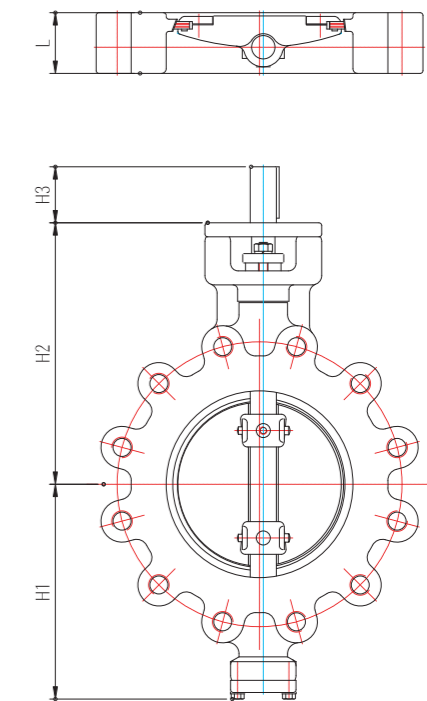
NO.	PART NAME	MATERIAL
1	BODY	CAST STEEL / STAINLESS STEEL NI-AL-BRONZE
2	DISC	CAST STEEL / STAINLESS STEEL NI-AL-BRONZE
3	SEAT	STAINLESS STEEL + GRAPHITE LAMINATED STAINLESS STEEL / MONEL
4	STEM	STAINLESS STEEL / MONEL
5	DISC PIN	STAINLESS STEEL / MONEL
6	RETAINER	CAST STEEL / STAINLESS STEEL NI-AL-BRONZE
7	PACKING GLAND	CAST STEEL / STAINLESS STEEL NI-AL-BRONZE
9	BOTTOM COVER	CAST STEEL / STAINLESS STEEL NI-AL-BRONZE
10	ACTUATOR STAND	CARBON STEEL
11	STEM BEARING	STAINLESS STEEL + TEFLON STAINLESS STEEL / BRONZE
12	PACKING	GRAPHITE
13	THRUST PLATE	STAINLESS STEEL + TEFLON STAINLESS STEEL / BRONZE
15	BOTTOM GASKET	GRAPHITE
71	SEAT GASKET	GRAPHITE

