



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL



FEATURES

- Dual trunnion plates provide maximum stability and support to the ball, as well as help lower the torque required to operate
- Multiple seal sealing featuring a triple seal with dual O-ring seals and fire-safe gasket.
- Low torque for easy automation
- Bi-directional zero leakage – maximum life with minimum maintenance
- ISO 5211 mounting allows for easy automation
- API 607/ 6FA fire safe certification
- Compression springs provide uniform loading of seats, ensuring sealing at low pressures
- Low fugitive emissions

The **KTM** Virgo Series NL Trunnion Ball Valve was developed as a robust, cost effective valve that provides exceptional performance in upstream, midstream and downstream oil and gas. This valve delivers with outstanding performance not only in the Oil and Gas industry but in many other industries requiring a robust, cost effective valve. "Zero" leakage operation of this valve is provided via specially designed bi-directional soft seat. These seats are available in many different materials to provide outstanding performance in a large variety of process fluids. This valve was also created with the utmost safety in mind, featuring a fire safe design, built-in anti static protection, blowout-proof stem, and is SIL3 capable.

The valve is loaded with great features such as double block and bleed, sealant injection, increased corrosion allowance for longer life, and many others.

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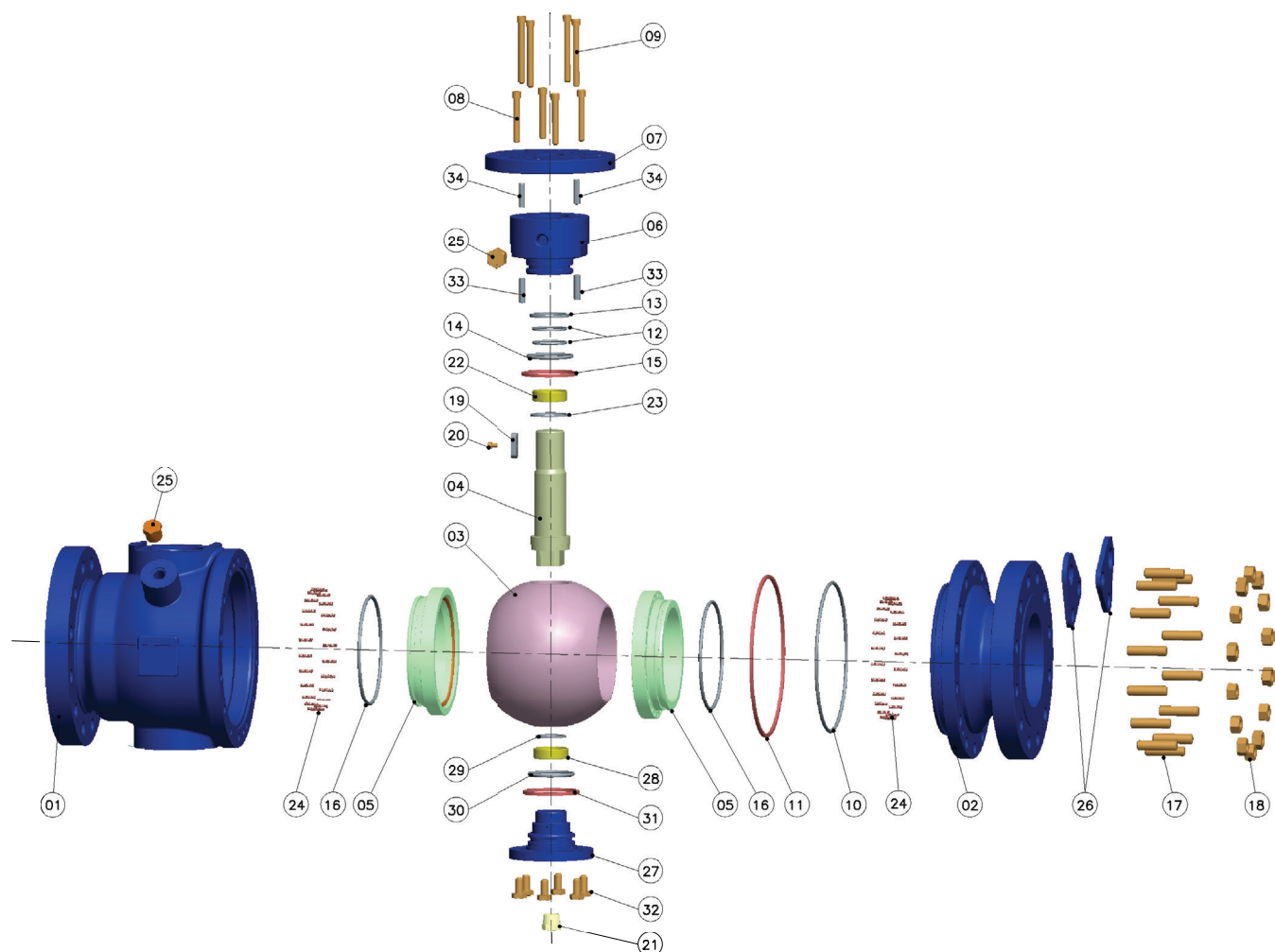
SPECIFICATIONS

