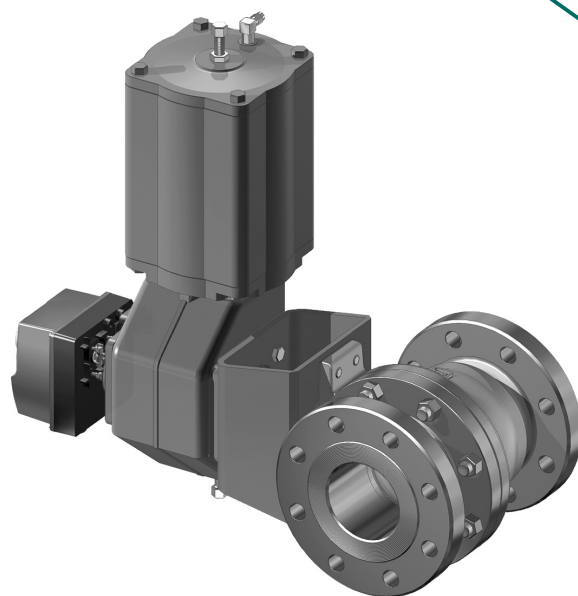


## NELES® METAL SEATED BALL VALVES, SEAT SUPPORTED, FULL AND REDUCED BORE, SERIES X

Metso's Neles® series X is a seat supported modular ball valve. Neles X series valves incorporate robust stem to ball connection. This assures valves are delivering solid long lasting performance in high cycle isolation and control applications. Application based seat selection assures valves are capable of delivering long lasting tightness even in most demanding applications including abrasive fluids and solids handling. Valve modularity widens the options in material selections to meet application specific requirements. Valve series meets modern industry requirements concerning safety and emissions.



### Applications

- Chemical and petrochemical plants
- Oil and gas production
- Power plants
- Other process industry applications
- Liquids, gas and steam
- From cryogenic to high temperature service
- Hydrocarbons
- Catalyst handling
- Moderate control and tight shut-off applications
- Emergency valves ESD/ESV
- LNG

### Size range

- 1" – 8" / DN 25 – 200 in full bore
- 3" - 8" / DN 80 - 200 in reduced bore
- For larger sizes, up to 16" / DN 400, see bulletin 1 X 22 for trunnion mounted designs.

### Pressure classes

- ASME Class 150 and 300.
- ASME Class 600, see bulletin 1 X 23.

### Tightness

- Floating ball design assures good tightness even with metal seats, and low shut-off pressures.

### Versions, details

- Live-loaded graphite packing assures long operation and low emission level.
- Spiral wound body joint gasket.
- Q-TRIM® option for noise abatement and cavitation.
- Scraping seat as standard; can be locked.
- Spline driver connection for reliable torque transmission.
- Fire tested API 607, with selected construction and seat design.
- Trunnion mounted versions – see bulletin 1 X 22.
- Soft seated versions - see bulletin 1 X 27 (full & reduced bore)

