

Mapag® BO series butterfly valve for recovery of oxygen in Vacuum Pressure Swing adsorption (VPSA) Plants

Metso's Mapag BO series butterfly valve is designed for use in vacuum Pressure Swing Adsorption plants (VPSA), under extreme demanding conditions due to the high cycle and high tightness requirement. The series BO valve is a wafer type, soft seated, high performance, single eccentric disc valve. The valve is designed to last huge amounts of fast cycles, maintaining the internal tightness.

Additionally it provides long lasting tight shut off with excellent flow characteristics and high capacity. The BO series fulfils the requirements of both ASME and EN/DIN standards.

Series BO valve is field proven and the maintenance capabilities of the valve are be tuned to the top. The valve, combined to Metso smart valve controller together with easy access online diagnostic capabilities ensures a secure operation and a fast maintenance operation during plant shutdowns.



Features and benefits

Fast operation

The shut - off disc is made of aluminium to minimize the disc inertia and to give the valve extremely short opening and closing times.

The optimized aluminum disc design minimizes the disc inertia and gives the valve extremely short opening and closing times.

Reliable construction

The connection of the disc and drive shaft is secured with an innovative stainless steel bushing design, giving a reliable torque transfer from the shaft to the disc. The light aluminum disc is hard anodized to withstand also aggressive environment.

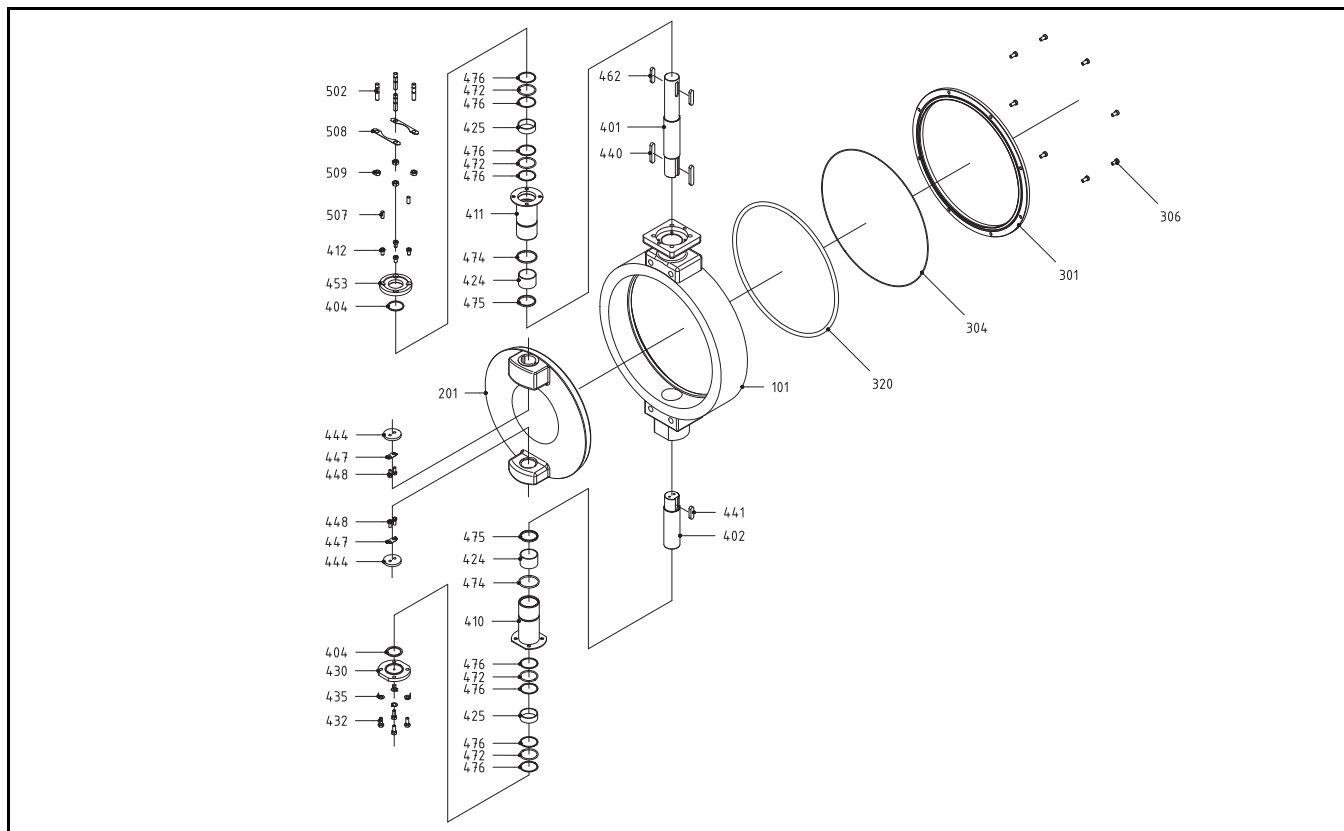
This type of coating is suitable for flow media e.g. in a molecular sieve applications where dust and catalyst particles can generate problems.

