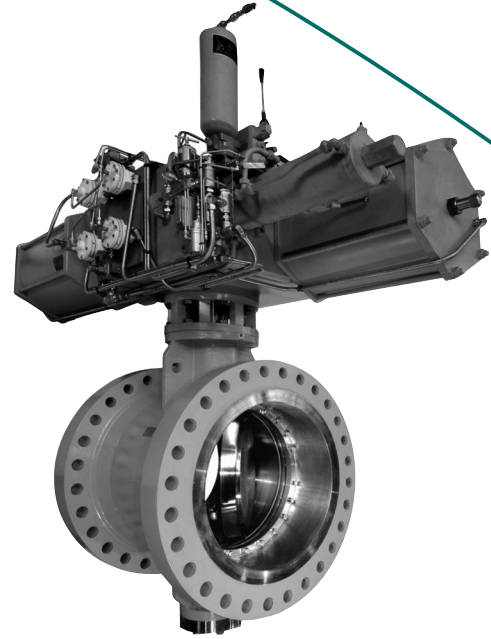


METSO MAPAG HIGH PERFORMANCE TRIPLE ECCENTRIC DISC VALVE, METAL SEATED SERIES BW

Mapag BW series metal seated triple eccentric disc valve with one piece body design, for both control and tight shut-off applications. Multiple body options makes it particularly well suited for the refining, power, petrochemical and chemical industries.

The BW incorporates the Mapag triple offset metal seated design, which provides extended operational life in control, tight shut-off, high cycle, high temperature and abrasive applications. Full rating from ASME 900 to 2500 makes the BW a sound control or shut-off valve in severe service applications.



Excellent on-off capabilities

- Uniquely functioning full metal seat design assures tightness over long time periods.
- Contact between disc and seat is mechanically induced and does not rely on assistance from differential pressure.
- Bi-directional long term tightness is maintained even in high cycle rate services. Tightness is not compromised by large thermal cycling either.
- Low friction and excellent wear resistance.
- Lowered operational torque reduces actuator size
- Heavy-duty stem and ingenious bearings design extends service life and is insensitive to thermal cycles and impurities.

Excellent flow control capabilities

- Good controllability via smoothly rising installed characteristic curve at both very small openings and nearly full Cv positions. Series BW provides very wide rangeability in fairly low pressure drop services.
- Good dynamic stability in both flow directions.
- Available with a variety of actuators, positioners and accessories for single source responsibility. Mounting face according to ISO 5211.

Abrasion resistant construction

- Solid, sturdy all metal seat design is based on metal-to-metal contact. No resilient parts are needed for seating.

Low emissions

- The live loaded gland packing is located right after the outer bearing maximizing the tightness. The emissions are well below the international standards.
- Furthermore, there are no resilient parts exposed to the medium.

Extremely wide pressure and temperature range

- Differential pressure/temperature ratings in accordance with ASME B16.34.
- Extremely wide temperature range up to +1150°C / +2100 °F.

Low cost of ownership

- Extremely high cycle life minimizes the need for maintenance, and increases Mean Time Between Failure (MTBF) value.
- Interchangeable seat can be replaced without disassembling the disc and shaft. Seat replacement does not require any adjustment or special tools.

Certified emission and fire safe performance

- Emission certified according to industry standard, ISO 15848-1 class B in shut-off applications.
- Fire safe certification according to API 607, 6th edition

Certified safety performance

- SIL certification to meet IEC61508 requirements
- Capable to SIL 3 level

Applications

The BW series butterfly valve is suitable for the following industries and applications.