Triple Eccentric Metal Seated Butterfly Valves

CLASS 150LB WAFER TYPE



CLASS 150LB LUG TYPE



VALVE DIMENSIONS

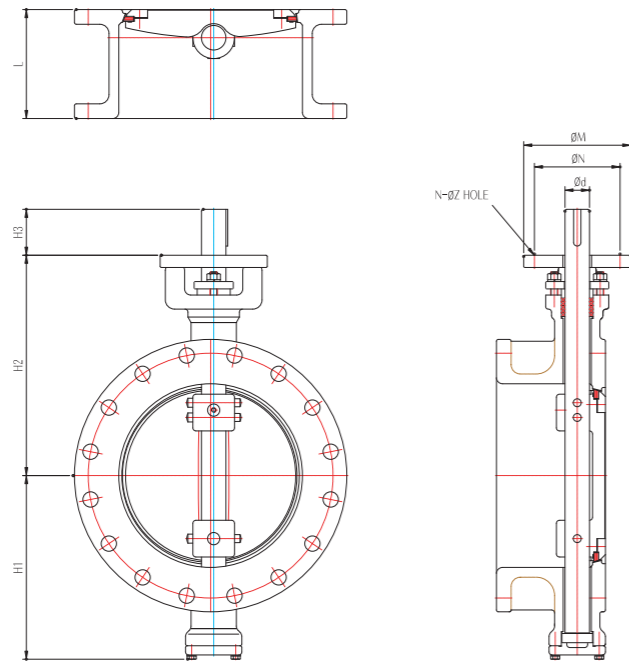
unit : mm

SIZE			L	H1	H2	STEM		TOP FLANGE			
WAFER (inch)	LUG (inch)	mm				KEY		TYPE	ΦN	ΦM	N - ΦZ
			H3	Φd							
2"	2"	50	43	118	170	45	16	F07	70	90	4 - 9
2.5"	2.5"	65	46	129	177	45	16	F07	70	90	4 - 9
3"	3"	80	48	141	185	45	19	F07	70	90	4 - 9
4"	4"	100	54	161	200	45	19	F07	70	90	4 - 9
5"	5"	125	57	187	217	45	22	F07	70	90	4 - 9
6"	6"	150	57	203	240	45	22	F07	70	90	4 - 9
8"	8"	200	64	230	280	60	25	F10	102	125	4 - 12
10"	10"	250	71	270	320	60	32	F10	102	125	4 - 12
12"	12"	300	81	308	360	75	40	F14	140	175	4 - 18
14"	14"	350	92	340	390	75	40	F14	140	175	4 - 18
16"	16"	400	102	381	445	75	45	F14	140	175	4 - 18
18"	18"	450	114	407	490	100	50	F16	165	210	4 - 22
20"	20"	500	127	444	500	100	55	F16	165	210	4 - 22
22"	22"	550	154	484	530	100	65	F25	254	300	8 - 18
24"	24"	600	154	509	570	100	65	F25	254	300	8 - 18
	26"	650	210	545	645	120	85	F30	298	350	8 - 23
	28"	700	229	570	651	120	95	F30	298	350	8 - 23
	30"	750	230	600	684	120	100	F30	298	350	8 - 23
	32"	800	241	645	740	120	110	F30	298	350	8 - 23
	36"	900	241	699	769	150	120	F35	356	415	8 - 33
	40"	1000	300	770	870	150	140	F35	356	415	8 - 33
	44"	1100	350	835	930	150	160	F40	406	475	8 - 39
48"	1200	350	898	995	220	180	F48	483	560	12 - 39	

※ The flange dimension shall be conformed to ASME 150LB, KS/JIS 5K/10K/16K, BS PN6/PN10/PN16, DIN PN6/PN10/PN16, ISO PN6/PN10/PN16 respectively.

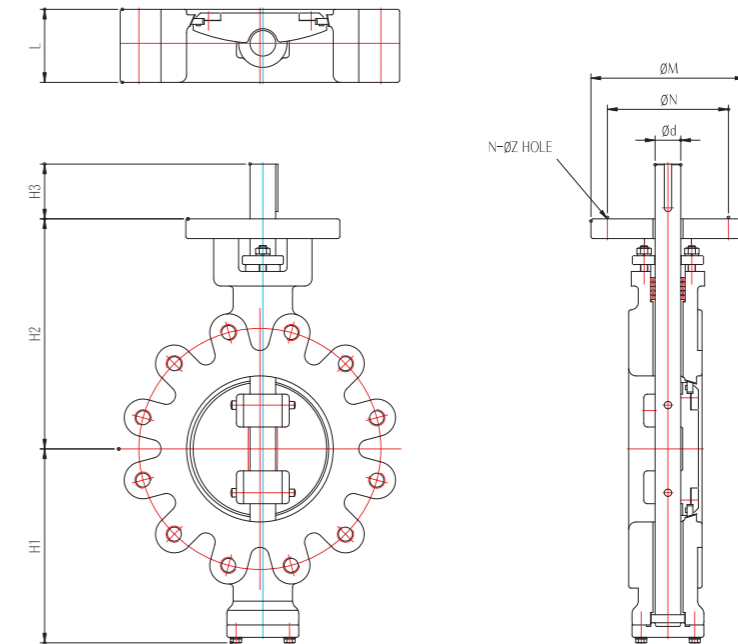
Triple Eccentric Metal Seated Butterfly Valves