Configurations:	Side entry 2-piece cast body up to 24" Side entry 3-piece forged 30" and larger
Sizes:	NPS 2, NPS 3, NPS 4, NPS 6, NPS 8, NPS 10, NPS 12, NP14, NPS 16, NPS 18, NPS 20, NPS 22, NPS 24, NPS 26, NPS28, NPS 30, NPS 36, NPS 40, NPS 42, NPS 44, NPS 48, NPS 52, NPS 56, NPS 60
End Connector Types:	Flanged Raised Face Serrated, Flanged RTJ, Flanged Raised Face Smooth, Flanged Flat Face Serrated, Flanged Flat Face Smooth, Butt Weld, Butt Weld with pup piece, Flanged RTJ (API 6A), Hub connection
End Connection Rating:	150#, 300#, 600#, 900#, 1500#, 2500#
Bore:	Full, Reduced
Body Materials:	WCB, LCB, WCC, LCC, CF8M or F316, CF3M or F316L, CF8 or F304, CF3 or F304L, Duplex (4A or F51), Super Duplex (6A or F55), Inconel (825 or Cu5MCuC), Inconel (625 or CW6MC), A105, LF2, F60 (Carbon Steel), F6A, Super Duplex (5A or F53), Duplex F60
Trim Materials (Ball / Seat Ring* / Stem):	A105 / A105 / 4140, LF2 / LF2 / 17-4 PH, LF2 / LF2 / LF2, 316 / 316 / 316, 316 / 316 / 17-4 PH, 316 / 316 / Duplex, 316 / 316 / Inconel, 316L / 316L / 316L, 304 / 304 / 304, F6A / F6A / 410, Duplex (4A or F51), Super Duplex (6A or F55), Inconel (825 or Cu5MCuC), Inconel (625 or CW6MC), 316 / 316 / XM-19, F60 (Carbon Steel), Super Duplex (5A or F53), Duplex F60
Seat Material:	RTFE, Devlon, PEEK, PCTFE (Kel F), Viton
Seal Materials:	HNBR, HNBR AED, HNBR Low Temp, FKM/Viton, FKM AED/ Viton AED, FKM Low Temp, FEPM, FFKM, EPDM, Lip Seals (Material as Specified), PTFE sealing (No graphite)
Reference Standards:	Design and Manufacturing: API 6D, API 608, API 6A, ASME B 16.34, BS EN ISO 17292 Face to Face: ASME B 16.10, API 6D Flange Dimensions: ASME B 16.5 (up to 24"), ASME B16.47 Series A (26" and above) Butt Weld Valve Ends: ASME B16.25 Pressure Tests: API 6D, API 598, BS EN 12266 -1 and 2 Fire Safety Test: API 607, API 6FA, BS EN ISO 10497 Quality/Product Certifications: ISO 9001, API 6D, PED 2014/68/EU, EAC (Russia), ATEX and OSHAS 18001 Safety Reliability: SIL3 Fugitive Emissions: ISO 15848 * Valve conforming to NACE MR 0175/MR 0103 can be supplied. Environmental restrictions may apply.

