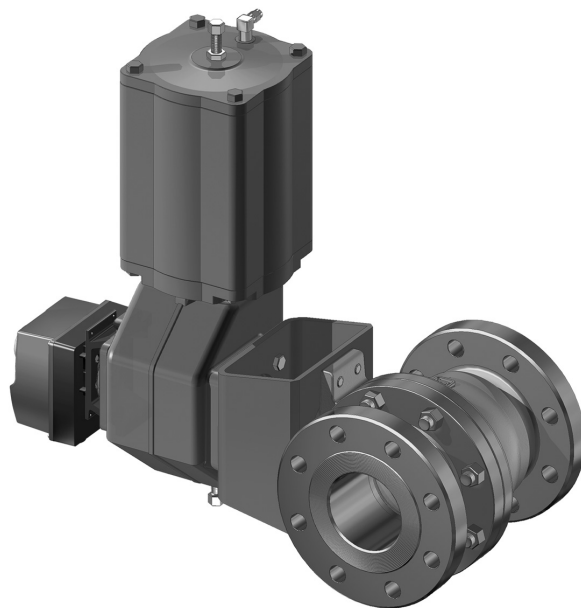


## NELES® FLANGED FULL BORE MBV BALL VALVE, SERIES M1 FOR PN RATINGS

Metso's Neles modular ball valve series M1, offers optimized performance of pulp and paper applications. Series M, incorporates Metso's leading pulp and paper application know-how in valve technology. Several decade experience of Metso 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 delivers 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 application

### DESIGN FEATURES

#### Size range

- DN 25 ... 400.

#### Pressure classes

- PN 10, 16, 25 and 40.

#### Tightness

- Separate ball and shaft assure good tightness, even with metal seats, at low shut-off pressure.
- 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.
- Metric threading
- Trunnion design in DN 250 - 400
- ATEX