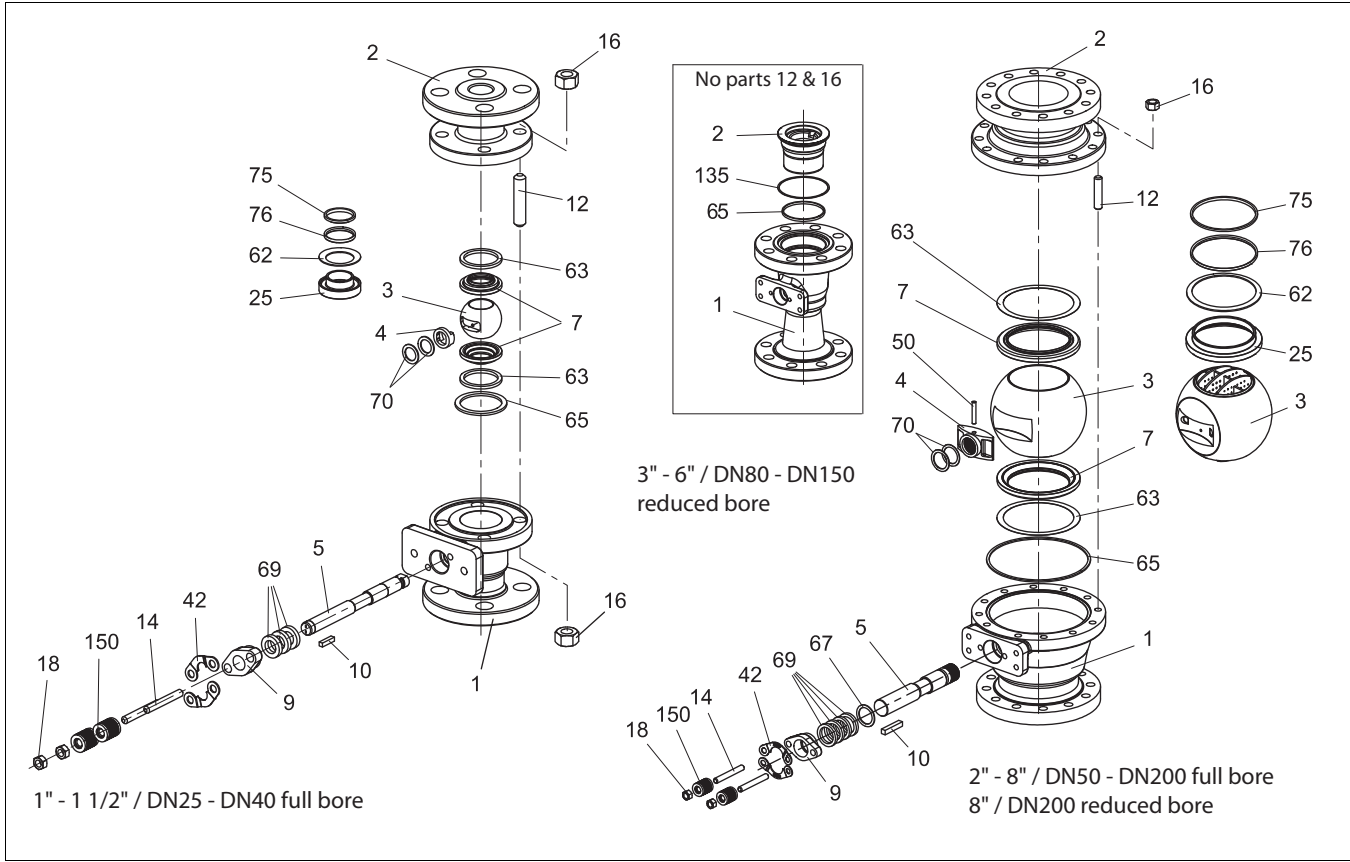
### Full bore

- Maximum Cv per nominal size.
- Cylindrical flow path allows low flow resistance.
- Full bore design for API requirements.

### Minimized emissions

- Live-loaded gland packing.
  - ISO 15848 with graphite packing
  - TA-Luft with graphite packing
  - Clean Air Act.
- Off-center body joint, sizes 1" - 8" full bore and 8" reduced bore.
- One piece body in reduced bore sizes 3" - 6".
  - Uninterrupted circular spiral wound body gasket.
  - No bending forces to gland packing.

**EXPLODED VIEW**



**PARTS LIST**

Item	Part description	Material		
1	Body	Stainless steel CF8M	Carbon steel WCB	Chrome Moly C5
2	Body cap	Stainless steel CF8M / AISI 316	Carbon steel WCB	Chrome Moly C5
	Insert 3" - 6" / DN80 - 150 reduced bore	Stainless steel CF8M / AISI 316	Carbon steel WCB	Chrome Moly C5
3	Ball / Q-TRIM ball	Stainless steel AISI 316 / CF8M		
4	Spline driver 2" - 8" / DN 50 - 200	Stainless steel CF8M		
	Thrust ring 1" - 1 1/2" / DN25 - 40	AISI 316		
5	Shaft	Stainless steel XM-19		
7	Ball seat	Stainless steel + cobalt based alloy		
9	Gland	Stainless steel CF8M		
10	Key	Stainless steel AISI 329		
12	Stud (not in reduced bore 3" - 6" / DN80 - 150)	ASTM A 193 gr. B8M	ASTM A 320 gr. L7M	
		ASTM A 193 gr. B8M	ASTM A 320 gr. L7M	
14	Stud	ASTM A 193 gr. B8M		
16	Hexagon nut (not in reduced bore 3" - 6" / DN80 - 150)	ASTM A 193 gr. 8M		
18	Hexagon nut	ASTM A 193 gr. 8M		
25	Ball seat (H)	Stainless steel + cobalt based alloy		
42	Retainer plate	Stainless steel AISI 316		
50	Locking pin	Stainless steel XM-19		
62	Seat spring	Alloy 825 / F6NM		
63	Back seal	PTFE or graphite		
65	Body gasket	Stainless steel AISI 316 + PTFE or graphite filled spiral wound		
67	Thrust ring	Stainless steel AISI 316		
69	Packing ring	PTFE or graphite		
70	Thrust bearing	Cobalt based alloy or PTFE		
75	Seat seal (H)	Graphite		
76	Back-up ring	Stainless steel AISI 316		
135	Gasket (only in reduced bore 3" - 6" / DN80 - 150)	Graphite or PTFE		
150	Disc spring set	Electroless nickel plated spring steel (EN 10083-1.8159)		

## TECHNICAL SPECIFICATION

### Product type

Full bore, seat supported ball valve  
Floating ball design  
Split body design

### Pressure ratings

ASME 150 and 300

### Size range

1" – 8" / DN25 - 200 in full bore  
3" - 8" / DN80 - 200 in reduced bore

### Temperature range

-200 ... +600 °C / -330 ... 1110 °F, consult factory for higher temperature applications.

