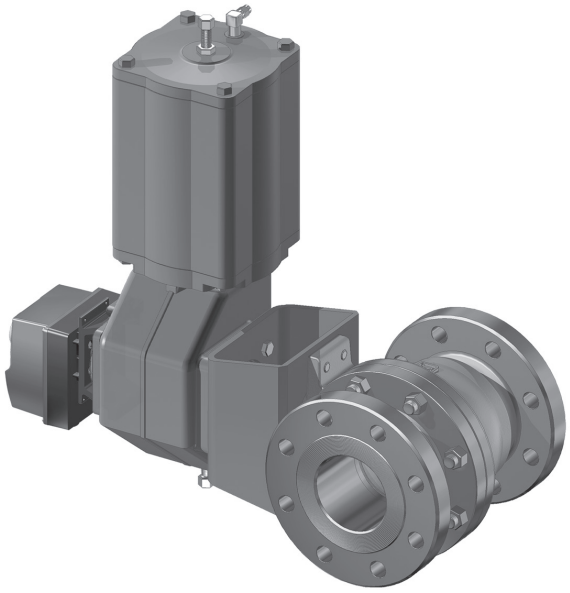
Neles™ flanged full bore MBV ball valve

Series M2 for ASME ratings

Modular ball valve series M2 offers optimized performance of pulp and paper applications. Series M, incorporates our leading pulp and paper application know-how in valve technology. Several decade experience of Valmet has fine tuned this product to deliver P&P customers easy product selection with industry leading performance. Valve series includes seat supported and trunnion mounted ball valve designs covering seat types, size ranges and material options offering comprehensive coverage for most pulp and paper applications needs. Valve deliveries excellent tightness for shutoff as well as delivering good control performance for pulp and paper applications. Optimized modularity can be used as an advantage to cut down costs via reduced spare part inventory and product suitability for wide scope of process applications.



Applications

- Pulp & paper
- Digesters and fiberlines
- Liquor service
- Chemical recovery
- Sludge treatment
- TMP-plants
- Deinking and recycling plants
- Steam
- Paper mill applications

DESIGN FEATURES

Size range

- 1” ... 24”.

Pressure classes

- ASME 150 and 300.

Tightness

- Separate ball and shaft assure good tightness, even with metal seats and low shut-off pressures.
- Bubble tight shut-off with soft seats.

Versions, details

- V-ring gland packing ensures long maintenance-free operation.
- Spiral wound body joint gasket for leak free operation.
- Live loaded packing as standard option for trunnion mounted valves.
- Q-trim option for reduced noise and cavitation.
- Scraping seat as standard, can be locked.
- Splined ball/shaft connection for good torque transmission.
- Trunnion design in 10” ... 24”.
- ATEX

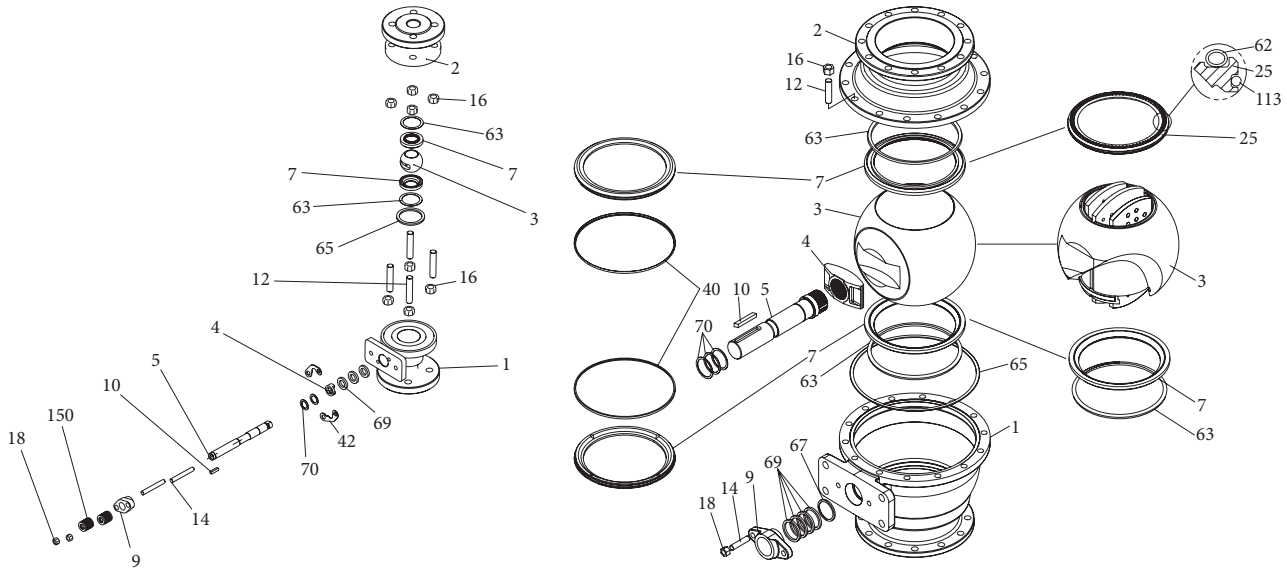
Full bore

- High C_v per nominal size.
- Straight ball opening offers low flow resistance.
- True full bore ball (cylindrical flow path).

Minimized emissions

- Uninterrupted circular spiral wound body gasket.
- No bending forces to gland packing.
- Live loaded gland packing available for seat supported valves.