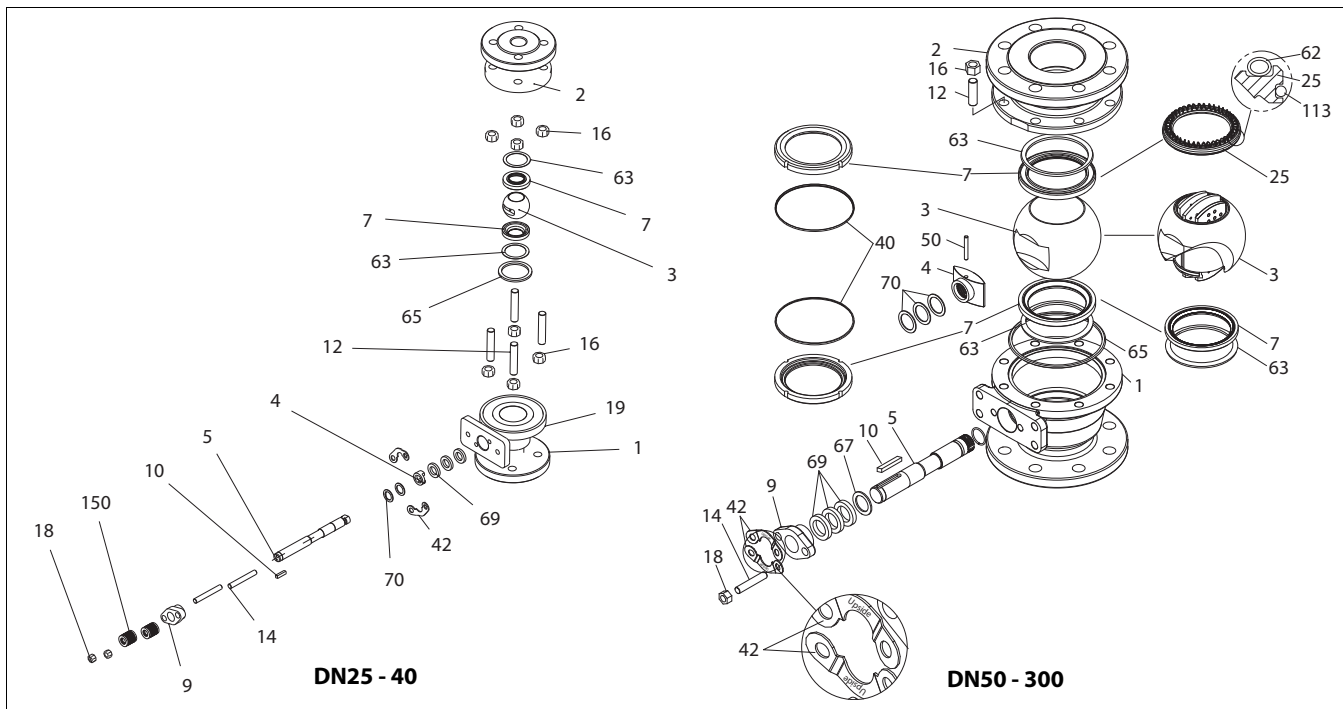
### Full bore

- 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**

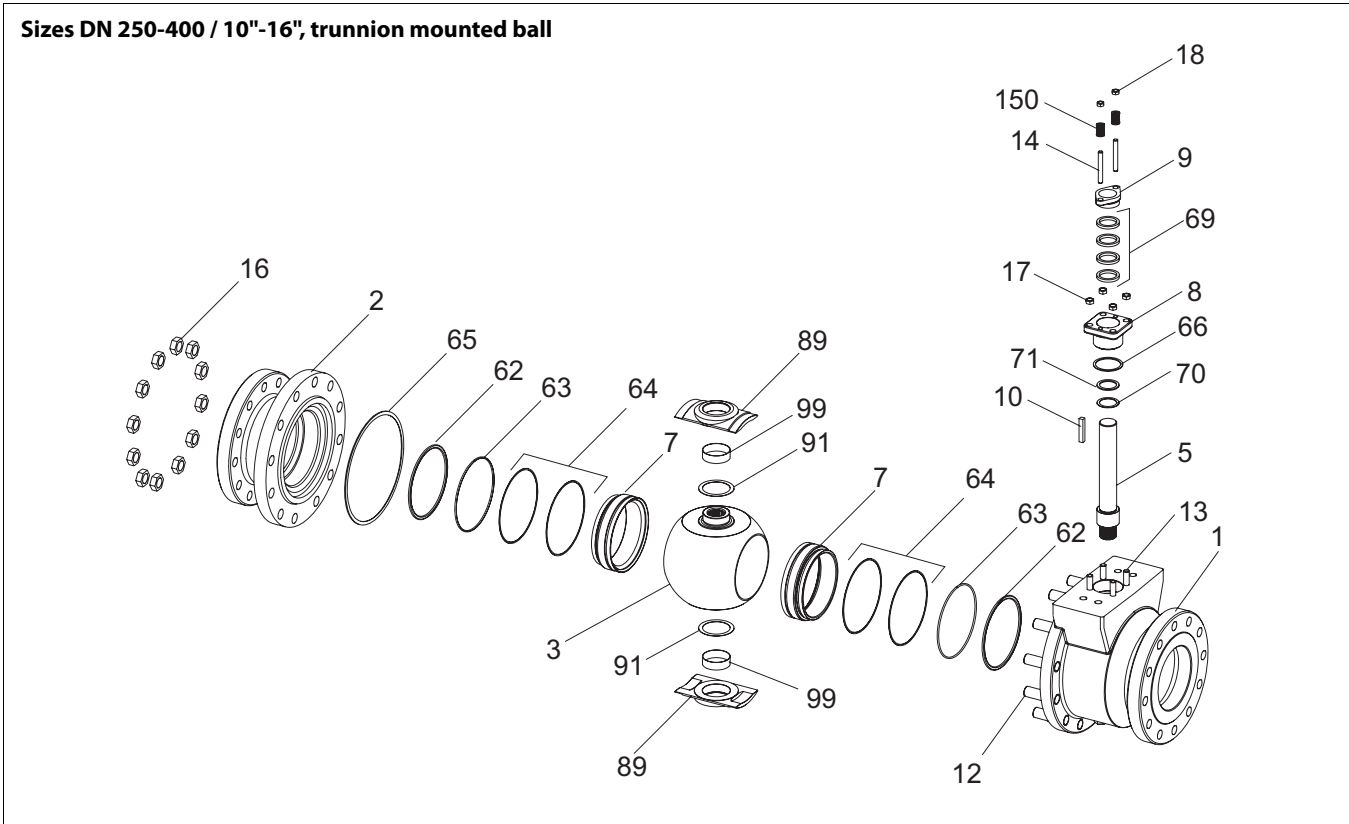


**PARTS LIST**

| 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 DN50 ... 300<br>Thrust ring DN25 ... 40 | Stainless steel CF8M<br>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 A2-70  |      |         |
| 14   | Stud  | Stainless steel A2-70  |      |         |
| 16   | Hexagon nut   | Stainless steel A2-70  |      |         |
| 18   | Hexagon nut   | Stainless steel A2-70  |      |         |
| 25   | Seat (E)  | Stainless steel + cobalt based alloy                           |      |         |
| 40   | Locking ring DN 250 - DN 300                          | 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   | PTFE, 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**