### Design standards

Valve body ASME B16.34  
Valve flanges ASME B16.5  
Face-to-face ASME B16.10 long pattern, full bore  
ASME B16.10 short pattern, reduced bore  
Actuator mounting ISO 5211

### Standard materials

Body: WCB, C5 and CF8M  
Ball: CF8M + hard chrome or other special coatings with metal seats  
Bearings: PTFE or cobalt based alloy  
Seats: stainless steel + cobalt based alloy  
Seals/gaskets: PTFE or graphite  
Body gasket: spiral wound with PTFE or graphite filler  
Gland packing: PTFE (V-rings) or graphite  
Standard bolting: L7M/2HM, B8M/8M.

### Material and test certification

EN 10204-3.1 material certificates for body and bonnet.  
Tightness test certificate.

### Standard options

Carbide or NiBo ball and seat coatings  
Spring loaded seat  
Solid proof seat  
Q-TRIM  
High temperature linkages (temperatures above +300 °C/+570 °F)  
Anti-static  
Oxygen construction for gaseous oxygen service.  
Cryogenic version (temperatures below -50 °C/-58 °F)  
Steam jacket  
Fire tested API 607, with selected constructions and seat designs  
NACE MR 0103 and MR 0175 on request based on application.

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

### Valve tightness

ISO 5208 Rate C or ANSI/FCI 70-2 class V for metal seats  
Other tightness rates upon request

- Rate B
- ANSI Class VI
- API 598

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

Valve size	Standard trim			Q-TRIM		
	inch / DN	C <sub>v</sub> 90°	K <sub>v</sub> 90°	ζ 90°	C <sub>v</sub> 90°	K <sub>v</sub> 90°
1 / 25		105	91	0.08	-	-
1 1/2 / 40		250	220	0.07	-	-
2 / 50		490	425	0.06	84	73
3 / 80		1160	1000	0.05	245	210
4 / 100		2200	1900	0.05	530	460
6 / 150		5100	4400	0.04	1360	1180
8 / 200		9300	8000	0.04	2330	2020

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

Valve size	Standard trim			Q-Trim		
	Inch / DN	C <sub>v</sub> 90°	K <sub>v</sub> 90°	ζ 90°	C <sub>v</sub> 90°	K <sub>v</sub> 90°
3 / 80		234	202	1.6	84	73
4 / 100		666	576	0.5	245	212
6 / 150		1022	884	1.0	530	458
8 / 200		2665	2305	0.5	1360	1176

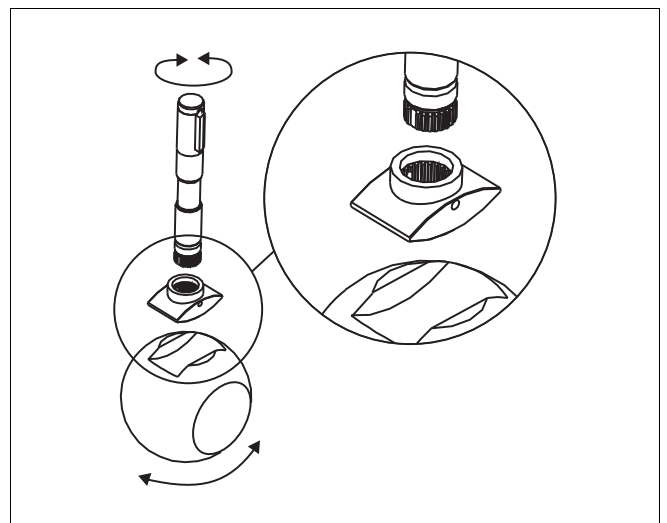
### THE ADVANTAGES OF THE SPLINE DRIVER

This unique design allows for a larger shaft to ball interface, which in turn minimizes the contact stress. This feature results in:

- excellent operational durability
- maximized torque transmission
- accurate operation,
- minimized mechanical backlash

For the end-user, these technical advantages offer longer valve life, less maintenance, more economical and safer processes.

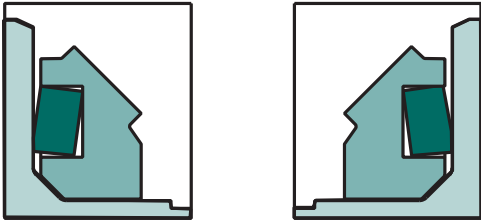
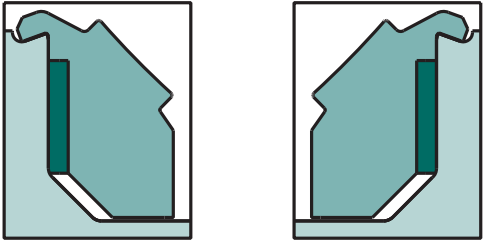

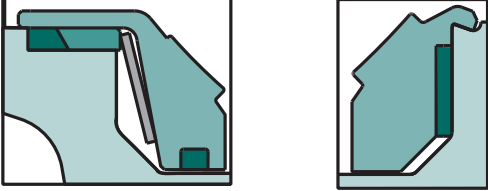
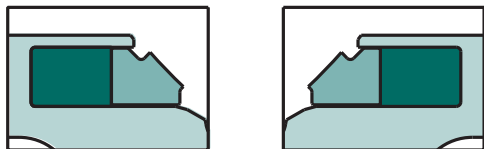
The spline driver construction is available in valve sizes 2" - 8" / DN50 - 200.