Exploded view, seat supported valves

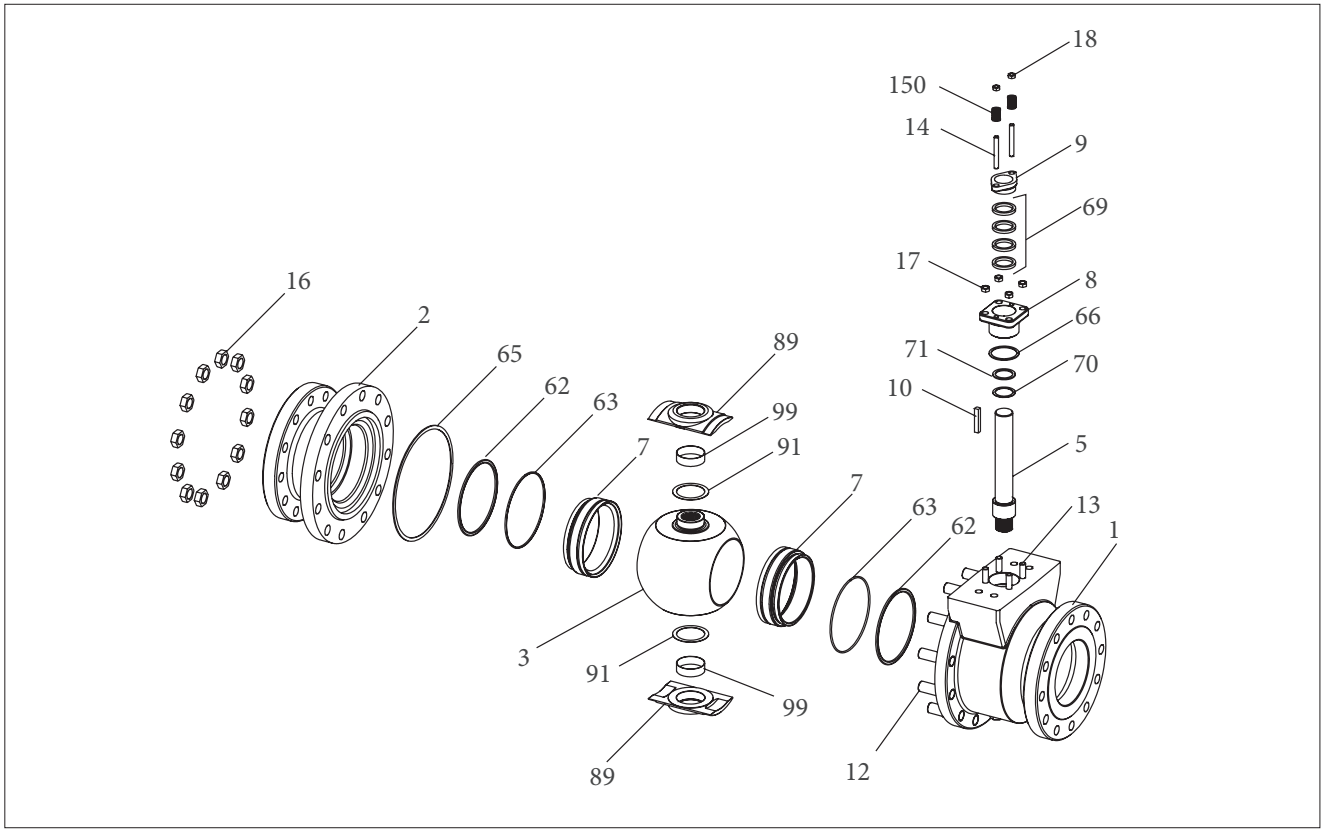


1”, 1 1/2” **2” - 12”**

Parts list

Item	Part description	Material		
1	Body	Stainless steel CF8M / CG8M		
2	Body cap	Stainless steel CF8M / CG8M		
3	Ball / Q-Trim ball	Stainless steel AISI 316/CF8M / CG8M		
4	Spline driver 2” - 12” Thrust ring 1” - 1 1/2”	Stainless steel CF8M AISI 316		
5	Stem	Stainless steel AISI 329		
7	Seat	Stainless steel + cobalt based alloy	PTFE	Xtreme®
9	Gland	Stainless steel CF8M		
10	Key	Stainless steel AISI 329		
12	Stud	Stainless steel ASTM A 193 gr. B8M		
14	Stud	Stainless steel ASTM A 193 gr. B8M		
16	Hexagon nut	Stainless steel ASTM A 194 gr. 8M		
18	Hexagon nut	Stainless steel ASTM A 194 gr. 8M		
25	Seat (E)	Stainless steel + cobalt based alloy		
40	Locking ring 10" - 12"	Stainless steel AISI 316		
42	Retainer plate	Stainless steel AISI 316		
50	Cylindrical pin	Stainless steel AISI 316		
62	Spring	UNS N06625		
63	Back seal	PTFE		
65	Body gasket	Stainless steel AISI 316 + PTFE filled spiral wound		
67	Thrust ring	Stainless steel AISI 316		
69	Packing	PTFE or graphite		
70	Thrust bearing	PTFE		
113	Back seal	FPM (O-ring) as standard, PTFE + polyester (lip seal) optional		
150	Disc spring set	Electroless nickel plated spring steel (EN 10083 - 1.8159)		