Industry:	Application:
Chemical	Process, tail gas, waste water Flue gas, styrene, acrylic acid
Refinery	Flammable media, process, gas
Off-shore	Flammable media, process, gas
Steel	Gas and crude gas
Gas	Natural gas, sour gas
Nuclear power	Steam, gas, water
Conventional power	Steam, gas, water

Special features

Mapag has provided solutions for special applications including, but not limiting to following examples:

- Valve with heating jacket together with purging
- Valve with double sealing element
- Double block and bleed applications (DBB)
- Flashing and purging of the sealing elements and bearings
- Solid proof design including protection for bearings and sealing element
- Live-loading with seal gas connection

Emergency shut-down design (ESD) for safety applications

TECHNICAL SPECIFICATIONS

Valve ratings

- ASME 600, 900, 1500 and 2500
- EN/DIN PN100, PN150, PN250, PN400
- ISO ISO PN50, ISO PN PN100, PN150, PN250, PN400

Engineering standards

In accordance with ASME B16.34 and the valve meets the requirements of the European Directive 97/23/EC relating to pressure equipment directive (PED).

Sizes and end connection types

- ASME cl. 150 to 600 available on special request
- ASME cl. 900 is available in sizes 6" - 24".
- ASME cl. 1500 is available in sizes 6"-24".
- ASME cl. 2500 is available in sizes 6"-18".
- Other sizes on request

Inherent flow characteristic

Standard: Equal percentage

Standard shut-off classifications

- Standard tightness:
- API 598 (metal seated)
 - ANSI Class V
 - ISO 5208, rate D

Optional tightness

- ANSI Class VI (air)
- ISO 5208, rate B (air)
- ISO 5208, rate A (air) unidirection

Safety features

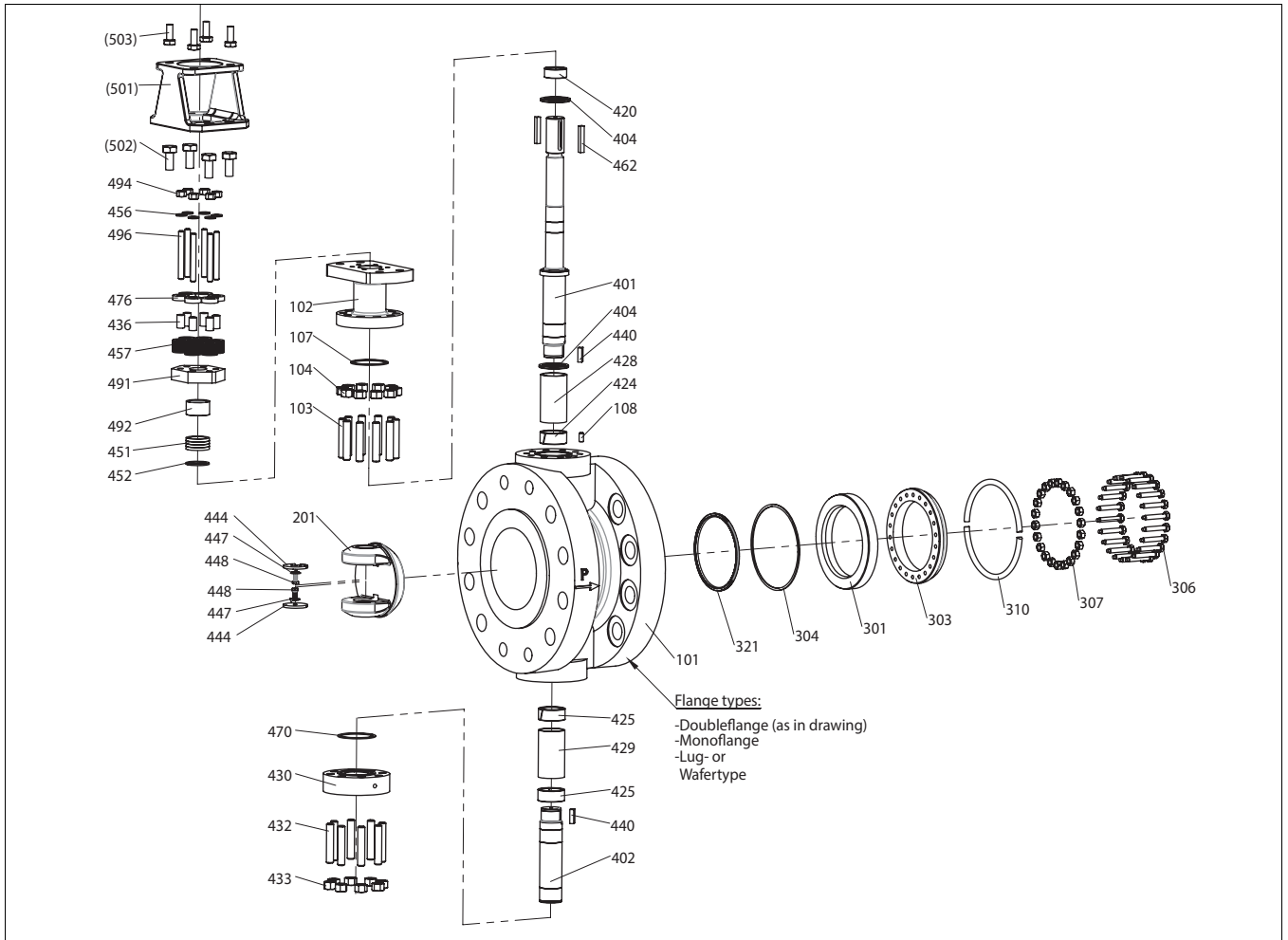
- Fire-tested per API 607, 6th edition
- Fugitive emission control with live loaded stem sealing as standard, ISO 15848, TA-Luft/VDI 2440 and Shell 77/312
- Rugged single piece body eliminates potential leak paths associated with jointed bodies
- Positive shaft blow-out prevention
- Quadruple bearing construction eliminates jamming