**STANDARD SEATS CONSTRUCTIONS AND MATERIALS**

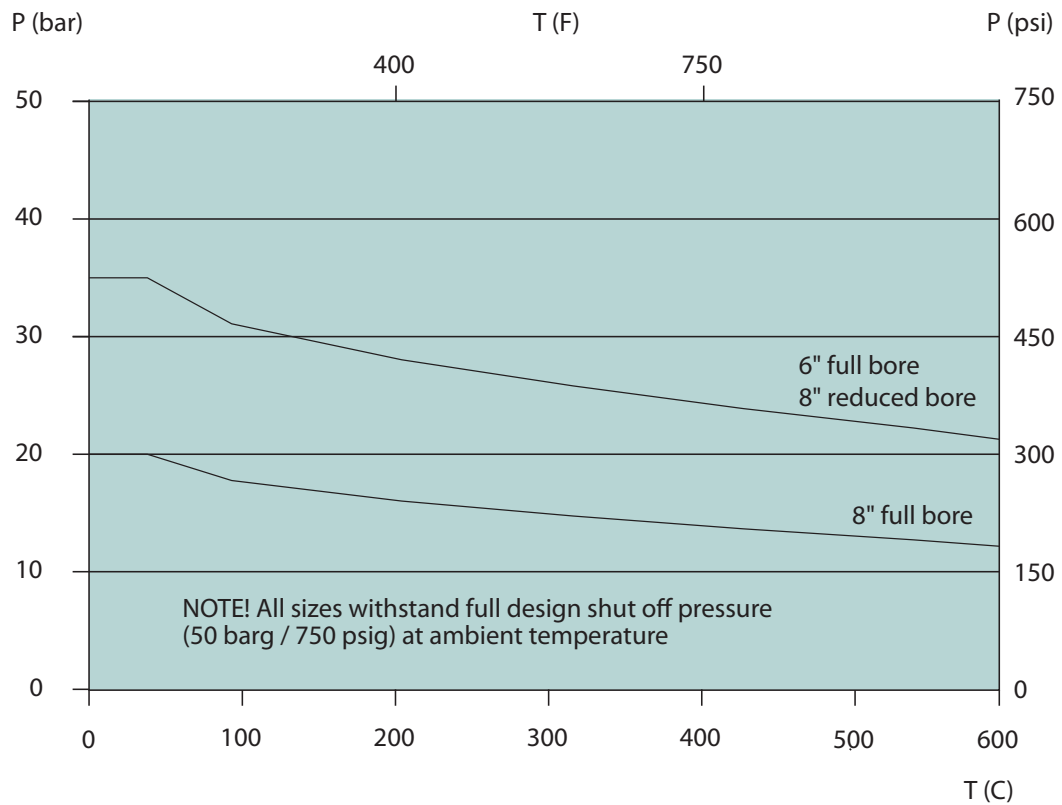
**Seat type**

**Standard materials**

<p><b>S</b>     <b>Scraping general seat</b></p>  <p>1" - 8"</p>	<p>Ball seat:     Stainless steel + hard facing                      Seat seal:     PTFE                      Temp. range: -50 ...+230 °C / -58 ...+440 °F                      Note:           Available only in sizes 1"...8" / DN 25...200</p>
<p><b>K</b>     <b>Scraping locked seat</b></p>  <p>1" - 8"</p>	<p>Ball seat:     Stainless steel + hard facing                      Seat seal:     PTFE                      Temp. range: -50 ...+260 °C / -58 ...+480 °F                      Note:           Available in sizes 1"...8" / DN 25...200</p>
<p><b>H</b>     <b>High temperature seat</b></p>  <p>1" - 8"</p>	<p>Ball seat:     Stainless steel + hard facing                      Seat seal:     Graphite                      Spring:        INCOLOY 825 (NPS 1"-6") / F6NM (NPS 8")                      Temp. range (Inc 825):                                       -200 ... +538 °C / -330 ...+1000 °F                      Temp. range (F6NM):                                       -75 ... +425 °C / -103 ...+800 °F                                       (+600 °C/+1110 °F with NiBo or carbide coated ball and Inconel 718 spring)</p>
<p><b>G</b>     <b>Dust proof seat</b></p>  <p>1" - 8"</p>	<p>Ball seat:     Stainless steel + hard facing                      Seat seal:     Graphite                      Spring:        INCOLOY 825 (NPS 1"-6") / F6NM (NPS 8")                      Temp. range (Inc 825):                                       -200 ... +538 °C / -330 ...+1000 °F                      Temp. range (F6NM):                                       -75 ... +425 °C / -103 ...+800 °F                                       (+600 °C/+1110 °F with NiBo or carbide coated ball and Inconel 718 spring)</p>
<p><b>J</b>     <b>Solids proof seat</b></p> 	<p>Ball seat:     SS steel + hard facing                      Seat seal:     Graphite                      Temp. range: -50 ... +600 °C / -58 ...+1110 °F                      NOTE:        Available only with carbide or NiBo coated ball.                                       Available only in sizes 2"- 6" / DN 50 - 150                                       Max. dP 30 bar.</p>

Soft seated versions - see bulletin 1 X 27 (full and reduced bore types).