Exploded view, trunnion mounted valves

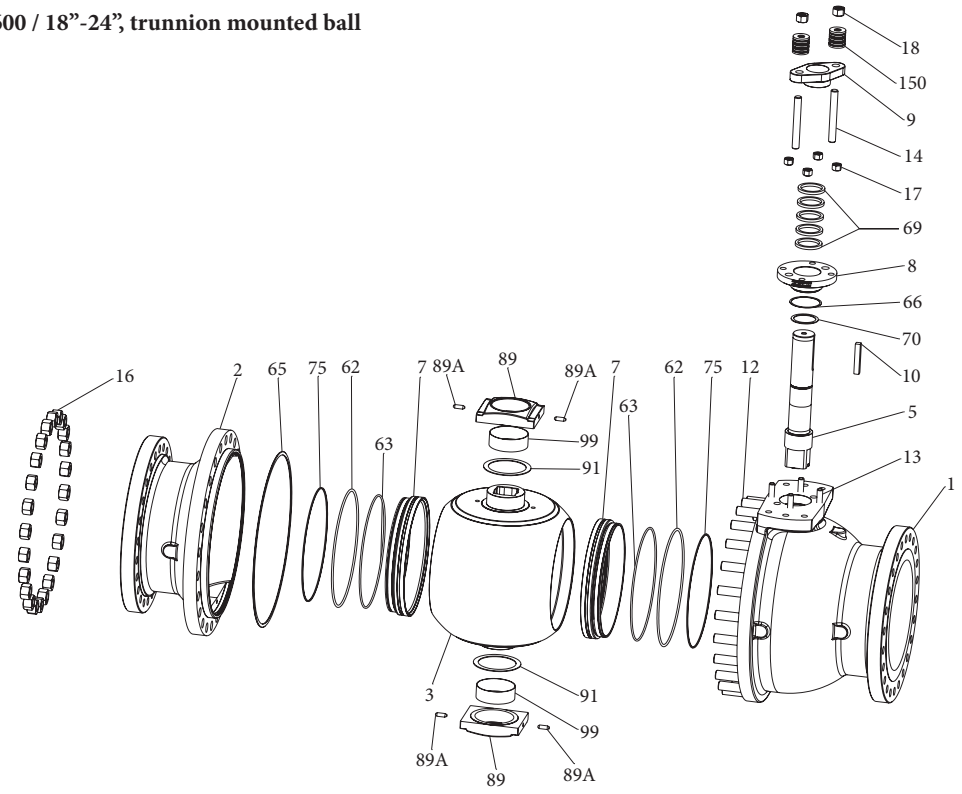


Parts list

Item	Part description	Material		
1	Body	Stainless steel CF8M / CG8M		
2	Body cap	Stainless steel CF8M / CG8M		
3	Ball	Stainless steel AISI 316/CF8M / CG8M		
5	Shaft	Stainless steel XM-19 / AISI 329		
7	Seat	Stainless steel + cobalt based alloy	PTFE	Xtreme®
8	Bonnet	Stainless steel CF8M		
9	Gland	Stainless steel CF8M		
10	Key	Stainless steel AISI 329		
12	Stud	Stainless steel ASTM A 193 B8M		
13	Stud	Stainless steel ASTM A 193 B8M		
14	Stud	Stainless steel ASTM A 193 B8M		
16	Hexagon nut	Stainless steel ASTM A 194 8M		
17	Hexagon nut	Stainless steel ASTM A 194 8M		
18	Hexagon nut	Stainless steel ASTM A 194 8M		
62	Seat spring	Alloy 625		
63	Back seal	O-ring (FKM)		
65	Body gasket	Stainless steel AISI 316 + PTFE filled spiral wound		
66	Bonnet gasket	PTFE		
69	Packing ring	PTFE		
70	Thrust bearing	Cobalt based alloy		
71	Thrust bearing	Cobalt based alloy		
89	Trunnion plate	Stainless steel, ASTM A 351 gr. CF8M		
91	Bearing spacer	Cobalt based alloy		
99	Trunnion bearing	PTFE + Stainless steel		
150	Disc spring set	Electroless nickel plated spring steel (EN 10083-1.8159)		

Exploded view, trunnion mounted valves

Sizes DN 450-600 / 18”-24”, trunnion mounted ball



Parts list (P-seat)

Item	Part description	Material
1	Body	Stainless steel CF8M
2	Body cap	Stainless steel CF8M
3	Ball	Stainless steel CF8M
5	Shaft	EN 10088-1.4460 Duplex 329
7	Seat	Stainless steel AISI 316/CF8M + cobalt based alloy
8	Bonnet	Stainless steel CF8M
9	Gland	Stainless steel CF8M
10	Key	Stainless steel AISI 329
12	Stud	Stainless steel ASTM A 193 B8M
13	Stud	Stainless steel ASTM A 193 B8M
14	Stud	Stainless steel ASTM A 193 B8M
16	Hexagon nut	Stainless steel ASTM A 194 8M
17	Hexagon nut	Stainless steel ASTM A 194 8M
18	Hexagon nut	Stainless steel ASTM A 194 8M
62	Seat spring	UNS N06625
63	Back seal	O-ring (FFKM)
65	Body seal	Stainless steel AISI 316 + PTFE filled spiral wound
66	Bonnet gasket	PTFE
69	Packing ring	PTFE
70	Thrust bearing	AISI 316 + PTFE
75	Braided seal square	PTFE
89	Trunnion plate	Stainless steel CF8M
89A	Pin	AISI 316
91	Thrust bearing	AISI 316 + PTFE
99	Trunnion bearing	AISI 316 + PTFE
150	Disc spring set	AISI 304

Technical specification

Product type
Flanged full bore, ball valve.
Split body design
Seat supported design 1"...12".
Trunnion design 10" ... 24".

Pressure ratings
ASME 150 & 300.

Size range
1" ... 24".

Temperature range
-50 ... +260 °C. Depending on the seat material.
-60 ... +480 °F.

Design standards

Valve body	ASME B16.34
Valve flanges	ASME B16.5
Face-to-face	1" ... 6" ASME 150 / 300 and 8" ... 12" ASME 150: ASME B16.10 long, except class 150 NPS01" acc. to Table 2, same as in class 300. 8" ... 12" ASME 300: ASME B16.10 short Trunnion 10" ... 24": ASME B16.10 long

Standard materials

Body	CF8M.
Ball	CF8M + hard chrome.
Bearings	PTFE + graphite.
Seats	Stainless steel + cobalt based alloy, Xtreme Optional PTFE or filled PTFE.
Seals/gaskets	PTFE, graphite, FPM.
Body gasket	Spiral wound with PTFE or graphite filler.
Gland packing	PTFE (V-rings), graphite.
Bolting	ASTM A 193 gr. B8M.

Certification
EN 10204 - 3.1 material certificates for body and body cap / bonnet.

Standard options
Degreasing.
Anti-static. (ATEX)
Q-Trim.
Live loaded construction for trunnion mounted valves.

Valve testing
Each valve is tested for body integrity and seat tightness.
The body test pressure is 1.5 x PN. The standard seat test pressure for metal seated valves is 1.0 x PN or 7 bar / 100 psi. The seat test pressure for soft seats is 6 bar / 90 psi.
The test medium is inhibited water. Air test upon request.