Shaft and drive shaft design

The Series BO butterfly valve has a two piece shaft design which gives a high flow coefficient. Both shafts have two pairs of bearings. The axial bearings ensure the correct alignment of the disc. The axial bearings are located at the bottom and top of the valve body and protected from the flow media.

High safety factor has been included to bearing design. The bearing bushings are open to the outside at both ends, giving a pressure balance preventing any axial forces on the butterfly valve. The three independent seals on the bottom and drive shaft protect the valve against emissions. The first seal protects the bearings and the O-rings from solid particles. The other two seals provide the actual seal. Live-loaded gland packing is available as an optional feature to both ends of the valve.

EXPLODED VIEW



PARTS LIST

Part No.	Qty.	Description	Material	Spare part
101	1	Body	Carbon Steel	
201	1	Disc	Aluminium hard coated	3
301	1	Sealing Ring	Stainless Steel	3
304	1	O-ring seal	FKM	1
306	8	Cylinder head screw	Stainless Steel	
320	1	Seat	FKM	2
401	1	Drive shaft	Stainless Steel	3
402	1	Shaft	Stainless Steel	3
404	2	Thrust bearing	Metal + PTFE coating	1
410	1	Bearing bushing	Stainless Steel	3
411	1	Bearing bushing	Stainless Steel	3
412	8	Cylinder head screw	Stainless Steel	
424	1	Bearing	Metal + PTFE coating	1
425	1	Bearing	Metal + PTFE coating	1
430	1	Cover	Stainless Steel	
432	4	Hexagon screw	Stainless Steel	
435	4	Wascher, Retaining plate	Stainless Steel	
440	2	Key	Stainless Steel	3
441	1	Key	Stainless Steel	3
444	2	Clamping disc	Stainless Steel	3
447	2	Lock Washer, Retaining plate	Stainless Steel	3
448	4	Hexagon screw	Stainless Steel	3
453	1	Packing Gland, Flange	Stainless Steel	
462	2	Key	Stainless Steel	3
472	4	O-ring packing	FKM	1
474	2	O-ring packing	FKM	1
475	2	Sealing	PTFE	1
476	8	Bearing protection, Back up ring	PTFE	1
502	4	Hexagon head screw	Stainless Steel	
507	2	Pin	Stainless Steel	
508	2	Retaining plate	Stainless Steel	
509	4	Hexagon nut	Stainless Steel	

1&2) Maintenance after 750 000 cycles or every 1 year
 3) maintenance after 1500 000 cycles or every 2 year

TECHNICAL SPECIFICATION

Product type

High performance wafer type butterfly valve with a single eccentric disc

Valve ratings

Class 150 with 2 bar disc
PN 10, PN16 with 2 bar disc

Design standards and face to face

- AD2000
- EN 558 - / series 25 (e.g. ASME B16.10 table 9) size ≤ DN 600 (24")
- EN 558 - / series 20 (e.g. ASME B16.10 table 9) size > DN 600 (24")

Sizes and end connection types

ASME cl. 150 valves are available in sizes 8"-24" (DN 80-600).
PN10 valves are available in sizes DN 80-600 (8"-24").
PN16 valves are available in sizes DN 80-600 (8"-24").