### MAXIMUM OPERATIONAL PRESSURE DIFFERENTIAL Metal seated ASME Class 300



### ACTUATOR SELECTION

X series 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 - 200 / 1"-8"; B1C/B1J actuators have an ISO 5211 mounting face.

**M** Gear operator for valve sizes DN 25-200 / 1"-8".

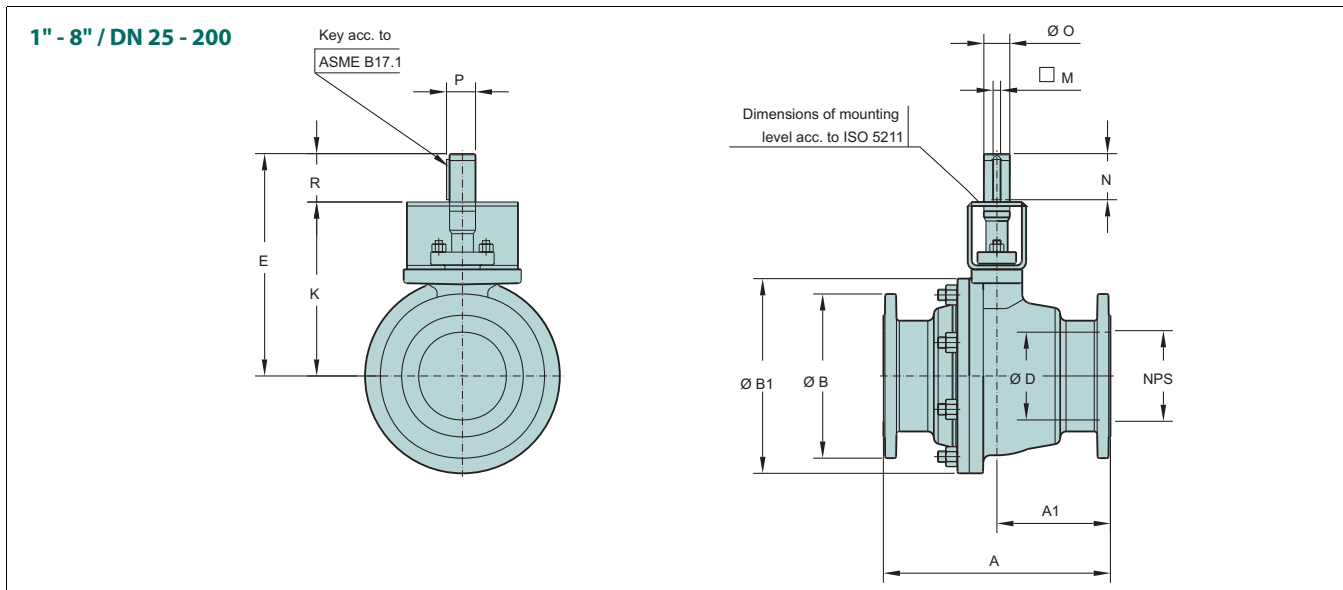
**LX/LK** Hand lever for valve sizes DN 25-100 / 1"-4".

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

For the correct actuator selection in on-off service, you need to know the following process data:

- valve size and seat type
- supply pressure for the actuator
- maximum shut-off pressure across the valve