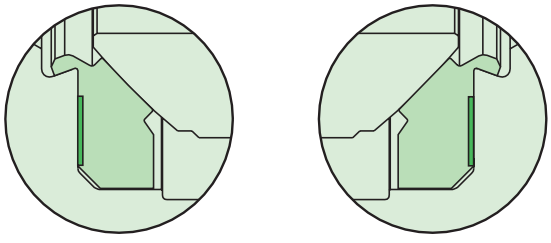
Valve tightness
ASME / FCI 70-2 class V for metal seats as standard.
Soft seated seat supported valves are bubble tight.
Other tightness rates upon request.

C_v (K_v) -values and resistance coefficients

Valve size NPS	M2			M2 with Q-Trim	
	C_v 90°	K_v 90°	□ 90°	C_v 90°	K_v 90°
1"	105	91	0.05	-	-
1 1/2"	250	220	0.07	-	-
2"	490	425	0.06	84	73
3"	1160	1000	0.05	245	210
4"	2200	1900	0.05	530	460
6"	5100	4400	0.04	1360	1180
8"	9300	8000	0.04	2330	2020
10"	15200	13200	0.04	3920	3400
12"	22400	19400	0.03	5600	4850
14"	30500	26400	0.03	6860	5930
16"	39800	34500	0.03	9190	7950
18"	50900	44000	0.03	–	–
20"	65200	56400	0.03	–	–
24"	99500	86100	0.03	–	–

Standard seat options

Locked scraping seat P, V & C

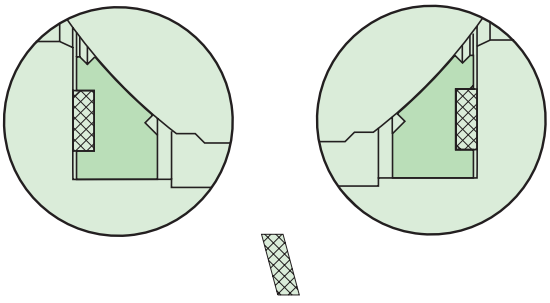


Non-compressed form of the PTFE back seal.

Materials:

Seats	Stainless steel + cobalt based alloy (P) See optional materials from type code
Seals	PTFE
Temperature range	-50 ... +260 °C -60 ... +480 °F
Size range	1" - 12"

General scraping seat S



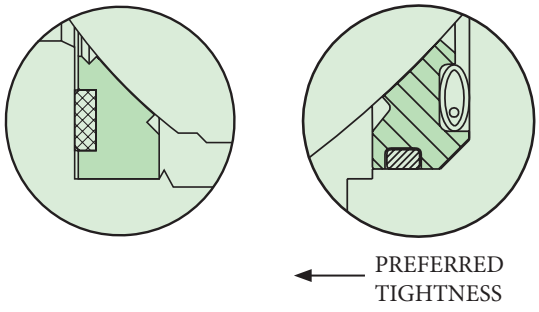
Non-compressed form of the PTFE back seal.

Materials:

Seats	Stainless steel + cobalt based alloy
Seals	PTFE
Temperature range	-50 ... +230 °C -60 ... +445 °F
Size range	1" - 12"

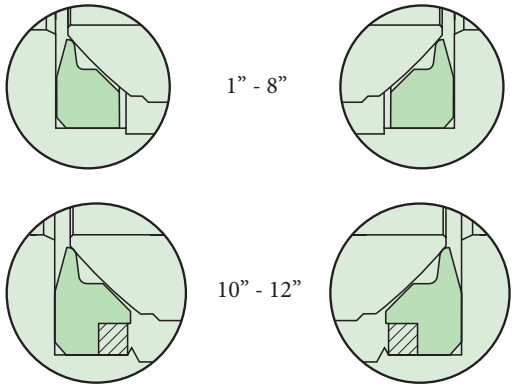
Standard seat options

Scraping seat E for low Δp-applications



Material:	
Seats	Stainless steel + cobalt based alloy
Locked seals	PTFE
Spring assisted seals	FPM
Springs	UNS N06625
Temperature range	-30 ... +200 °C
	-22 ... +390 °F
Maximum ýp	16 bar / 230 psi.
Size range	2” - 12”

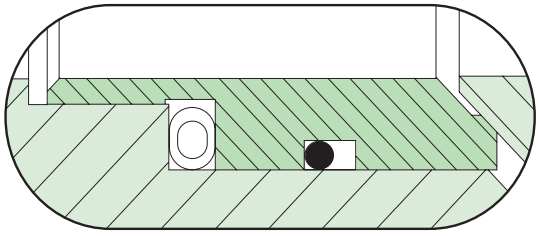
Soft seat M, for general use



Temperature ranges:	
Xtreme (X)	-50 ... +260 °C/-60 ... +500 °F, 1” - 8”
PTFE (T)	-50 ... +200 °C/-60 ... +390 °F, 10” - 12”
Reinforced with carbon (M)	-50 ... +250 °C/
	-60 ... +480 °F, 10” - 12”

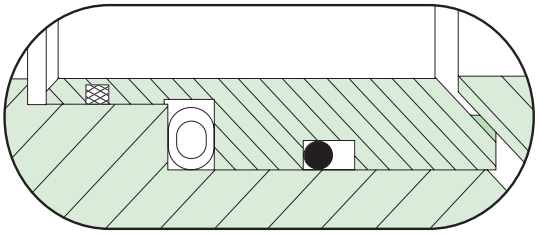
S seat for trunnion mounted valves

Metal seat



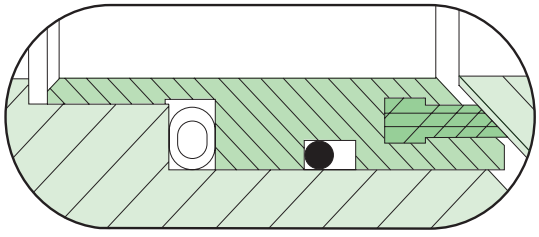
Materials:	
Ball seats	SS steel + cobalt based alloy
Seat seals	Viton GF O-ring
Spring:	INCONEL 625
Temperature range	-30 ... +200 °C
	-22 ... +390 °F