Flow Data

Cv [gal/min] at 90°, Carbon steel valves									
Body-trim	150	200	250	300	350	400	450	500	600
rating	06	08	10	12	14	16	18	20	24
0900_0300	612	1451	2869	4515	5670	7593	10420	12698	18973
0900_0600	422	1075	2329	3561	4608	6039	8773	10787	16492
0900_0900	345	936	1962	2819	4033	5460	7618	8814	13589
1500_0300	521	1164	2533	3981	5094	6860	9837	10499	17026
1500_0600	417	982	2010	3388	4444	5845	8233	8884	13797
1500_0900	364	905	1588	2798	3803	4884	6763	7414	12051
1500_1500		528	1047	1876	2532	3507	4297	4735	7939
2500_0300	306	798	1748	2558	3991	5469	7421		
2500_0600	281	746	1572	2352	3522	4487	6237		
2500_0900	264	663	1347	1921	2839	3772	5347		
2500_1500		346	838	1384	1808	2392	3559		

Cv [gal/min] at 90°, only for Stainless steel valves									
Body-trim	150	200	250	300	350	400	450	500	600
rating	06	08	10	12	14	16	18	20	24
0900_0300	345	936	1962	2819	4033	5460	7618	8814	13589
0900_0600	not available in SS								
0900_0900	not available in SS								
1500_0300	364	905	1588	2798	3803	4884	6763	7414	12051
1500_0600		528	1047	1876	2532	3507	4297	4735	7939
1500_0900	not available in SS								
1500_1500	not available in SS								
2500_0300	264	663	1347	1921	2839	3772	5347		
2500_0600		346	838	1384	1808	2392	3559		
2500_0900	not available in SS								
2500_1500	not available in SS								