**DIMENSIONS, FULL BORE**

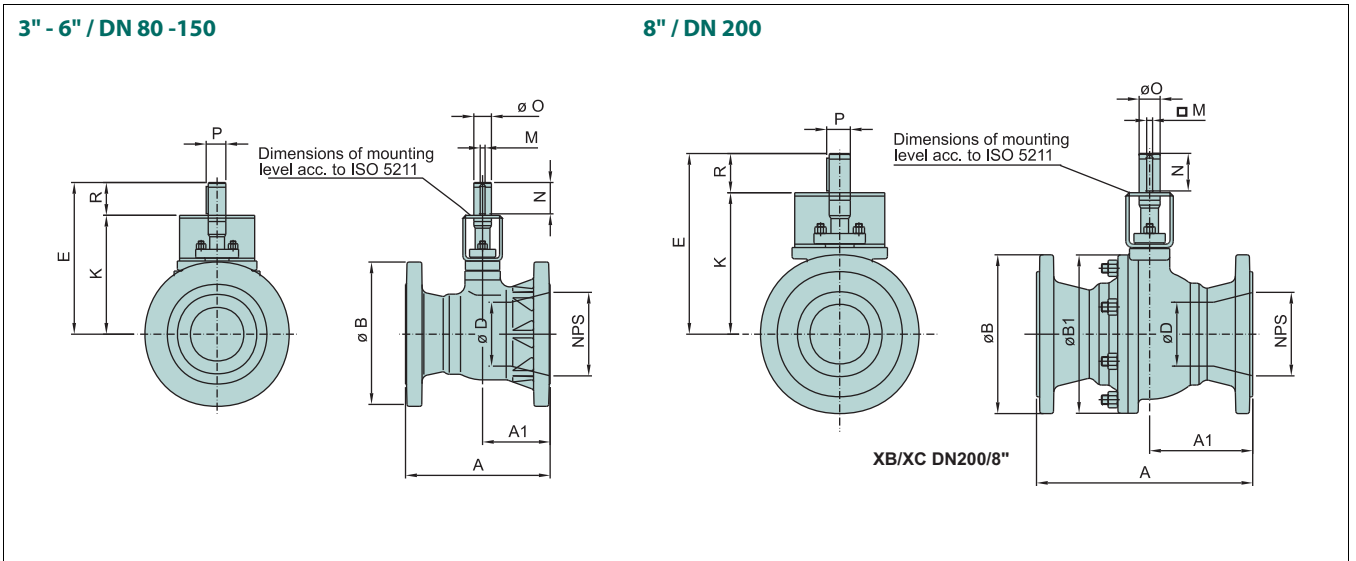


TYPE	SIZE	ISO FLANGE	DIMENSIONS, mm												kg
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P	R	
XT_C	1	F07	165	74	110	110	25.4	175	150	4.76	25	15	17	25	6
	1.5	F07	165	70	125	145	38.1	202	168	4.76	35	20	22	34	8
	2	F07, F10	178	79.0	150	146	50.8	215	168	6.35	46	25	27.8	47	11
	3	F07, F10, F12, F14	203	101.5	190	190	76.2	237	190	6.35	46	25	27.8	47	25
	4	F10, F12, F14	229	110.5	230	241	101.6	309	250	9.52	58	35	39.1	59	39
	6	F14, F16	394	197.0	280	338	152.4	386	305	12.70	80	45	50.4	81	93
XA_D	1	F07	165	74	125	110	25.4	175	150	4.76	25	15	17	25	7
	1.5	F07	191	70	155	145	38.1	202	168	4.76	35	20	22	34	11
	2	F07, F10	216	89.0	165	146	50.8	215	168	6.35	46	25	27.8	47	15
	3	F07, F10, F12, F14	282	141.0	210	195	76.2	237	190	6.35	46	25	27.8	47	35
	4	F10, F12, 14	305	152.5	255	252	101.6	309	250	9.52	58	35	39.1	59	59
	6	F14, F16	403	201.5	320	346	152.4	386	305	12.70	80	45	50.4	81	129
	8	F14, F16, F25	502	249.0	380	462	203.2	476	385	12.70	90	55	60.6	91	255

TYPE	SIZE	ISO FLANGE	DIMENSIONS, inch												lbs
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P	R	
XT_C	1	F07	6.50	2.91	4.25	4.33	1.00	6.89	5.91	0.19	0.98	0.59	0.67	0.98	13
	1.5	F07	6.50	2.76	5.00	5.71	1.50	7.95	6.61	0.19	1.38	0.79	0.87	1.39	18
	2	F07, F10	7.01	3.11	6.00	5.75	2.00	8.46	6.61	0.25	1.81	0.98	1.09	1.85	24
	3	F07, F10, F12, F14	7.99	4.00	7.50	7.48	3.00	9.33	7.48	0.25	1.81	0.98	1.09	1.85	55
	4	F10, F12, F14	9.02	4.35	9.00	9.49	4.00	12.17	9.84	0.37	2.28	1.38	1.54	2.32	86
	6	F14, F16	15.51	7.76	11.00	13.46	6.00	15.20	12.01	0.50	3.15	1.77	1.98	3.19	205
XA_D	1	F07	6.50	2.91	4.88	4.33	1.00	6.89	5.91	0.19	0.98	0.59	0.67	0.98	15
	1.5	F07	7.52	2.76	6.12	5.71	1.50	7.95	6.61	0.19	1.38	0.79	0.87	1.39	24
	2	F07, F10	8.50	3.50	6.50	5.75	2.00	8.46	6.61	0.25	1.81	0.98	1.09	1.85	33
	3	F07, F10, F12, F14	11.10	5.55	8.25	7.87	3.00	9.33	7.48	0.25	1.81	0.98	1.09	1.85	77
	4	F10, F12, 14	12.01	6.00	10.00	10.00	4.00	12.17	9.84	0.37	2.28	1.38	1.54	2.32	130
	6	F14, F16	15.87	7.93	12.50	13.90	6.00	15.20	12.01	0.50	3.15	1.77	1.98	3.19	284
	8	F14, F16, F25	19.76	9.80	15.00	18.19	8.00	18.74	15.16	0.50	3.54	2.17	2.39	3.58	561