P seat for trunnion valves



Ball seat:	SS steel +Cobalt based alloy
Seat seal:	FFKM O-ring, braided PTFE.
Spring:	INCONEL 625.
Temp. range:	-10 ... +225 °C

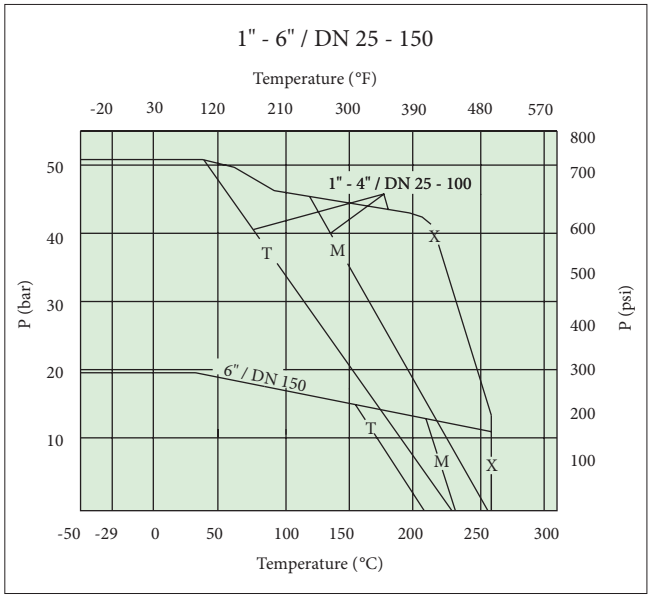
T soft seat

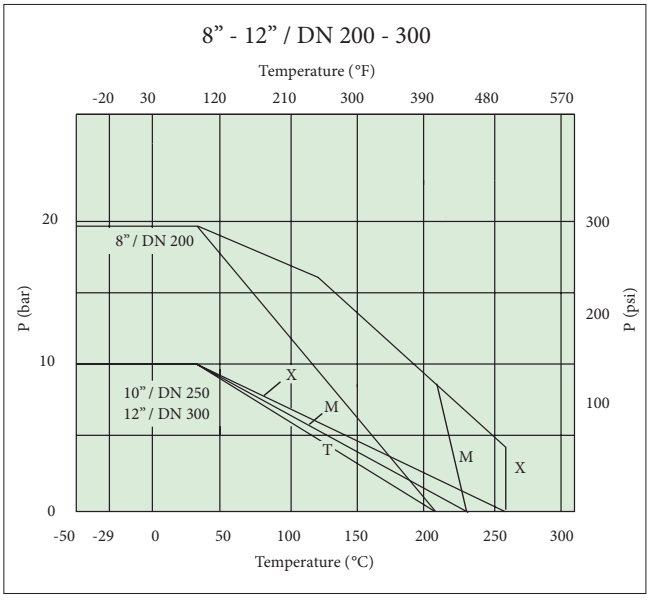


Ball seat:	PTFE.
Seat body:	Stainless steel.
Seat seal:	Viton GF O-ring.
Spring:	INCONEL 625.
Temp. range:	-30 ... +200 °C

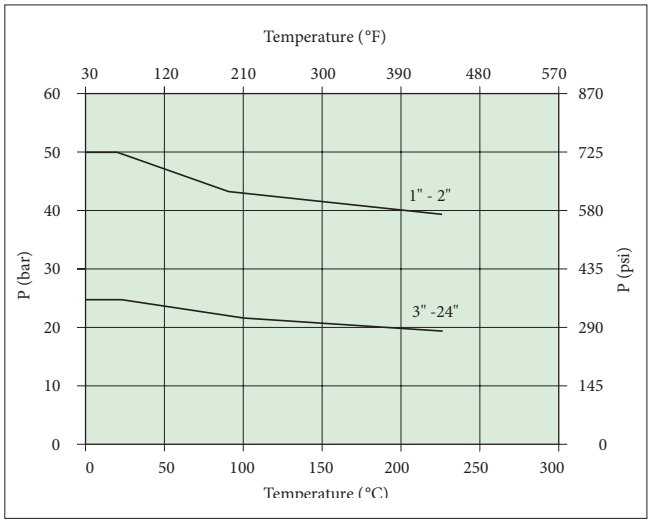
Valve seat ratings

Seat supported valves, maximum operating pressure for soft seats





Maximum operating pressure for metal seats



ACTUATOR SELECTION

Soft seat ratings are based on differential pressure with the valve ball in the fully closed position and refers only the seats.
M2-valve can be equipped with the following Neles actuator types:

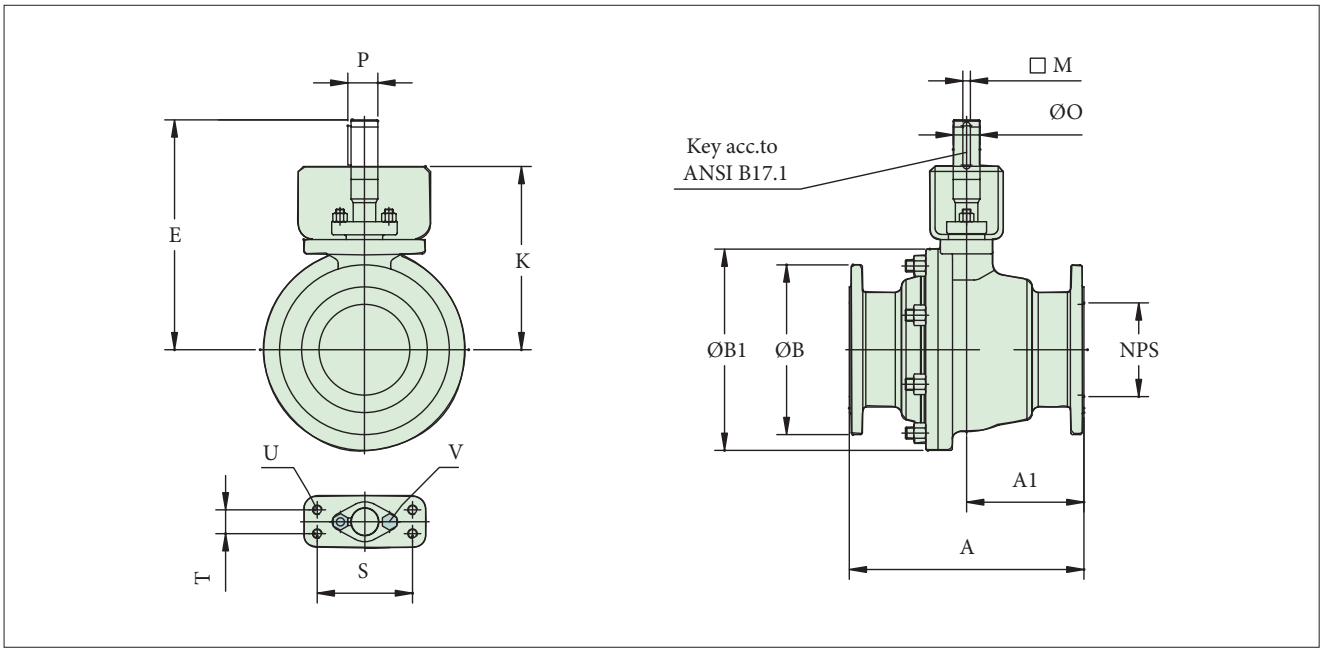
B1C/B1J	Pneumatic double acting or spring return actuator. Actuators available for size range 1" - 24".
M	M-series manual gear operator for valve sizes 1" - 16".
LK	Hand lever for valve sizes 1" - 4".