EXPLODED VIEW

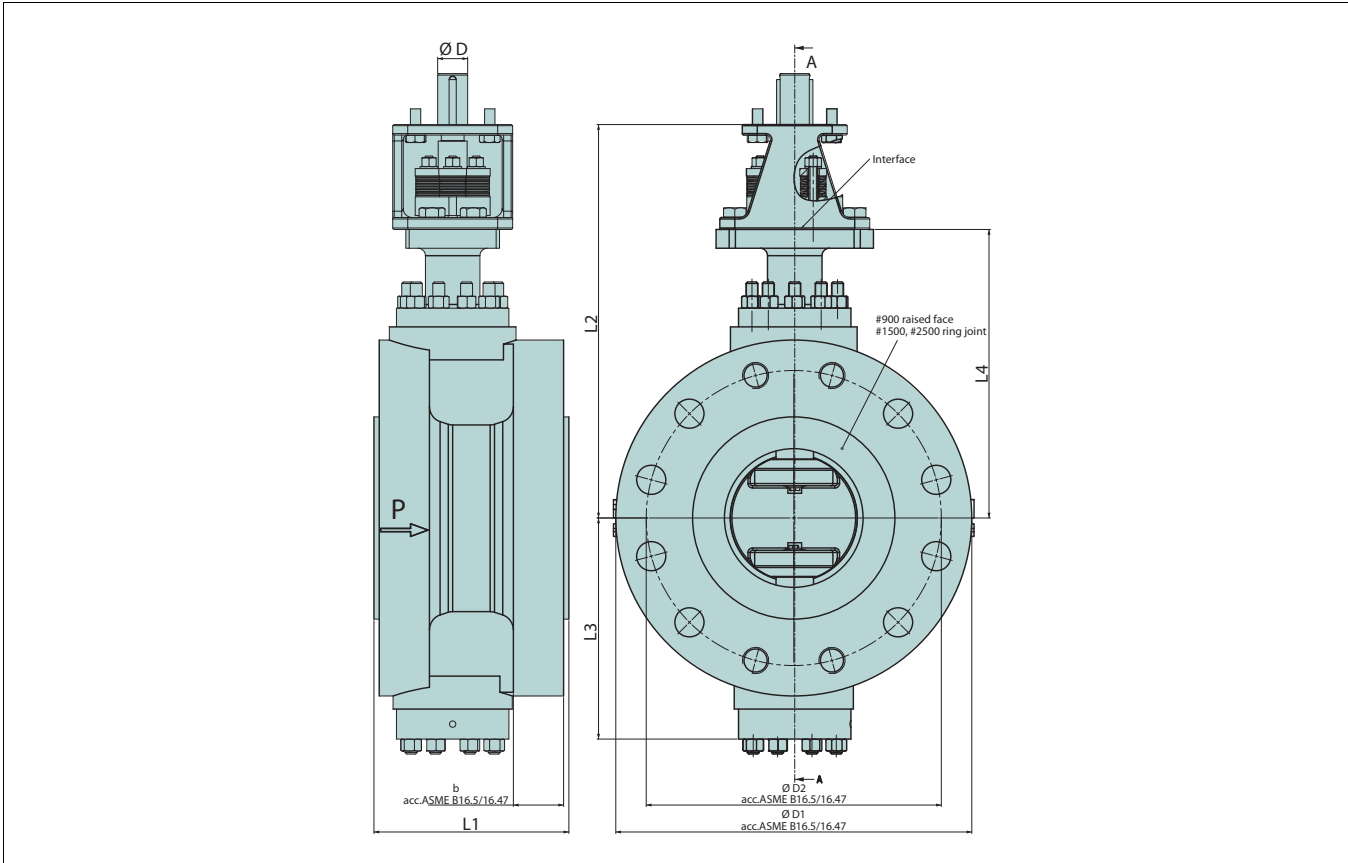


PART LIST

Part nr.	Qty.	Description	Material
101	1	Body	ASTM A217 gr. WC6
102	1	Extension	ASTM A217 gr. WC6
103	variable	Stud	ASTM A193 gr. B7
104	variable	Hexagonal nut	ASTM A194 gr. 7
107	1	Seal	GRAPHITE
108	1	Socket head set screw	A2 STAINLESS STEEL
201	1	Disc	EN 10213-1.4931+ENP
301	1	Seal ring	ASTM A182 gr. F12 cl.2
303	1	Ring	ASTM A182 gr. F12 cl.2
304	1	Seal	GRAPHITE
306	variable	Hexagon screw	ASTM A193 gr. B7
307	variable	Hexagonal nut	ASTM A194 gr. 7
310	1	Retaining ring	EN 10302-1.4923
321	1	Sealing element	EN 10302-1.4923+Ag
401	1	Drive shaft	1.4923+Al2O3/TiO2
402	1	Shaft	1.4923+Al2O3/TiO2
404	2	Thrust washer	EN 13835-0.7660
420	1	Bearing sleeve	EN 13835-0.7660
424	1	Bearing sleeve	EN 13835-0.7660
425	2	Bearing sleeve	EN 13835-0.7660
428	1	Spacer ring	AISI 304
429	1	Spacer ring	AISI 304