**Sizes DN 250-400 / 10"-16", trunnion mounted ball**



**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                                    |      |
| 7    | Seat             | Stainless steel + cobalt based alloy                     | PTFE |
| 8    | Bonnet           | Stainless steel CF8M                                     |      |
| 9    | Gland            | Stainless steel CF8M                                     |      |
| 10   | Key              | Stainless steel AISI 329                                 |      |
| 12   | Stud             | Stainless steel A2-70                                    |      |
| 13   | Stud             | Stainless steel A2-70                                    |      |
| 14   | Stud             | Stainless steel A2-70                                    |      |
| 16   | Hexagon nut      | Stainless steel A2-70                                    |      |
| 17   | Hexagon nut      | Stainless steel A2-70                                    |      |
| 18   | Hexagon nut      | Stainless steel A2-70                                    |      |
| 62   | Seat spring      | Alloy 625  |      |
| 63   | Back seal        | O-ring (FKM)   |      |
| 64   | Back-up ring     | PTFE   |      |
| 65   | Body gasket      | Stainless steel AISI 316 + PTFE filled spiral wound      |      |
| 66   | Bonnet gasket    | PTFE   |      |
| 69   | Packing ring     | PTFE   |      |
| 70   | Thrust bearing   | Cobalt based allo  |      |
| 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) |      |

## TECHNICAL SPECIFICATION

### Product type

Flanged full bore, ball valve.  
Split body design.  
Seat supported design DN 25 ... 300  
Trunnion design DN 250 ... 400

### Pressure ratings

PN 10, 16, 25, 40.

### Size range

DN 25 ... 400.

### Temperature range

-50 ... +260 °C. Depending on the seat material.

### Design standards

Valve body DIN 3840, ISO 7121  
Valve flanges PN 10 - 40  
Face-to-face ISO 5752/EN 558-1. Basic series 3, 4 or 12 depending on size and pressure class.

### 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 A2-70

### Certification

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

### Standard options

Degreasing.  
Q-Trim.  
Anti-Static. (ATEX).  
Live loaded construction.

### Valve testing

Each valve is tested for body integrity and seat tightness. The body test pressure is 1.5 x PN. The seat test pressure for metal seated valves is 1.1 x PN. The seat test pressure for soft seats is 6 bar.

The test medium is inhibited water. Air test upon request.

### Valve tightness

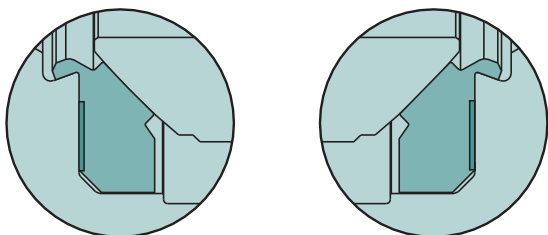
ISO 5208 Rate D for metal seats as standard.  
Soft seated seat supported valves are bubble tight.  
Other tightness rates upon request.

### C<sub>v</sub> (K<sub>v</sub>) -values and resistance coefficients

| Valve size<br>DN | M1                 |                    |       | M1 with Q-Trim     |                    |
|------------------|--------------------|--------------------|-------|--------------------|--------------------|
|                  | C <sub>v</sub> 90° | K <sub>v</sub> 90° | ξ 90° | C <sub>v</sub> 90° | K <sub>v</sub> 90° |
| 25               | 105                | 91                 | 0.08  | -                  | -                  |
| 40               | 250                | 220                | 0.07  | -                  | -                  |
| 50               | 490                | 425                | 0.06  | 84                 | 73                 |
| 65               | 830                | 720                | 0.06  | -                  | -                  |
| 80               | 1160               | 1000               | 0.05  | 245                | 210                |
| 100              | 2200               | 1900               | 0.05  | 530                | 460                |
| 125              | 3360               | 2900               | 0.05  | -                  | -                  |
| 150              | 5100               | 4400               | 0.04  | 1360               | 1180               |
| 200              | 9300               | 8000               | 0.04  | 2330               | 2020               |
| 250              | 15200              | 13200              | 0.04  | 3920               | 3400               |
| 300              | 22400              | 19400              | 0.03  | 5600               | 4850               |
| 350              | 30500              | 26400              | 0.03  | 6860               | 5930               |
| 400              | 39800              | 34500              | 0.03  | 9190               | 7950               |