When selecting other than Neles actuators please contact your local Valmet representative.

For the correct actuator selection you need to know the following process data:
- valve size and seat type
- supply pressure for the actuator
- maximum operating differential pressure over the valve in closed position

For pneumatic actuator selection use Neles Nelprof™ Control and On-Off sizing and selection software, www.neles.com/nelprof

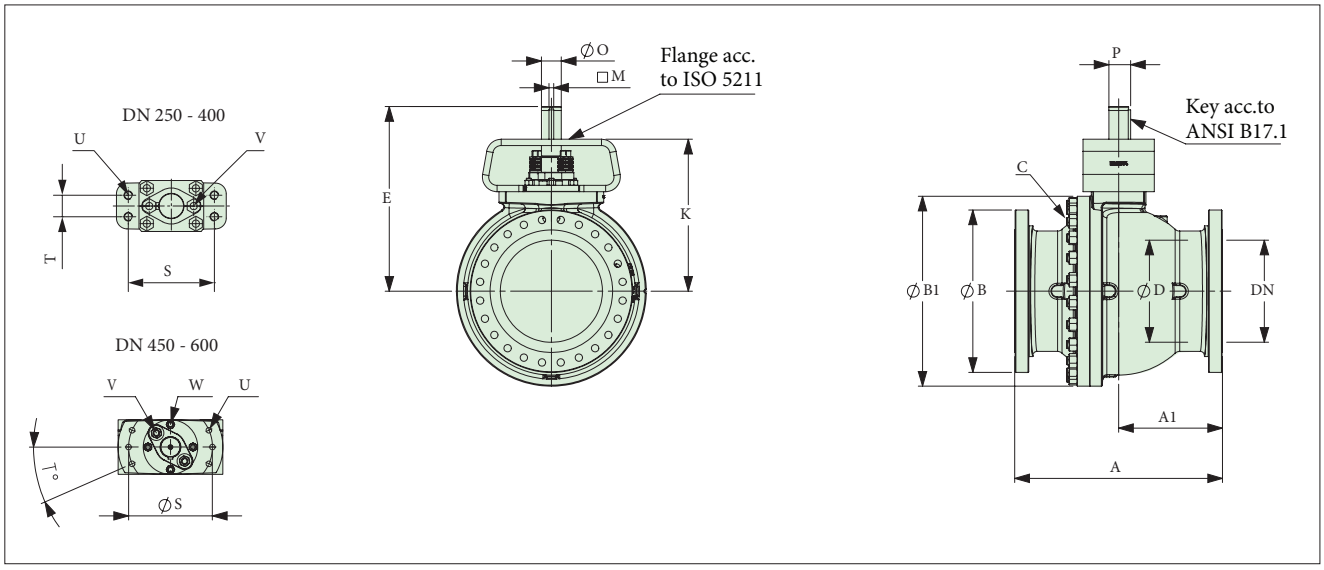
Dimensions



Seat supported valves

TYPE Class	NPS	DIMENSIONS (mm)													WEIGHT (kg)	
		A	A1	ØB	ØB1	E	K	M	O	P	S	T	U	V	M2	Q-M2
M2C Class 150	1	165*	74	124	110	178	150	4.76	Ø 15	17	70	-	M10	M8	5	-
	11/2	165	70	155	145	206	168	4.76	Ø 20	22	70	-	M10	M8	8	
	2	178	79.0	152.4	146	215	168	6.35	Ø 25	27.8	110	32	M12	3/8	11	12
	3	203	101.5	190.5	190	237	190	6.35	Ø 25	27.8	110	32	M12	3/8	25	27
	4	229	110.5	228.6	241	309	250	9.52	Ø 35	39.1	130	32	M12	3/8	40	43
	6	394	197.0	279.5	342	386	305	12.70	Ø 45	50.4	160	40	M16	1/2	100	110
	8	457	228.5	342.9	430	476	385	12.70	Ø 55	60.6	160	55	M20	1/2	175	195
	10	533	266.5	406.4	512	582	472	15.87	Ø 65	71.9	230	90	M24	3/4	290	330
	12	610	305.0	482.6	592	685	555	19.05	Ø 75	83.1	307	120	M30	3/4	460	515
M2D Class 300	1	165	74.0	124.0	110	178	150	4.76	Ø 15	17.0	70	-	M10	M8	5	-
	11/2	191	70.0	155.0	145	206	168	4.76	Ø 20	22.0	70	-	M10	M8	10	-
	2	216	89.0	165.1	146	215	168	6.35	Ø 25	27.8	110	32	M12	3/8	15	17
	3	282	141.0	209.6	200	237	190	6.35	Ø 25	27.8	110	32	M12	3/8	35	37
	4	305	152.5	254.0	254	309	250	9.52	Ø 35	39.1	130	32	M12	3/8	60	63
	6	403	201.5	317.5	353	386	305	12.70	Ø 45	50.4	160	40	M16	1/2	135	145
	8	419	209.5	381.0	462	476	385	12.70	Ø 55	60.6	160	55	M20	1/2	240	260
	10**	457	208.0	445.5	552	582	472	15.87	Ø 65	71.9	230	90	M24	3/4	365	405
	12**	502	223.0	520.7	626	685	555	19.05	Ø 75	83.1	307	120	M30	3/4	545	600