CLASS 150LB FLANGE TYPE



Triple Eccentric Metal Seated Butterfly Valves

CLASS 300LB LUG TYPE



VALVE DIMENSIONS

unit : mm

SIZE		L	H1	H2	STEM KEY		TOP FLANGE			
inch	mm				H3	Ød	TYPE	ΦN	ΦM	N - ΦZ
2"	50	108	118	170	45	16	F07	70	90	4 - 9
2.5"	65	112	129	177	45	16	F07	70	90	4 - 9
3"	80	114	141	185	45	19	F07	70	90	4 - 9
4"	100	127	161	200	45	19	F07	70	90	4 - 9
5"	125	140	187	217	45	22	F07	70	90	4 - 9
6"	150	140	203	240	45	22	F07	70	90	4 - 9
8"	200	152	230	280	60	25	F10	102	125	4 - 12
10"	250	165	270	320	60	32	F10	102	125	4 - 12
12"	300	178	308	360	75	40	F14	140	175	4 - 18
14"	350	190	340	390	75	40	F14	140	175	4 - 18
16"	400	216	381	445	75	45	F14	140	175	4 - 18
18"	450	222	407	490	100	50	F16	165	210	4 - 22
20"	500	229	444	500	100	55	F16	165	210	4 - 22
24"	600	267	509	570	100	65	F25	254	300	8 - 18
26"	650	292	545	645	120	85	F30	298	350	8 - 23
28"	700	292	570	651	120	95	F30	298	350	8 - 23
30"	750	318	600	684	120	100	F30	298	350	8 - 23
32"	800	318	645	740	120	110	F30	298	350	8 - 23
36"	900	330	699	769	150	120	F35	356	415	8 - 33
40"	1000	410	770	870	150	140	F35	356	415	8 - 33
44"	1100	470	835	930	150	160	F40	406	475	8 - 39
48"	1200	470	898	995	220	180	F48	483	560	12 - 39
54"	1350	470	1050	1200	220	190	F48	483	560	12 - 39
60"	1500	530	1105	1310	260	190	F60	603	686	20 - 39
72"	1800	670	1270	1315	260	220	F60	603	686	20 - 39
80"	2000	760	1340	1450	260	230	F60	603	686	20 - 39
96"	2400	760	1622	1950	280	280	F60	603	686	20 - 39
120"	3000	760	2005	2225	350	340	F60	603	686	20 - 39

※ The flange dimension shall be conformed to ASME 150LB, KS/JIS 5K/10K/16K, BS PN6/PN10/PN16, DIN PN6/PN10/PN16, ISO PN6/PN10/PN16 respectively.