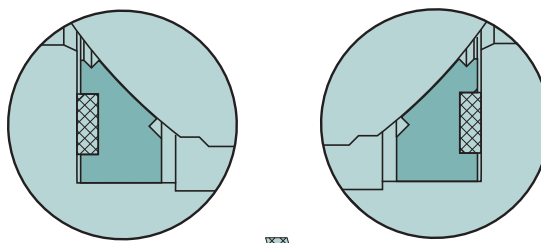
## STANDARD SEAT OPTIONS

### Locked scraping seat P



Materials:  
Seats Stainless steel + cobalt based alloy  
Seals PTFE  
Temperature range -50 ... +260 °C  
Size range DN 25 - 300

### General scraping seat S



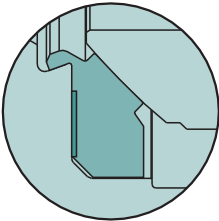
Non-compressed form of the PTFE back seal.

Materials:  
Seats Stainless steel + cobalt based alloy  
Seals PTFE  
Temperature range -50 ... +230 °C  
Size range DN 25 - 300

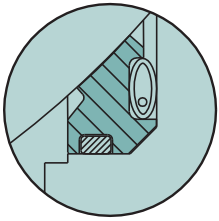
### STANDARD SEAT OPTIONS

#### Scraping seat E for low Δp-applications

Body



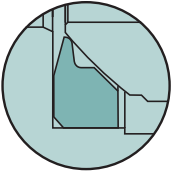
Body cap



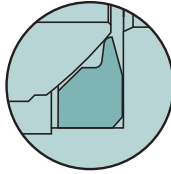
← PREFERRED TIGHTNESS DIRECTION

|  |   |
|--|---|
| <p>Seats<br/>Locked seals<br/>Spring assisted seals<br/>Springs<br/>Temperature range<br/>Maximum Δp</p> | <p>Stainless steel + cobalt based alloy<br/>PTFE<br/>Viton® GF O-ring.<br/>UNS N06625<br/>-30 ... +200 °C<br/>16 bar.</p> |
| <p>Note Available only on sizes DN 25 - 300</p>  |   |

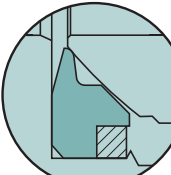
#### Soft seat X, for general use



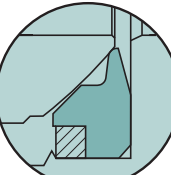
DN 25 - 200



DN 250 - 300



DN 25 - 200

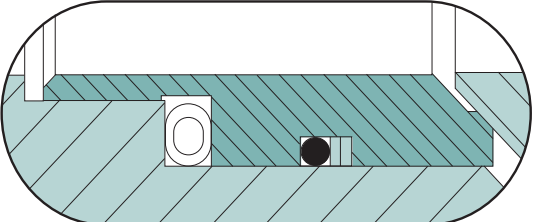


DN 250 - 300

Temperature ranges:

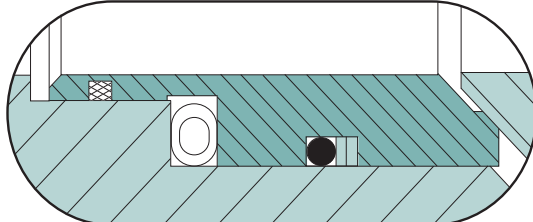
|                            |                                   |
|----------------------------|-----------------------------------|
| Xtreme (X)                 | -50 ... +260 °C DN 25 - 200       |
| PTFE (T)                   | -50 ... +200 °C DN 250 & 300      |
| Reinforced with carbon (M) | -50 ... +230 °C DN 125, 250 & 300 |