FACE-TO-FACE DIMENSIONS ACC. TO ASME B16.10  
 PRESSURE RATINGS C=ASME 150, D=ASME 300  
 Valve is shown in closed position

**DIMENSIONS, REDUCED BORE**



**ASME 150**

TYPE	SIZE	ISO FLANGE	DIMENSIONS, mm											kg	
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P		R
XB	3	F07, F10	203	100	190	-	50.8	215	168	6.35	46	25	27.8	47	23
	4	F07, F10, F12, F14	229	107	230	-	76.2	237	190	6.35	46	25	27.8	47	34
	6	F10, F12, F14	267	126	280	-	101.6	309	250	9.52	58	35	39.1	59	82
	8	F14, F16	292	135	345	342	152.4	386	305	12.70	80	45	50.4	81	160

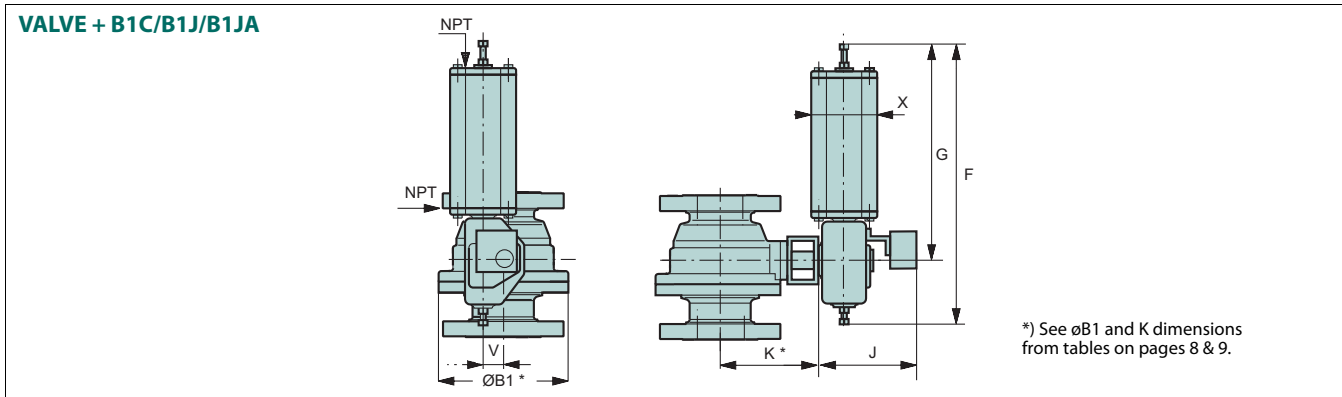
TYPE	SIZE	ISO FLANGE	DIMENSIONS, inch											lbs	
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P		R
XB	3	F07, F10	8.00	3.94	7.5	-	2.00	8.46	6.6	0.25	1.81	0.98	1.09	1.85	51
	4	F07, F10, F12, F14	9.00	4.21	9.0	-	3.00	9.33	7.5	0.25	1.81	0.98	1.09	1.85	75
	6	F10, F12, F14	10.50	4.98	11.0	-	4.00	12.17	9.8	0.37	2.28	1.38	1.54	2.32	180
	8	F14, F16	11.50	5.31	13.5	13.5	6.00	15.20	12.0	0.50	3.15	1.77	1.98	3.19	353

**ASME 300**

TYPE	SIZE	ISO FLANGE	DIMENSIONS, mm											kg	
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P		R
XC	3	F07, F10	283	100	210	-	50.8	215	168	6.35	46	25	27.8	47	31
	4	F07, F10, F12, F14	305	107	255	-	76.2	237	190	6.35	46	25	27.8	47	50
	6	F10, F12, F14	403	126	320	-	101.6	309	250	9.52	58	35	39.1	59	110
	8	F14, F16	419	209.5	380	353	152.4	386	305	12.70	80	45	50.4	81	235

TYPE	SIZE	ISO FLANGE	DIMENSIONS, inch											lbs	
			A	A1	ØB	ØB1	ØD	E	K	□M	N	ØO	P		R
XC	3	F07, F10	11.12	3.94	8.25	-	2.00	8.46	6.6	0.25	1.81	0.98	1.09	1.85	68
	4	F07, F10, F12, F14	12.00	4.21	10.0	-	3.00	9.33	7.5	0.25	1.81	0.98	1.09	1.85	110
	6	F10, F12, F14	15.88	4.98	12.5	-	4.00	12.17	9.8	0.37	2.28	1.38	1.54	2.32	242
	8	F14, F16	16.50	8.25	15.0	13.9	6.00	15.20	12.0	0.50	3.15	1.77	1.98	3.19	518

Face to face dimensions acc. to ASME B16.10  
 Valve is shown in closed position.