Part nr.	Qty.	Description	Material
430	1	Cover	ASTM A182 gr. F12 cl.2
432	variable	Stud	ASTM A193 gr. B7
433	variable	Hexagon nut	ASTM A194 gr. 7
436	6	Sleeve	AISI 316
440	variable	Feather key	EN 10302-1.4923
444	2	Clamp disc	AISI 316
447	2	Shim	A2 STAINLESS STEEL
448	2	Hexagon screw	ISO 3506 A2-70
451	4	Packing ring	GRAPHITE
452	1	Anti extrusion ring	AISI 316
456	6	Washer	AISI 316
457	72	Disc spring	DIN 17222-1.8159
462	1	Feather key	EN 10302-1.4923
470	1	Seal	GRAPHITE
476	6	Spring washer	AISI 316
491	1	Gland	AISI 316
492	1	Compression sleeve	AISI 316
494	6	Hexagonal nut	ASTM A194 gr. 8M
496	6	Stud	ASTM A193 gr. B8M2 cl. 2B
501	1	Bracket	AISI 316
502	variable	Hexagon screw	ISO 3506 A2-70
503	variable	Hexagon screw	ISO 3506 A2-70

DIMENSIONS



L1 (short pattern, double flanged)

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	222	260	285	335	355	390	440	485	570	
0900/0600	222	260	285	335	355	390	440	485	570	
0900/0900	222	260	285	335	355	390	440	485	570	
1500/0300	286	330	374	418	450	508	530	582	660	
1500/0600	286	330	374	418	450	508	530	582	660	
1500/0900	286	330	374	418	450	508	530	582	660	
1500/1500		330	374	418	450	508	530	582	660	
2500/0300	376	418	522	570	640	690	740			
2500/0600	376	418	522	570	640	690	740			
2500/0900	376	418	522	570	640	690	740			
2500/1500		418	522	570	640	690	740			

L3

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	235	295	330	365	375	410	460	495	590	
0900/0600	235	295	330	365	380	420	460	500	595	
0900/0900	235	295	330	370	390	425	465	505	600	
1500/0300	255	305	360	405	445	485	535	565	660	
1500/0600	255	305	365	405	450	485	535	570	665	
1500/0900	255	305	365	415	450	500	550	580	680	
1500/1500		310	370	425	465	510	560	590	695	
2500/0300	300	340	410	455	515	570	615			
2500/0600	300	340	410	465	525	570	630			
2500/0900	300	355	420	465	535	585	635			
2500/1500		355	430	480	540	600	665			

L2

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	470	525	610	645	665	740	790	820	970	
0900/0600	470	525	610	655	670	750	785	825	975	
0900/0900	475	525	610	655	680	745	790	885	980	
1500/0300	490	535	655	690	735	775	865	895	1045	
1500/0600	490	535	655	690	740	815	865	895	1060	
1500/0900	490	545	655	705	745	825	885	915	1065	
1500/1500		595	655	710	800	845	900	980	1080	
2500/0300	535	590	705	750	805	880	965			
2500/0600	535	590	705	750	820	880	970			
2500/0900	535	590	705	755	830	885	980			
2500/1500		65D	710	760	875	935	1005			