#### S seat for trunnion valves



|              |                               |
|--------------|-------------------------------|
| Ball seat:   | SS steel + Cobalt based alloy |
| Seat seal:   | Viton® GF O-ring.             |
| Spring:      | INCONEL 625.                  |
| Temp. range: | -30 ... +200 °C               |

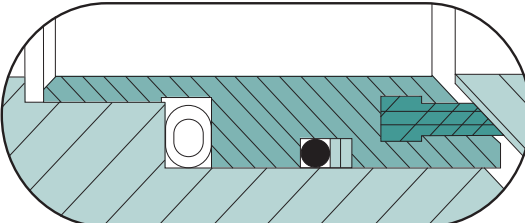
#### P seat for trunnion valves



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

For temperatures over the specified ranges contact Metso.  
Note: Max. operating pressure differentials for each seat type, see page 6.

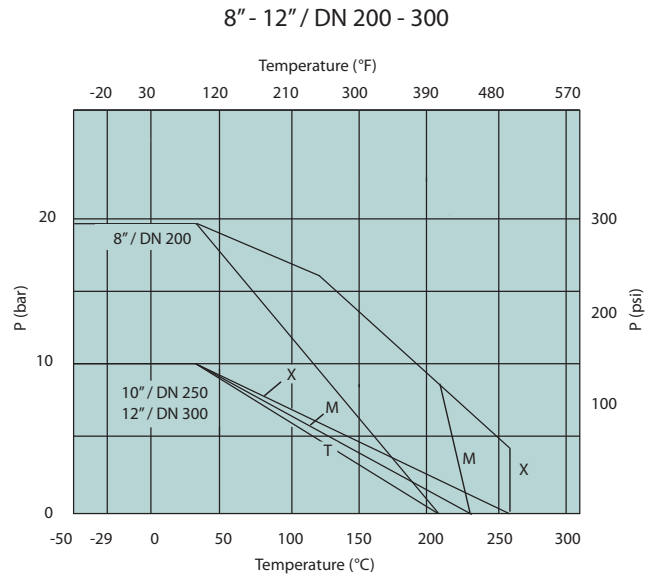
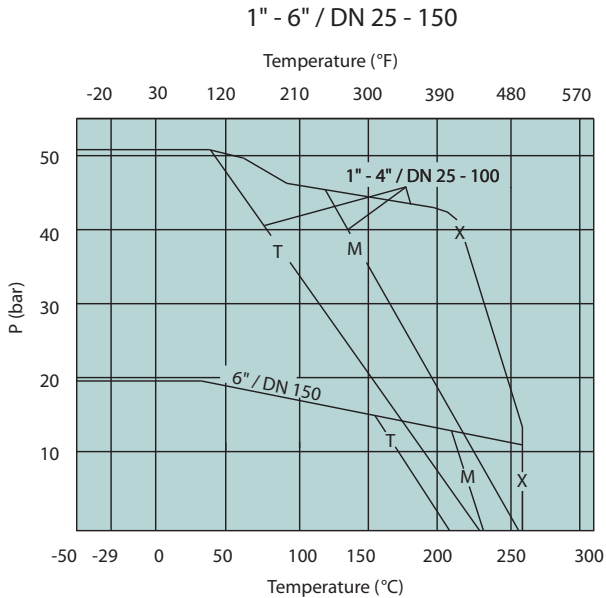
#### T soft seat



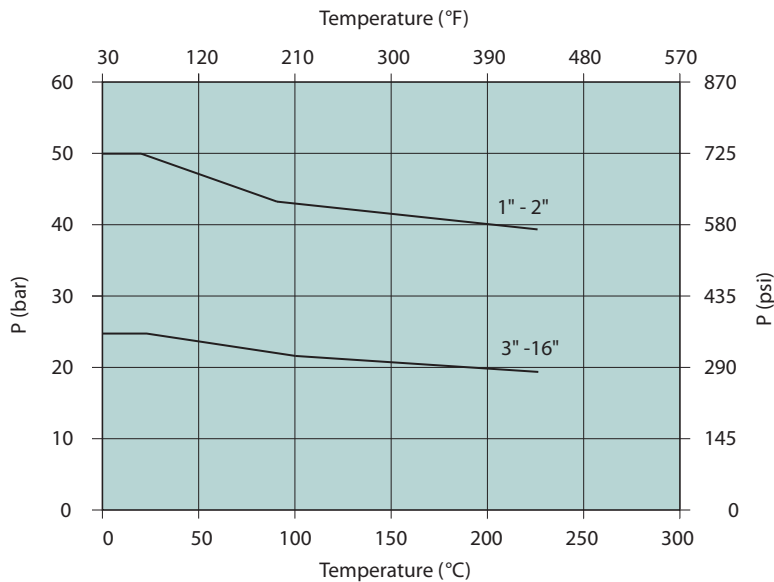
|              |                  |
|--------------|------------------|
| Ball seat:   | PTFE.            |
| Seat body:   | Stainless steel. |
| Seat seal:   | Viton GF O-ring. |
| Spring:      | INCONEL 625.     |
| Temp. range: | -30 ... +200 °C  |