VALVE DIMENSIONS

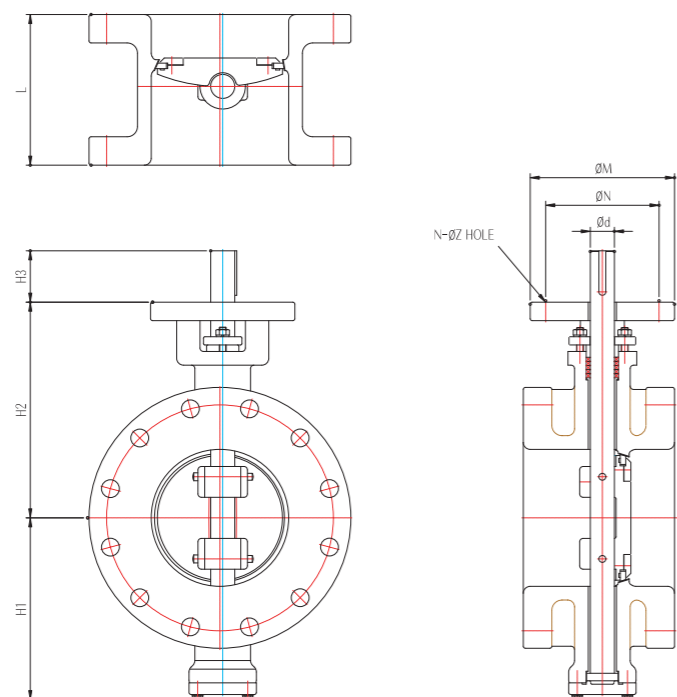
unit : mm

SIZE		L	H1	H2	STEM KEY		TOP FLANGE			
inch	mm				H3	Ød	TYPE	ΦN	ΦM	N - ΦZ
3"	80	48	151	191	45	22	F07	70	90	4 - 9
4"	100	54	176	215	45	22	F07	70	90	4 - 9
5"	125	57	191	228	45	22	F07	70	90	4 - 9
6"	150	59	223	252	60	25	F10	102	125	4 - 12
8"	200	73	251	305	75	35	F16	165	210	4 - 22
10"	250	83	290	350	75	45	F16	165	210	4 - 22
12"	300	92	340	380	100	55	F25	254	300	8 - 18
14"	350	117	365	406	100	60	F25	254	300	8 - 18
16"	400	133	415	486	100	70	F25	254	300	8 - 18
18"	450	149	445	525	120	75	F30	298	350	8 - 23
20"	500	159	473	585	120	90	F30	298	350	8 - 23
22"	550	171	490	610	120	100	F30	298	350	8 - 23
24"	600	181	550	657	150	110	F35	356	415	8 - 33
26"	650	210	579	680	150	110	F35	356	415	8 - 33
28"	700	229	632	728	180	120	F40	406	475	8 - 39
30"	750	230	659	756	180	135	F40	406	475	8 - 39
32"	800	241	700	800	180	140	F40	406	475	8 - 39
34"	850	241	730	840	180	140	F40	406	475	8 - 39
36"	900	241	770	885	220	150	F48	483	560	12 - 39
40"	1000	300	800	915	220	170	F48	483	560	12 - 39
44"	1100	350	840	980	260	200	F60	603	686	20 - 39
48"	1200	350	900	1030	260	220	F60	603	686	20 - 39

※ The flange dimension shall be conformed to ASME 300LB, KS/JIS 20K, BS PN25, DIN PN20/PN25, ISO PN25 respectively.