L4

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	205	255	290	325	335	365	415	450	540	
0900/0600	205	255	290	325	335	375	415	450	540	
0900/0900	205	255	290	325	345	375	415	450	540	
1500/0300	215	255	315	350	395	430	480	510	595	
1500/0600	215	255	315	350	395	430	480	510	595	
1500/0900	215	255	315	360	395	440	480	510	595	
1500/1500		255	315	360	395	440	480	510	595	
2500/0300	250	295	350	395	445	505	550			
2500/0600	250	295	350	395	445	505	550			
2500/0900	250	295	350	395	455	505	550			
2500/1500		295	35D	400	455	505	550			

Shaft diameter ØD:

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	30	40	50	55	65	65	75	85	95	
0900/0600	30	40	50	55	65	75	75	85	95	
0900/0900	35	40	50	55	65	75	85	95	105	
1500/0300	30	40	50	55	65	65	75	85	95	
1500/0600	30	40	50	55	65	70	75	85	95	
1500/0900	35	40	50	55	65	75	85	85	95	
1500/1500		45	50	65	70	75	85	95	120	
2500/0300	30	40	50	50	55	65	65			
2500/0600	30	40	50	50	55	65	70			
2500/0900	30	40	50	50	65	65	75			
2500/1500		50	50	55	70	75	85			

Weight

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	145	249	339	501	571	745	1015	1293	2219	
0900/0600	145	251	354	505	582	770	1041	1318	2262	
0900/0900	147	261	359	515	597	774	1059	1385	2311	
1500/0300	217	360	535	349	1096	1461	1890	2404	3773	
1500/0600	218	361	587	850	1106	1492	1901	2424	3821	
1500/0900	218	366	591	368	1122	1518	1954	2455	3893	
1500/1500		385	536	906	1192	1604	2056	2596	4101	
2500/0300	424	595	1142	1537	2211	3003	4080			
2500/0600	424	595	1140	1550	2234	3017	4118			
2500/0900	424	606	1148	1561	2259	3053	4143			
2500/1500		642	1179	1604	2383	3225	4322			

Actuator mounting interface

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	18	20	24	NPS
0900/0300	160-55	160-55	230-90	230-90	230-90	330-120	330-120	330-120	360-135	
0900/0600	160-55	160-55	230-90	230-90	230-90	330-120	330-120	330-120	360-135	
0900/0900	160-55	160-55	230-90	230-90	230-90	330-120	330-120	360-135	360-135	
1500/0300	160-55	160-55	230-90	230-90	230-90	230-90	330-120	330-120	360-135	
1500/0600	160-55	160-55	230-90	230-90	230-90	330-120	330-120	330-120	360-135	
1500/0900	160-55	160-55	230-90	230-90	230-90	330-120	330-120	330-120	360-135	
1500/1500		230-90	230-90	230-90	330-120	330-120	330-120	360-135	360-135	
2500/0300	160-55	160-55	230-90	230-90	230-90	230-90	330-120			
2500/0600	160-55	160-55	230-90	230-90	230-90	230-90	330-120			
2500/0900	160-55	160-55	230-90	230-90	230-90	230-90	330-120			
2500/1500		230-90	230-90	230-90	330-120	330-120	330-120			

Torque:

Body-trim	150	200	250	300	350	400	450	500	600	DN
rating	06	08	10	12	14	16	13	20	24	NPS
0900/0300	658	1233	2089	2923	4470	5810	8205	10689	16806	
0900/0600	680	1293	2175	3114	4645	7102	8587	11138	18002	
0900/0900	734	1283	2279	3316	5046	7430	10020	14140	20850	
1500/0300	664	1190	1978	2857	4526	5614	7513	9667	15156	
1500/0600	659	1190	2091	2919	4656	6003	7983	9859	16188	
1500/0900	724	1183	2114	3146	4343	6776	9294	10555	17450	
1500/1500		1605	2330	3882	6237	8395	10533	15599	25656	
2500/0300	660	1148	1957	2378	3829	5175	6137			
2500/0600	660	1148	2006	2405	3930	5192	6494			
2500/0900	660	1138	2041	2439	4455	5374	7557			
2500/1500		1324	2267	3033	5855	7573	10154			

HOW TO ORDER

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12	/	/	13.	14
	BW	3	G/D	1	B	56	P	N2	N1	N1	G3				

1. sign	
-	

2. sign	PRODUCT SERIES / DESIGN
BW	Metal seated Mapag butterfly valve, triple eccentric available as Double flanged, Lug, Wafer or Butt weld end type.