## VALVE SEAT RATINGS

### Seat supported valves, maximum operating pressure for soft seats



### Maximum operating pressure for metal seats



Soft seat ratings are based on differential pressure with the valve ball in fully closed position and refer seats only.

## ACTUATOR SELECTION

M1-valve can be equipped with the following Metso actuator types:

**B1C/B1J** Pneumatic double acting or spring return actuator. Actuators available for size range DN 25 - 400.

**M** M-series manual gear operator for valve sizes DN 25-300.

**LK** Hand lever for valve sizes DN 25-100.

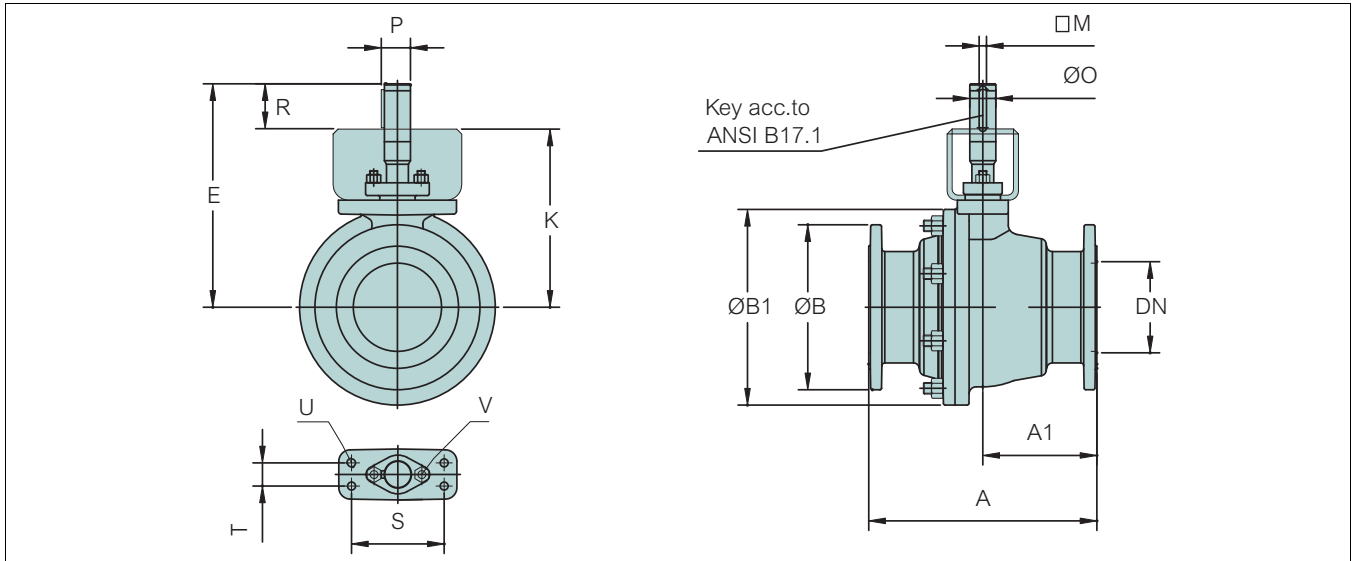
When selecting other than Metso actuators please contact your local Metso representative.

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 Metso Nelprof(R) Control and On-Off sizing and selection software. You can get a copy from you local sales office.