Triple Eccentric Metal Seated Butterfly Valves

CLASS 300LB FLANGE TYPE



VALVE DIMENSIONS

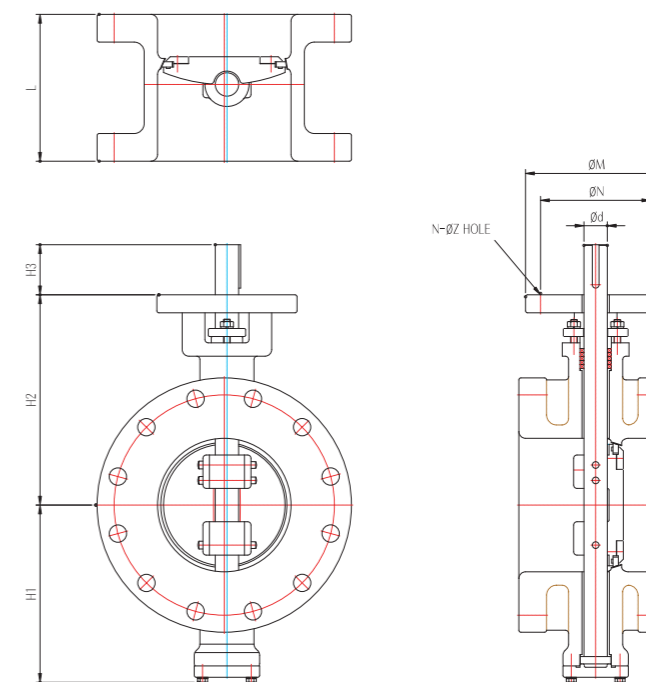
unit : mm

SIZE		L	H1	H2	STEM KEY		TOP FLANGE			
inch	mm				H3	Ød	TYPE	ΦN	ΦM	N - ΦZ
3"	80	180	151	191	45	22	F07	70	90	4 - 9
4"	100	190	176	215	45	22	F07	70	90	4 - 9
5"	125	210	191	228	45	22	F07	70	90	4 - 9
6"	150	210	223	252	60	25	F10	102	125	4 - 12
8"	200	230	251	305	75	35	F16	165	210	4 - 22
10"	250	250	290	350	75	45	F16	165	210	4 - 22
12"	300	270	340	380	100	55	F25	254	300	8 - 18
14"	350	290	365	406	100	60	F25	254	300	8 - 18
16"	400	310	415	486	100	70	F25	254	300	8 - 18
18"	450	330	445	525	120	75	F30	298	350	8 - 23
20"	500	350	473	585	120	90	F30	298	350	8 - 23
22"	550	390	490	610	120	100	F30	298	350	8 - 23
24"	600	390	550	657	150	110	F35	356	415	8 - 33
26"	650	410	579	680	150	110	F35	356	415	8 - 33
28"	700	430	632	728	180	120	F40	406	475	8 - 39
30"	750	450	659	756	180	135	F40	406	475	8 - 39
32"	800	470	700	800	180	140	F40	406	475	8 - 39
36"	900	510	770	885	220	150	F48	483	560	12 - 39
40"	1000	550	800	915	220	170	F48	483	560	12 - 39
48"	1200	630	900	1030	260	220	F60	603	686	20 - 39
52"	1300	650	939	1199	260	230	F60	603	686	20 - 39
54"	1350	670	940	1200	260	240	F60	603	686	20 - 39
56"	1400	710	970	1250	260	240	F60	603	686	20 - 39
60"	1500	790	1081	1342	260	260	F60	603	686	20 - 39
80"	2000	950	1430	1600	260	320	F60	603	686	20 - 39
96"	2400	1100	1622	1950	280	340	F60	603	686	20 - 39
120"	3000	1200	2005	2225	350	400	F60	603	686	20 - 39

※ The flange dimension shall be conformed to ASME 300LB, KS/JIS 20K, BS PN25, DIN PN20/PN25, ISO PN25 respectively.

Triple Eccentric Metal Seated Butterfly Valves

CLASS 600LB FLANGE TYPE



VALVE DIMENSIONS

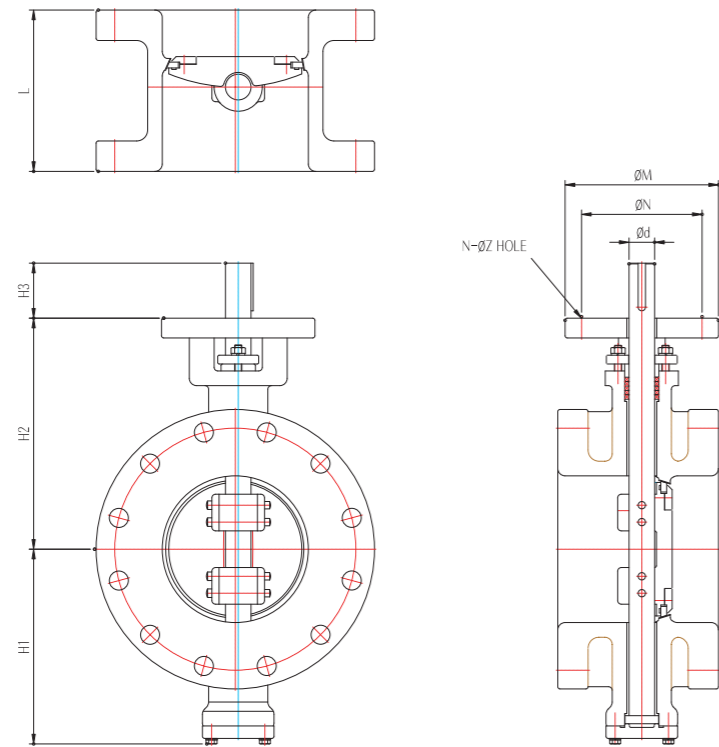
unit : mm

SIZE		L	H1	H2	STEM KEY		TOP FLANGE			
inch	mm				H3	Ød	TYPE	ΦN	ΦM	N - ΦZ
4"	100	190	212	257	100	28	F16	165	210	4-22
5"	125	210	240	300	100	30	F16	165	210	4-22
6"	150	210	280	330	100	35	F16	165	210	4-22
8"	200	230	308	347	100	45	F25	254	300	8-18
10"	250	250	355	420	120	55	F30	298	350	8-23
12"	300	270	385	450	120	65	F30	298	350	8-23
14"	350	290	425	490	120	75	F30	298	350	8-23
16"	400	310	480	510	150	80	F35	356	415	8-33
18"	450	330	520	610	150	100	F35	356	415	8-33
20"	500	350	552	655	150	110	F35	356	415	8-33
24"	600	390	600	730	220	110	F35	356	415	8-33
28"	700	610	660	760	220	150	F48	483	560	12-39
30"	750	610	690	795	220	150	F48	483	560	12-39
32"	800	660	740	820	220	170	F48	483	560	12-39
36"	900	711	780	870	260	180	F60	603	686	20-39
40"	1000	811	840	930	260	220	F60	603	686	20-39
48"	1200	900	1020	1240	280	270	F60	603	686	20-39
52"	1300	960	1120	1350	330	300	F60	603	686	20-39
54"	1350	980	1170	1420	350	310	F60	603	686	20-39
56"	1400	1020	1200	1480	380	320	F80	800	1000	20-45
60"	1500	1080	1340	1605	380	350	F80	800	1000	20-45
80"	2000	1400	1690	1890	450	450	F80	800	1000	20-45