Flanges:

- ASME B16.5 for 8"-24" (DN 80-600) valves
- ASME B16.47 series A for 28"-40" (DN 700-1000) valves
- DIN 2501, PN10, PN16

Standard materials

Body: EN 10213-1.0619 / ASTM A 216 gr. WCB
Disc: EN 10088-aluminium / ASTM A Aluminium + hard anodization
Shafts and pins: AISI 329-1.4418 / ASTM A 546 gr. 630 (17-4PH)
Seat: FKM

Inherent flow characteristic

Standard: Equal percentage

Shut-off classifications

- API 598
- ANSI Class VI (air)
- ISO 5208, rate B (air)

Temperature range

- 10° to + 200 °C

Safety features

- Fugitive emission control with O-ring seal
- Rugged single piece body eliminates potential leak paths associated with multiple piece bodies.
- Anti-blow out shaft.

Flow data

Size DN/inch	PN10, PN16, ANSI cl. 150	
	Cv 90°	KV 90°
100/4"	400	460
150/6"	1180	1360
200/8"	2730	3150
250/10"	4960	5730
300/12"	8300	9570
350/14"	11170	12890
400/16"	14850	17140
450/18"	19060	21990
500/20"	23300	26890
600/24"	34230	39500
700/28"	39470	45540
750/30"	45890	52950
750/30"	53090	61260
800/32"	60030	69260
900/36"	76940	88780
1000/40"	94570	109120

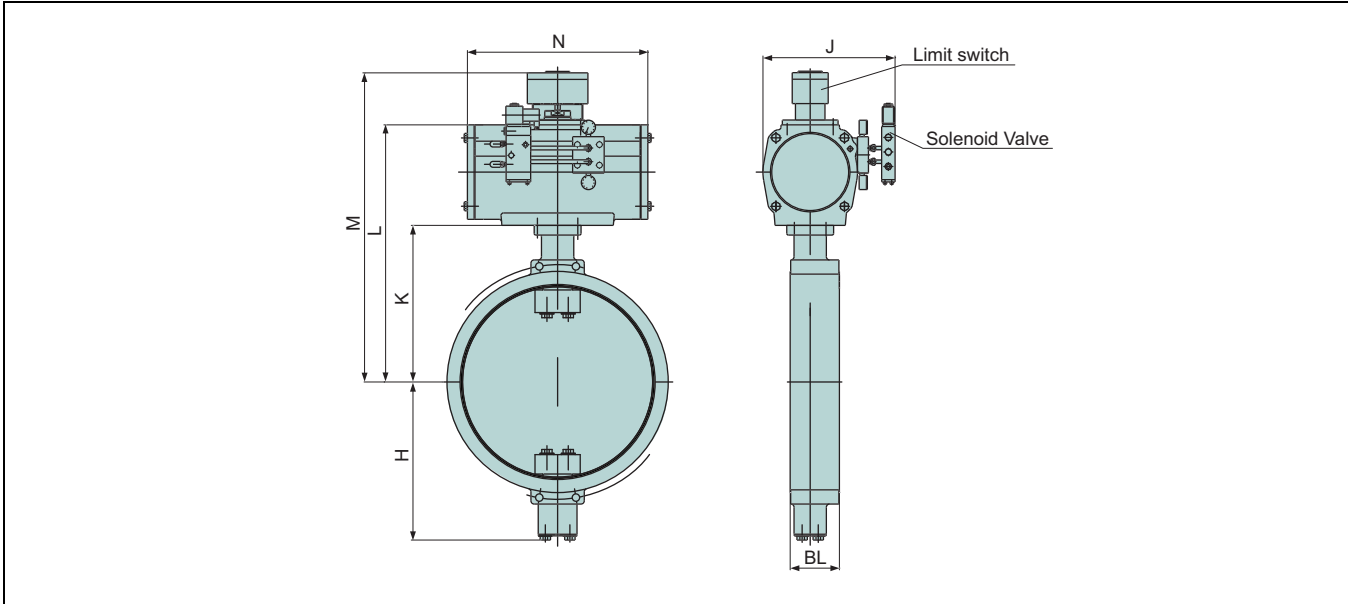
Table 1: Flow coefficients of series BO Metso single eccentric valves.