## DIMENSIONS



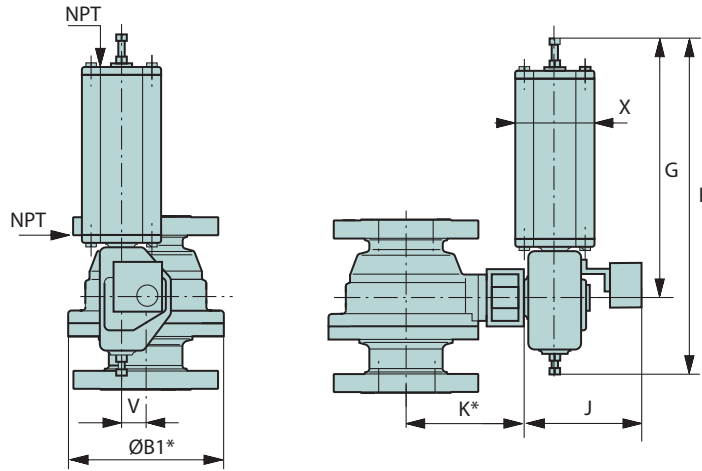
## SEAT SUPPORTED VALVES

| TYPE<br>PN                  | DN  | DIMENSIONS (mm) |       |     |     |     |     |       |    |      |     |       |     |     |     | WEIGHT (kg) |      |
|-----------------------------|-----|-----------------|-------|-----|-----|-----|-----|-------|----|------|-----|-------|-----|-----|-----|-------------|------|
|                             |     | A               | A1    | ØB  | ØB1 | E   | K   | M     | ØO | P    | R   | S     | T   | U   | V   | M1          | Q-M1 |
| M1M<br>PN40<br>(10, 16, 25) | 25  | 165             | 74    | 124 | 110 | 178 | 150 | 4.76  | 15 | 17   | 28  | 70    | -   | M10 | M8  | 5           | -    |
|                             | 40  | 165             | 70    | 155 | 145 | 206 | 168 | 4.76  | 20 | 22   | 38  | 70    | -   | M10 | M10 | 8           | -    |
|                             | 50  | 178             | 79    | 165 | 146 | 215 | 168 | 6.35  | 25 | 27.8 | 47  | 110   | 32  | M12 | M10 | 13          | 14   |
| M1M<br>PN40<br>(25)         | 65  | 270             | 135   | 185 | 154 | 223 | 176 | 6.35  | 25 | 27.8 | 47  | 110   | 32  | M12 | M10 | 20          | -    |
|                             | 80  | 282             | 141   | 200 | 195 | 237 | 190 | 6.35  | 25 | 27.8 | 47  | 110   | 32  | M12 | M10 | 30          | 32   |
|                             | 100 | 305             | 152.5 | 235 | 252 | 309 | 250 | 9.52  | 35 | 39.1 | 59  | 130   | 32  | M12 | M10 | 50          | 55   |
|                             | 125 | 325             | 162.5 | 270 | 280 | 331 | 272 | 9.52  | 35 | 39.1 | 59  | 130   | 32  | M12 | M10 | 80          | -    |
|                             | 150 | 403             | 201.5 | 300 | 346 | 386 | 305 | 12.70 | 45 | 50.4 | 81  | 160   | 40  | M16 | M14 | 120         | 130  |
| M1L<br>PN25                 | 200 | 502             | 251   | 360 | 432 | 476 | 385 | 12.70 | 55 | 60.6 | 91  | 160   | 55  | M20 | M14 | 200         | 220  |
|                             | 250 | 568             | 284   | 425 | 512 | 582 | 472 | 15.87 | 65 | 71.9 | 110 | 230   | 90  | M24 | M20 | 295         | 335  |
|                             | 300 | 648             | 324   | 485 | 584 | 685 | 555 | 19.05 | 75 | 83.1 | 130 | 307.4 | 120 | M30 | M20 | 450         | 505  |
| M1K<br>PN16<br>(10)         | 65  | 270             | 135   | 185 | 154 | 223 | 176 | 6.35  | 25 | 27.8 | 47  | 110   | 32  | M12 | M10 | 20          | -    |
|                             | 80  | 203             | 101.5 | 200 | 184 | 237 | 190 | 6.35  | 25 | 27.8 | 47  | 110   | 32  | M12 | M10 | 20          | 22   |
|                             | 100 | 229             | 114.5 | 220 | 236 | 309 | 250 | 9.52  | 35 | 39.1 | 59  | 130   | 32  | M12 | M10 | 35          | 37   |
|                             | 125 | 325             | 162.5 | 270 | 280 | 331 | 272 | 9.52  | 35 | 39.1 | 59  | 130   | 32  | M12 | M10 | 80          | -    |
|                             | 150 | 394             | 197   | 285 | 338 | 386 | 305 | 12.70 | 45 | 50.4 | 81  | 160   | 40  | M16 | M14 | 100         | 110  |
| M1K<br>PN16                 | 200 | 457             | 228.5 | 340 | 426 | 476 | 385 | 12.70 | 55 | 60.6 | 91  | 160   | 55  | M20 | M14 | 160         | 180  |
|                             | 250 | 533             | 266.5 | 405 | 512 | 582 | 472 | 15.87 | 65 | 71.9 | 110 | 230   | 90  | M24 | M20 | 280         | 320  |
|                             | 300 | 610             | 305   | 460 | 584 | 685 | 555 | 19.05 | 75 | 83.1 | 130 | 307.4 | 120 | M30 | M20 | 420         | 475  |
| M1J<br>PN10                 | 200 | 457             | 228.5 | 340 | 426 | 476 | 385 | 12.70 | 55 | 60.6 | 91  | 160   | 55  | M20 | M14 | 160         | 180  |
|                             | 250 | 533             | 266.5 | 405 | 512 | 582 | 472 | 15.87 | 65 | 71.9 | 110 | 230   | 90  | M24 | M20 | 280         | 320  |
|                             | 300 | 610             | 305   | 460 | 584 | 685 | 555 | 19.05 | 75 | 83.1 | 130 | 307.4 | 120 | M30 | M20 | 420         | 475  |