※ The flange dimension shall be conformed to ASME 600LB, KS/JIS 40K, BS PN40, DIN PN40, ISO PN40/PN50 respectively.

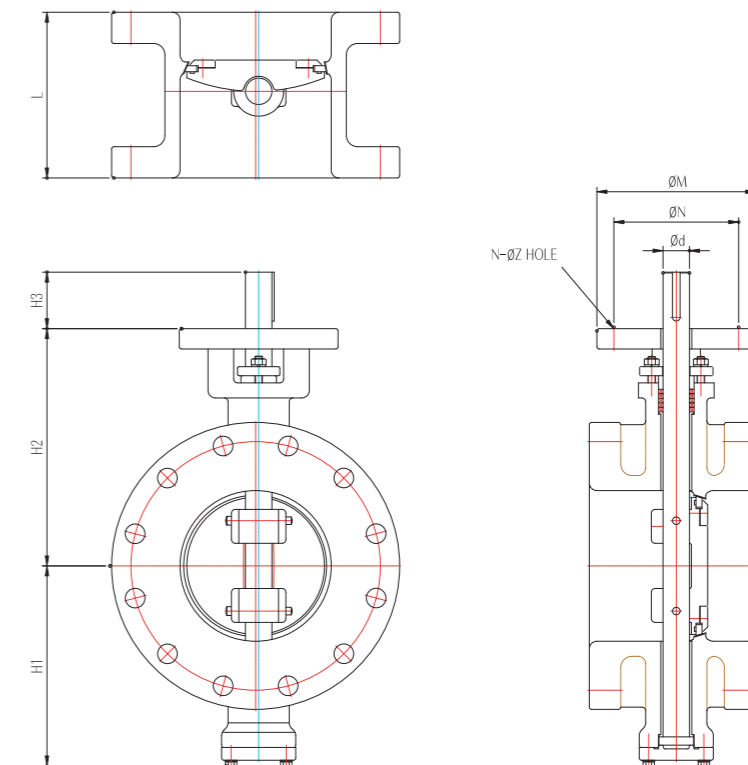
Triple Eccentric Metal Seated Butterfly Valves

CLASS 900LB FLANGE TYPE



Triple Eccentric Metal Seated Butterfly Valves

CLASS 1500LB FLANGE TYPE



VALVE DIMENSIONS

unit : mm

SIZE		L	H1	H2	STEM		TOP FLANGE			
inch	mm				KEY		TYPE	ΦN	ΦM	N - ΦZ
					H3	Φd				
4"	100	200	210	250	75	30	F16	165	210	4-22
8"	200	310	290	390	100	45	F25	254	300	8-18
10"	250	350	370	450	100	55	F25	254	300	8-18
12"	300	380	400	475	120	65	F30	298	350	8-23
14"	350	400	430	515	150	80	F35	356	415	8-33
16"	400	410	470	610	180	95	F40	406	475	8-39
18"	450	460	545	660	180	110	F40	406	475	8-39
20"	500	490	560	685	180	130	F40	406	475	8-39
24"	600	620	670	790	220	150	F48	483	560	12-39
28"	700	650	705	809	260	190	F60	603	686	20-39
30"	750	700	730	843	260	210	F60	603	686	20-39
32"	800	750	792	877	260	230	F60	603	686	20-39
36"	900	850	834	919	260	260	F60	603	686	20-39
40"	1000	950	907	1013	260	290	F60	603	686	20-39

※ The flange dimension shall be conformed to ASME 900LB, DIN PN100, ISO PN100 respectively.