Actuator selection

DIN PN 10, PN16 / ASME 150		Max Shut off pressure, bar	Mounting face	A, on-off	B1C on-off
Size DN/inch	*)Dp 70° in control bar			Supply air, 5 bar	Supply air, 5 bar
200/8"	1,0	2	F10	A60-K	B1CU11
250/10"	1,0	2	F10	A60-K	B1CU11
300/12"	1,0	2	F10	A60-K	B1CU11
350/14"	1,0	2	F12	A120-K	B1CU13
400/16"	1,0	2	F12	A120-K	B1CU13
450/18"	1,0	2	F12	A120-K	B1CU13
500/20"	0,5	2	F12	A120-K	B1CU13
600/24"	0,5	2	F14	A250-K	B1CU17
700/28"	0,5	2	F16	A500-K	B1CU20
750/30"	0,5	2	F16	A500-K	B1CU20
800/32"	0,2	2	F16	A500-K	B1CU25
900/36"	0,2	2	F16	A500-K	B1CU25
1000/40"	0,2	2	F16	A500-K	B1CU25

Table 2: Actuator selection with mounting face.

DIMENSIONS



Type BO + A, DN 80 – 1000

Size DN/inch	Actuator	Main dimensions									Weight	
		BL	H	K	L	N	B	C	J	M	Actuator kg	Valve kg
200/8"	A60-K	71	250	245	435	300	170	85	320	885	16	28
250/10"	A60-K	76	265	260	450	300	170	85	320	915	16	34
300/12"	A60-K	83	290	285	475	300	170	85	320	965	16	49
350/14"	A120-K	92	325	330	570	390	195	120	345	1095	28	58
400/16"	A120-K	102	355	350	590	390	195	120	345	1145	28	72
450/18"	A120-K	114	385	380	620	390	195	120	345	1205	28	108
500/20"	A120-K	127	405	400	640	390	195	120	345	1245	29	134
600/24"	A250-K	154	490	485	795	430	260	155	410	1485	51	187
700/28"	A500-K	165	545	535	880	595	290	175	490	1625	100	262
750/30"	A500-K	190	570	560	905	595	290	175	490	1675	100	310
800/32"	A500-K	190	585	580	925	595	290	175	490	1710	100	360
900/36"	A500-K	203	655	650	1075	750	400	215	600	1930	100	460
1000/40"	A500-K	216	725	720	1145	750	400	215	600	2070	100	620

HOW TO ORDER

Series BO single eccentric disc valve, EN/DIN and ASME rated

1	2	3	4	5	6	7
BO	C	200	A	A	/	-

1. sign	PRODUCT SERIES / DESIGN
BO	Standard/High temperature valve, single excentric available as Wafer, soft seated MAPAG butterfly valve, 4 bearings, two pcs shaft

4. sign	BODY PRESSURE RATING
C	ASME class 150
J, K	PN10, PN16

5. sign	SEAT DESIGN
1	O-ring type

6. sign	BEARING AND BODY DESIGN
A	4 bearings soft bearings, PTFE on metal net Tmax 250°C, trim rating max 2 bar Not NACE

7. sign	SIZE (ASME rating = inches / PN rating = mm)
BO	Inch: 08, 10, 12, 14, 16, 18, 20, 24, 28, 30, 32, 36, 38, 40 Metric: 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000

11. sign	SEAT MATERIAL
A	FKM (disc hard anodized) T = -10 °C ... + 200 °C

12. sign	PACKING CONSTRUCTION
T	Double O-ring packing

13. sign	SURFACE FINISH FOR JOINTING FACE
-	Ra 3.2 - 6.3, standard, without sign cover: EN 1092-1 Type B1 (Ra 3.2 - 12.5) ASME B16.5, Ra 3.2 - 6.3 (125 - 250 µin) DIN 2526 Form E (Ra 4)

Subject to change without prior notice.

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