3. sign	BODY CONSTRUCTION
2	Flanged, long pattern
3	Flanged, short pattern
4	Lug or Mono flange or single flange
6	Wafer
7	No Entry + Butt Weld ends
8	Top entry, Side Access + Butt Weld ends
9	Top entry, Top Access + Butt Weld ends
Y	Special, to be specified

4. sign Body	BODY PRESSURE RATING	4. sign Trim	TRIM PRESSURE RATING Use trim rating e.g. /C if not full rated
C	ASME class 150	/C	ASME class 150
D	ASME class 300	/D	ASME class 300
F	ASME class 600	/F	ASME class 600
G	ASME class 900	/G	ASME class 900
H	ASME class 1500	/C	ASME class 150
H	ASME class 1500	/H	ASME class 1500
1	ASME class 2500	/1	ASME class 2500

BW1H/F...-> full rated body #1500, de-rated trim #600. Corresponding PN pressure classes also available.

5. sign	SEAT DESIGN
1	U-Type Metal seat with coating (sign 11). Max tightness in preferred direction API 598 or FCI 70.2 cl V (std), FCI 70.2 cl VI (optional), EN12266 Rate B. Non-preferred direction, FCI 70.2 cl V (Air).
2	Double seat, metal + soft (Tmax limited by soft seat). Max tightness in preferred direction, API 598, FCI 70.2 cl VI, EN12266 Rate A. Non-preferred direction, FCI 70.2 cl VI (Air). Max pressure 100 bar.
4	Double seat on valve body + leak off connection between the seat. Max tightness in preferred direction, API 598. Max tightness in non-preferred direction, FCI 70.2 cl VI (Air).
8	Solid proof. One sealing ring on the disc + seat on the body. Max tightness in preferred direction, API 598, FCI 70.2 cl V. Max tightness in non-preferred direction, 100 x FCI 70.2 cl V (Air).
Y	Special construction

6. sign	BEARING AND BODY DESIGN
A	Soft bearings, PTFE or eq. on metal net Tmax 250 °C, trim rating max #600.
B	Metallic or carbon bearings for high temperature. (e.g. GGG-CrNi or stellite or high performance carbon bearings). Tmax 500 °C.
H	Metallic or carbon bearings for high temperature. (e.g. GGG-CrNi or stellite or high performance carbon bearings). Temp: 500-850 °C.
HH	H + cooling ribbons. (e.g. GGG-CrNi or stellite or high performance carbon bearings) cooling ribbons. Temp: 850-1150 °C.
S	Construction B + Steam jacket.
Y	Special construction

For NACE, add "N" to sign. 6 "B" -> "BN"

7. sign	SIZE
	Note: Pressure rating = ASME -> inch sizes Pressure rating = PN -> metric sizes
BW	Inch: 04, 06, 08, 10, 12, 14, 16, 18, 20, 24, 28, 30, 32, 36, 38, 40, 42, 48, 52, 54, 56, 60, 64, bigger sizes on request Metric: 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1200, 1400, 1500, 1600

NOTE:
- The factory will keep the right to change the material if the material is same e.g. from casting to forged
- With slash "/" the materials are double marked