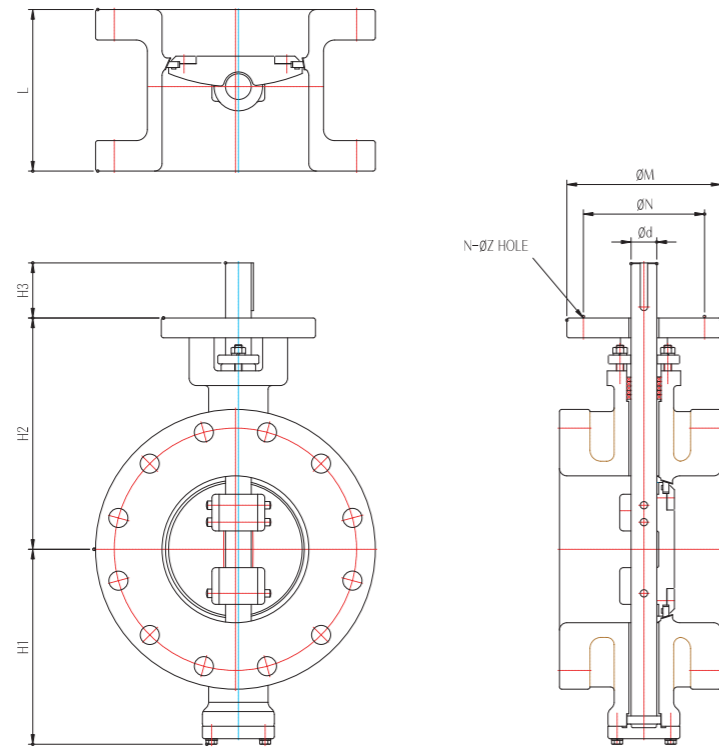
VALVE DIMENSIONS

unit : mm

SIZE		L	H1	H2	STEM		TOP FLANGE			
inch	mm				KEY		TYPE	ΦN	ΦM	N - ΦZ
					H3	Φd				
4"	100	260	240	285	75	30	F16	165	210	4-22
6"	150	300	290	360	75	40	F16	165	210	4-22
8"	200	380	345	430	75	50	F25	254	300	8-18
10"	250	460	470	490	120	70	F30	298	350	8-23
12"	300	540	500	530	120	70	F30	298	350	8-23
14"	350	581	565	610	180	100	F40	406	475	8-39
16"	400	640	610	680	180	120	F40	406	475	8-39
18"	450	710	660	770	180	140	F40	406	475	8-39
20"	500	780	730	830	220	150	F48	483	560	12-39
24"	600	890	850	980	260	170	F60	603	686	20-39