* Note: class 150 NPS01" face to face length is according to ASME B16.10 Table 2, same as in class 300 NPS01"
** Note, in sizes Class 300 NPS10" and 12" body side flange is with threaded bolt connection (lug style).



Trunnion type valves

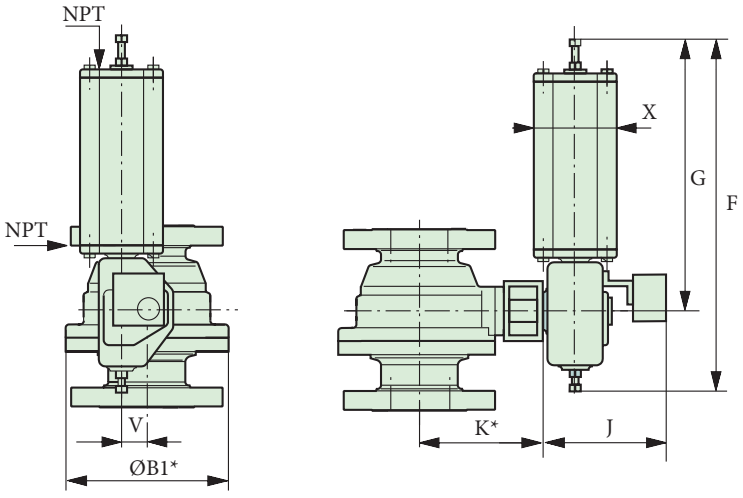
TYPE PN	NPS	DIMENSIONS (mm)													WEIGHT (kg)	
		A	A1	ØB	ØB1	E	K	M	ØO	P	S	T	U	V	M2	Q-M2
M2CW/ M2CZ Class 150	10	533	267	405	514	562	472	12.70	55	60.60	230	90	M24	M14	325	360
	12	610	305	485	592	605	515	12.70	55	60.60	230	90	M24	M14	480	530
	14	686	343	535	665	741	607	19.05	75	83.15	330	120	M30	M20	635	710
	16	762	381	595	750	779	633	22.23	85	94.63	330	120	M30	M20	840	940
M2DW/ M2DZ Class 300	10	568	284	445	580	562	472	12.70	55	60.60	230	90	M24	M14	330	370
	12	648	324	520	652	605	515	12.70	55	60.60	230	90	M24	M14	610	660
	14	762	381	585	700	741	607	19.05	75	83.15	330	120	M30	M20	800	870
	16	838	419	650	799	779	633	22.23	85	94.63	330	120	M30	M20	1015	1100

Type	DN	DIMENSIONS, mm																WEIGHT kg
		øD	A	A1	øB	ØB1	E	K	M	ØO	P	S	T	U	V	W	C	
ASME 150	450	436	864	389,5	635	800	793,9	645,7	22,23	85	95,68	330	21,3	M30	M20	M20	M27	1001
	500	487	914	457	700	885	811	665	22,23	85	95,68	330	21,3	M30	M20	M20	M27	1304
	600	589	1067	533,5	815	1041	987	831	22,23	95	105,87	400	23,6	M30	M30	M24	M30	2087
ASME 300	450	436	914	457	710	825	793,9	645,7	22,23	85	95,68	330	21,3	M30	M20	M20	M36	1235
	500	487	991	495,5	775	906	881	725	22,23	95	105,87	400	23,6	M30	M30	M24	M39	1692
	600	589	1143	571,5	915	1060	1090	885	31,75	120	136,54	460	23	M30	M30	M24	M39	2636

Type	DN	DIMENSIONS, inch																WEIGHT lbs
		øD	A	A1	øB	ØB1	E	K	M	ØO	P	S	T	U	V	W	C	
ASME 150	18	17.17	34.02	15.33	25	31.5	31.26	25.42	0.88	3.35	3.77	12.99	21.3	M30	M20	M20	M27	2224
	20	19.17	35.98	17.99	27.56	34.84	31.93	26.18	0.88	3.35	3.77	12.99	21.3	M30	M20	M20	M27	2898
	24	23.19	42.01	21	32.09	40.98	38.86	32.72	0.88	3.74	4.17	15.75	23.6	M30	M30	M24	M30	4638
ASME 300	18	17.17	35.98	17.99	27.95	32.48	31.26	25.42	0.88	3.35	3.77	12.99	21.3	M30	M20	M20	M36	2744
	20	19.17	39.02	19.51	30.51	35.67	34.69	28.54	0.88	3.74	4.17	15.75	23.6	M30	M30	M24	M39	3760
	24	23.19	45	22.5	36.02	41.73	42.91	34.84	1.25	4.72	5.38	18.11	23	M30	M30	M24	M39	5858

Topwork assembly dimensions

Valve + B1C/B1J/B1JA



*) See K and ØB1 dimensions from tables on page 8 and 9.