**B1C ACTUATOR**

Type	DIMENSIONS, mm					NPT	kg
	F	G	J	V	X		
B1C6	395	270	283	36	90	1/4	4.2
B1C9	450	315	279	43	110	1/4	9.6
B1C11	535	375	290	51	135	3/8	16
B1C13	640	445	316	65	175	3/8	31
B1C17	785	555	351	78	215	1/2	54
B1C20	880	590	385	97	215	1/2	73
B1C25	1075	725	448	121	265	1/2	131
B1C32	1370	920	525	153	395	3/4	256
B1C40	1670	1150	595	194	505	3/4	446
B1C50	2060	1350	690	242	610	1	830

Type	DIMENSIONS, inch					NPT	lbs
	F	G	J	V	X		
B1C6	15.55	10.63	11.14	1.42	3.54	1/4	9
B1C9	17.72	12.40	10.98	1.69	4.33	1/4	21
B1C11	21.06	14.76	11.42	2.01	5.31	3/8	35
B1C13	25.20	17.52	12.44	2.56	6.89	3/8	68
B1C17	30.91	21.85	13.82	3.07	8.46	1/2	119
B1C20	34.65	23.23	15.16	3.82	8.46	1/2	161
B1C25	42.32	28.54	17.64	4.76	10.43	1/2	289
B1C32	52.94	36.22	20.67	6.02	15.55	3/4	564
B1C40	65.75	45.28	23.43	7.64	19.88	3/4	983
B1C50	81.10	53.15	27.17	9.53	24.02	1	1829

**B1J/B1JA ACTUATOR**

Type	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

Type	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

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
XA	06	D	W	GA	J2	SJ	H	A	B	T

1. sign	VALVE SERIES & STYLE & FACE-TO-FACE
XT	Full bore, seat supported, face-to-face ASME B 16.10, Table 1, long pattern, ASME 150.
XA	Full bore, seat supported, face-to-face ASME 16.10, Table 2, long pattern, ASME 300.
XB	Reduced bore, seat supported, face-to-face ASME B 16.10, Table 1, short pattern, ASME 150.
XC	Reduced bore, seat supported, face-to-face ASME B 16.10, Table 2, short pattern, ASME 300.

2. sign	SIZE	
	Full bore	Reduced bore
01	1"	-
1H	1 1/2"	-
02	2"	-
03	3"	3"
04	4"	4"
06	6"	6"
08	8"	8"

3. sign	PRESSURE CLASS
C	ASME Class 150
D	ASME Class 300

4. sign	END CONNECTION STYLE
W	Raised face, ASME B 16.5, (Ra 3.2 - 6.3 / RMS 125 - 250), <b>standard</b>

5. sign	CONSTRUCTION & APPLICATION *)
GA	Standard construction. Live loaded packing.
GQ	Q-TRIM construction. Otherwise standard.
UU	UOP construction with solid proof J-seat
GZ	BAM tested non-metallic parts, for oxygen service. Double seated. Metal bearings; cobalt based alloy. Live loaded graphite packing. Temperature range -50...+200 °C. Max pressure per body rating. Oxygen cleaning acc. to Metso internal procedures.

\*) Consult factory for other constructions & applications

6. sign	BODY MATERIAL
J2	ASTM A216 gr WCB
S6	ASTM A351 gr CF8M
J5	ASTM A217 gr C5

7. sign	BALL / COATING & STEM MATERIAL
SJ	316SS / Hard Chrome & XM-19
RX	316SS / Chromium carbide, CrC & XM-19
RR	316SS / WC-CO & XM-19
RV	316SS / Tungsten carbide, TC2 & XM-19
SL	316SS / NiBo & XM-19

8. sign	SEAT TYPE, BACK SEALS AND SPRING MATERIAL		
	Seat type	Back seal	Spring
S	Metal, S	PTFE	-
K	Metal, K (locked)	PTFE	-
H	Metal, H	Graphite	Incoloy 825
G	Metal, H	Graphite	Incoloy 825
J	Metal	Graphite	-

9. sign	SEAT AND COATING MATERIAL	
	Seat material	Coating
A	316 Stainless Steel	Cobalt based hard facing
B	316 Stainless Steel	Chromium carbide, CrC-LF
R	316 Stainless Steel	Tungsten carbide, WC-CO
V	316 Stainless Steel	Tungsten carbide, TC2

10. sign	GASKET, PACKING & BEARING MATERIAL		
	Body gasket	Packing	Thrust bearing
A	PTFE	PTFE V-rings	Filled PTFE
B	Graphite	Graphite	Filled PTFE
C	PTFE	PTFE V-rings	Cobalt based alloy
D	Graphite	Graphite	Cobalt based alloy

11. sign	BOLTING MATERIALS			
	Pressure retaining		Packing gland bolting	
	Studs	Nuts	Studs	Nuts
For low emission gland packing design ISO 15848				
E*	B8M	8M	gr. 660	gr. 660
T**	L7M	2HM	B7	2H
For general service gland packing				
D*	B8M	8M	B8M	8M
F**	L7M	2HM	L7M	2HM

\* Bolting materials for stainless steel body

\*\* Bolting materials for carbon and low alloy steel body

NOTE: Other options available on application, consult factory

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