Triple Eccentric Metal Seated Butterfly Valves

CLASS 2500LB FLANGE TYPE

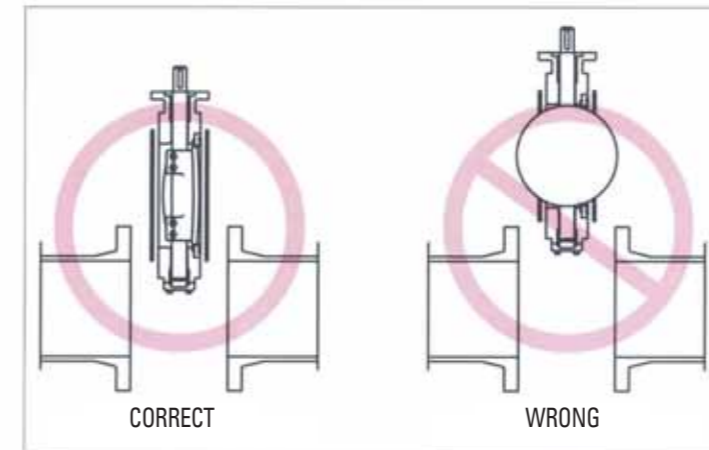


VALVE DIMENSIONS

unit : mm

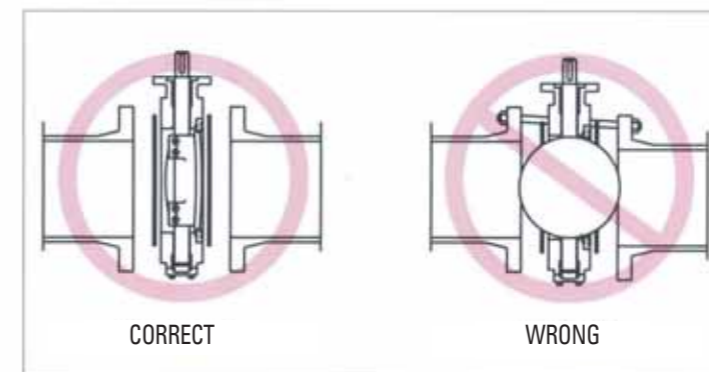
SIZE		L	H1	H2	STEM		TOP FLANGE			
inch	mm				KEY		TYPE	ΦN	ΦM	N - ΦZ
					H3	Φd				
4"	100	350	300	350	70	35	F16	165	210	4-22
6"	150	500	350	430	70	45	F16	165	210	4-22
8"	200	540	400	500	75	60	F25	254	300	8-18
10"	250	560	530	560	150	75	F35	356	415	8-33
12"	300	590	555	600	150	75	F35	356	415	8-33
14"	350	660	625	700	200	100	F48	483	560	12-39
16"	400	740	680	770	200	130	F48	483	560	12-39
18"	450	820	730	860	220	160	F60	603	686	20-39
20"	500	900	800	920	220	170	F60	603	686	20-39
24"	600	1000	920	1060	250	200	F60	603	686	20-39

How to Install Butterfly Valve



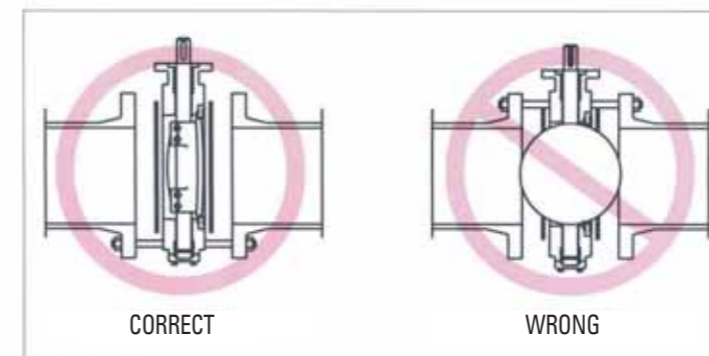
Centering & Flanging of Valve

- Spread both flanges enough to allow the valve with disc in semi-closed position.
- This prevents the damage of disc and seat during installation.



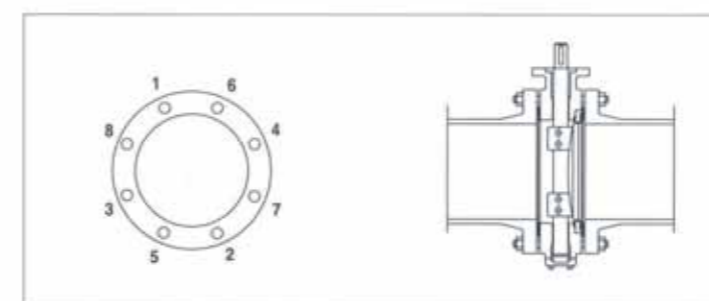
Aligning of Flange Gaskets

- Flange gaskets should be positioned aligned with valve bore.
- Pipe misalignment may cause interference between disc edge and flange face, creating leakage and excessive torque to open valve.



Aligning of Flange bolts

- Insert bolts through the two bottom pipe flange holes to rest valves on during installation.
- Disc should be in full open position after flange alignment and before evenly tightening flange bolts.



Bolts Tightening

- Disc in fully closed position may causes seat distortion and excessive torque in initial operation.
- Tighten the flange bolts evenly to prevent the leakage between flange and valve.

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