**VALVE + B1C/B1J/B1JA**



**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 M

| 1. | 2. | 3. | 4. | 5.  | 6. | 7. | 8. | 9. | 10. |
|----|----|----|----|-----|----|----|----|----|-----|
|    | M1 | M  | A  | 150 | A  | P  | V  | A  | /   |

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

| 2. sign | Valve series, face-to-face length   |
|---------|---|
| M1      | Full bore, seat supported, f-to-f length acc. to ISO 5752 basic series 3, 4, 12 or 15 depending on size and pressure class. Seat supported DN 025-300, trunnion mounted DN 250-400. |

| 3. sign | Pressure rating of body and flanges |
|---------|-------------------------------------|
| J       | PN10                                |
| K       | PN16                                |
| L       | PN25                                |
| M       | PN40                                |

| 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   | 025, 040, 050, 065, 080, 100, 125, 150, 200, 250, 300 |
| Trunnion mounted valves | 250, 300, 350, 400                                    |

| 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 (DN250-400) | A2 - 70 / metric          |
| C       | CG8M  | CG8M (+ Hard Chrome, if metal seat)                       | AISI 329 trunnion mounted: XM-19 (DN250-400) | A2 - 70 / metric          |
| U       | CK-3MCuN  | CK-3MCuN (& ceramic coating, if metal seat)               | UNS S31254                                   | A2 - 70 / metric          |
| 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       | A2 - 70 / metric          |
| T       | Titanium gr C-2                                 | Titanium gr. C-2 (soft seats only)                        | Titanium gr 5                                | A2 - 70 / metric          |
| X       | 4A  | 4A (+ Hard Chrome, if metal seat)                         | AISI 329 trunnion mounted: XM-19 (DN250-400) | A2 - 70 / metric          |

| 7. sign | Materials |                                     |                  |                    |
|---------|-----------|-------------------------------------|------------------|--------------------|
|         | Seat type | Seat material                       | Bearing material | Back seal material |
| P       | locked    | SS+ Cobalt based hard facing        | PTFE + Graphite  | PTFE               |
| X       | soft      | Xtreme®                             | PTFE + Graphite  | -                  |
| T       | soft      | PTFE                                | PTFE + Graphite  | -                  |
| S       | unlocked  | SS+ Cobalt based hard facing        | PTFE + Graphite  | PTFE               |
| E*      | low Δp    | SS+ Cobalt based hard facing        | PTFE + Graphite  | PTFE / FPM         |
| C       | locked    | CK-3MCuN + Cobalt based hard facing | PTFE + Graphite  | PTFE               |
| 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   |
|----------|--|
|          | EN 1092-1 Type B1 (Ra 3.2 - 12.5), standard, without sign (M1) |

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