8. sign	BODY	9. sign	DISC	10. sign	SHAFT, PINS AND KEY
P	ASTM A216 WCB/ 1.0619	N2	ASTM A487 CA6NM (similar to 1.4317)	N2	1.4021 (-10 °C to +400 °C)
F	ASTM A352 LCC	G5	1.4931	N1	1.4923
N	ASTM A217 WC6	N	ASTM A217 WC6	C	ASTM SA564 Gr. 630(17-4PH)
U	ASTM A351 CK3MCuN (SM0254)	U	ASTM A351 CK3MCuN (SM0254)	U	UNS31254 (SM0254)
U2	ASTM A890 4A (similar to 1.4517)	U2	ASTM A890 4A (similar to 1.4517)		
U3	ASTM A890 GR. 5A (similar to 1.4469)	U3	ASTM A890 5A (similar to 1.4469)		
		G9	1.4923	K5	1.4462
G				G	1.4313 (similar to A487 CA6NM)
				N	XM-19 (Nitronic 50 HS)
A	ASTM A351 CF8M / 1.4408	A	ASTM A351 CF8M eq. AISI 316/1.4408	C2	Gr. 660/1.4980 (pressure class 900 and above)
A2	ASTM A351 CF3M (AISI316L)	A4	ASTM A351 CF8C eq. AISI 347/1.4552	C3	1.4980 (-200 °C to + 815 °C)
		C2	ASTM A638 Gr. 660 (similar to 1.4980)		
				A	F316
		A2	ASTM A351 CF3M eq. AISI316L		
H	ASTM A494 CW-6M (Hastelloy C)	H	ASTM A494 CW-6M (Hastelloy C)	H1	HAST C
T	Titanium	T	Titanium	T	Titanium

NOTE: Check the recommend material combination from the Factory
NOTE: The list of materials have been shortened due to space limitations. Please consult Metso to find the availability of other materials.

11. sign	SEAT MATERIAL
Ferritic/Martensitic	
C	U-shape, 1.4923 or eq. + silver coated (disc ENP - Ni-coated) T = -200 °C... + 850 °C
C2	U-shape, A564 Gr 630 H1150M (17-4PH) /1.4542 + silver coated (disc ENP - Ni-coated) T = -30 °C... + 325 °C
Austenitic	
A	U-shape, 1.4980 or eq. + silver coated T = -200 °C... + 850 °C. If sign 6 includes NACE -> ASTM A638 gr. 660 is used.
A1	U-shape, 1.4980 or eq. + silver coated (disc HCr coated) T = -200 °C... + 400 °C.
Other SEAT MATERIAL	
S	Stellite/stellited sealing + stellited sealing surface, disc ENP - Ni-coated
Y	Special, to be specified

12. sign	PACKING CONSTRUCTION
T3	Live loaded PTFE packing
T2	Live loaded PTFE double packing with one 1/4" NPT leak off connection for shaft seal
G3	Live loaded graphite packing. Inherently firesafe.
G2	Live loaded graphite double packing with one 1/4" NPT leak off connection for shaft seal. Inherently firesafe.
Y	Special, to be specified

13.sign	SURFACE FINISH FOR PIPE FLANGE 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 µm) DIN 2526 Form E (Ra 4)

14. sign	SPECIAL FLANGE FACING TYPES/FORMS always check suitability from fac
05	Ring Joint
06	DIN EN 1092-1 Form F (tongue)
16	ANSI B16.5 Large Tongue (Ra 3.2)
Y	Special, to be specified

15. sign	FLANGE A sign for flange code needed, always check suitability from factory
-	Without sign according to valve body pressure rating ASME B 16.47 Series A #150 - 600, size 26" -60", #900 size max 48".
B	ASME 16.47 Series B (size 26" and bigger)
J	PN10
K	PN 16
L	PN25
M	PN40
N	PN63
P	PN100
R10	JIS 10K (14 bar)
R16	JIS 16K (27 bar)
R20	JIS 20K (34 bar)
R30	JIS 30K (50 bar)
R40	JIS 40K (66 bar)
R63	JIS 63K (105 bar)
Y	Special, to be specified

16. sign	
G1	1 grounding device NOTE: if the valve construction contains intrinsic grounding feature (graphite packing or conductive bearings) no additional grounding device is needed (e.g. for ATEX)
G3	2 independent grounding devices NOTE: if the valve construction contains intrinsic grounding features (graphite packing and conductive bearings) no additional grounding device is needed (e.g. for ATEX)

Subject to change without prior notice.

Metso Automation Inc.

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