B1C actuator

Actuator	DIMENSIONS, mm					NPT	kg
	F	G	J	V	X		
B1C6	400	260	283	36	90	1/4	4.2
B1C9	455	315	279	43	110	1/4	9.6
B1C11	540	375	290	51	135	3/8	16
B1C13	635	445	316	65	175	3/8	31
B1C17	770	545	351	78	215	1/2	54
B1C20	840	575	385	97	215	1/2	73
B1C25	1040	710	448	121	265	1/2	131
B1C32	1330	910	525	153	395	3/4	256
B1C40	1660	1150	595	194	505	3/4	446
B1C50	1970	1350	690	242	610	1	830

Actuator	DIMENSIONS, inch					NPT	lbs
	F	G	J	V	X		
B1C6	15.75	10.24	11.14	1.42	3.54	1/4	9
B1C9	17.91	12.40	10.98	1.69	4.33	1/4	21
B1C11	21.26	14.76	11.42	2.01	5.31	3/8	35
B1C13	25.00	17.52	12.44	2.56	6.89	3/8	68
B1C17	30.31	21.46	13.82	3.07	8.46	1/2	119
B1C20	33.07	22.64	15.16	3.82	8.46	1/2	161
B1C25	40.94	27.95	17.64	4.76	10.43	1/2	289
B1C32	52.36	35.83	20.67	6.02	15.55	3/4	564
B1C40	65.35	45.28	23.43	7.64	19.88	3/4	983
B1C50	77.56	53.15	27.17	9.53	24.02	1	1829

B1J/B1JA actuator

Actuator	DIMENSIONS, mm					NPT	kg
	F	G	J	V	X		
B1J/B1JA6	485	368	273	36	110	3/8	8
B1J/B1JA8	560	420	279	43	135	3/8	17
B1J/B1JA10	650	490	290	51	175	3/8	30
B1J/B1JA12	800	620	316	65	215	1/2	57
B1J/B1JA16	990	760	351	78	265	1/2	100
B1J/B1JA20	1200	935	358	97	395	3/4	175
B1J/B1JA25	1530	1200	448	121	505	3/4	350
B1J/B1JA32	1830	1410	525	153	540	1	671
B1J/B1JA40	2095	1578	580	194	724	1	1100

Actuator	DIMENSIONS, inch					NPT	lbs
	F	G	J	V	X		
B1J/B1JA6	19.09	14,49	10.75	1.42	4.33	3/8	20
B1J/B1JA8	22.05	16.54	10.98	1.69	5.31	3/8	37
B1J/B1JA10	25.59	19.29	11.42	2.01	6.89	3/8	66
B1J/B1JA12	31.50	24.41	12.44	2.56	8.46	1/2	126
B1J/B1JA16	38.98	29.92	13.82	3.07	10.43	1/2	220
B1J/B1JA20	47.24	36.81	14.09	3.82	15.55	3/4	386
B1J/B1JA25	60.24	47.24	17.64	4.76	19.88	3/4	771
B1J/B1JA32	72.05	55.51	20.67	6.02	21.26	1	1479
B1J/B1JA40	82.48	62.13	22.8	7.64	28.5	1	2424

How to order

MBV Modular ball valve, series M2

1.	2.	3.	4.	5.	6.	7.	8.	9.		10.
	M2	C	A	08	A	P	V	A	/	

1. sign	Low noise construction
Q-	Attenuator in flow port of ball

2. sign	Valve series, face-to-face length
M2	Full bore, seat supported, face-to-face length acc. to ASME B16.10, except class 150 NPS01" acc.to Table 2, same as in class 300.

3. sign	Pressure rating of body and flanges
C	ASME Class 150
D	ASME Class 300

4. sign	Construction
A	Standard construction, seat supported
V	Seat supported, pure PTFE soft parts, metal thrust bearing, for peroxide service
W	Trunnion mounted, 2-seats
Z	Trunnion mounted, 1-seat *

*) flow direction indicated by an arrow on the body

5. sign	Size
Seat supported valves	01, 1H, 02, 03, 04, 06, 08, 10, 12
Trunnion mounted valves	10, 12, 14, 16, 18, 20, 24

6. sign	Materials			
	Body material	Trim and coating material	Stem material	Bolting material/ thread
A	CF8M	CF8M (& Hard Chrome, if metal seat)	AISI 329 trunnion mounted: XM-19 (NPS 10”-16”)	A193 Gr. B8M
C	CG8M	CG8M (& Hard Chrome, if metal seat)	AISI 329 trunnion mounted: XM-19 (NPS 10”-16”)	A193 Gr. B8M
U	CK-3MCuN	CK-3MCuN (& Ceramic coating, if metal seat)	UNS S31254	A193 Gr. B8M
S	CF8M + Cobalt based alloy sleeves in flow ports	CF8M (cobalt based coating on ball surface and flow port)	AISI 329 Only for seat supported types	A193 Gr. B8M
T	Titanium gr C-2	Titanium gr. C-2 (soft seats only)	Titanium gr 5	A193 Gr. B8M
X	4A	4A (+ Hard Chrome, if metal seat)	AISI 329 trunnion mounted: XM-19 (NPS 10”-16”)	A193 Gr. B8M

7. sign	MATERIALS			
	Seat type	Seat material	Bearing material	Back seal material
SEAT SUPPORTED				
P	locked	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE
V	locked	4A + Cobalt based hard facing	PTFE + Graphite	PTFE
C	locked	CK-3MCuN + Cobalt based hard facing	PTFE + Graphite	PTFE
S	unlocked	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE
E	low Δp	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE / FPM
X	soft	Xtreme®	PTFE + Graphite	–
T	soft	PTFE	PTFE + Graphite	–
M	soft	Filled PTFE	PTFE + Graphite	–
TRUNNION MOUNTED				
P	metal	SS + Cobalt based hard facing	PTFE + Graphite	FFKM
S	metal	SS + Cobalt based hard facing	PTFE + Graphite	Viton GF
T	soft	PTFE + C25	PTFE + Graphite	–

8. sign	Packing	Body gasket
V	PTFE V-rings, standard	PTFE
F	Graphite	Graphite
G	Live loaded graphite packing for trunnion and seat supported valves	Graphite
T	Live loaded PTFE packing for trunnion and seat supported valves	PTFE

9. sign	Model code
A	Version

10. sign	End connection style
	Standard, without sign ASME B16.5 0.06” raised face with Ra 3.2 - 6.3 mikro-meters, Ra 125 - 250 micro-inches (M2)
13	Large female ANSI B16.5
12	Large male ANSI B16.5

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