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SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 2, 3, 4, 6 FB CLASS 150, 300



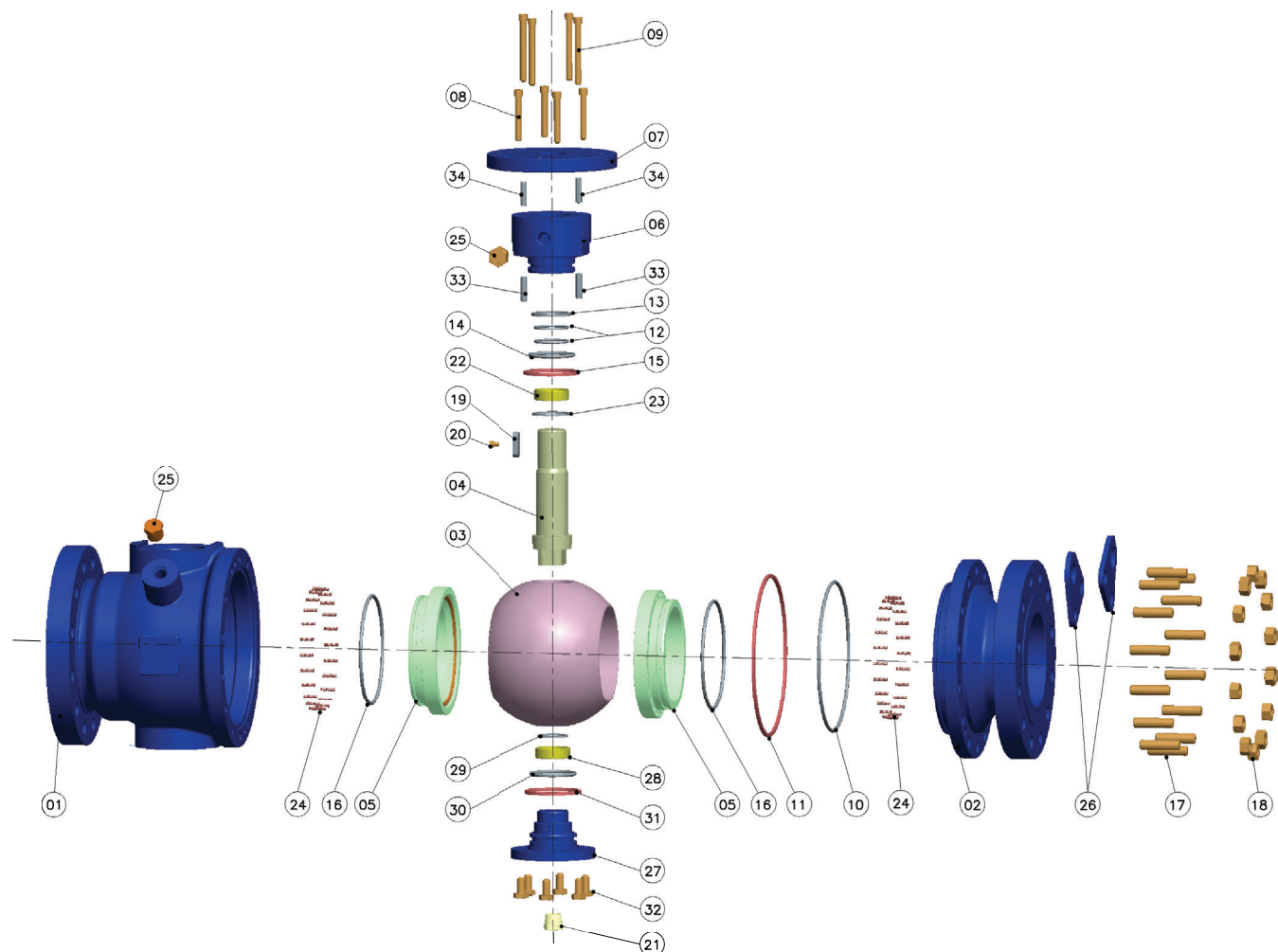
MATERIAL COMBINATION OF VALVE

Item no.	Part name	C1L Body - WCB Trim - CS with ENP Insert - Devlon	C6L Body - WCB Trim - SS Insert - Devlon	2LL Body - LCC Trim - CS with ENP Insert - Devlon	26L Body - LCC Trim - SS Insert - Devlon
		ASTM A216 GR. WCB ASTM A105 with ENP ASTM A105	ASTM A216 GR. WCB ASTM A182 GR. F316/ ASTM A351 GR. CF8M ASTM A105	ASTM A352 GR. LCC ASTM A352 GR. LCC ASTM A350 GR. LF2 with ENP ASTM A350 GR. LF2	ASTM A352 GR. LCC ASTM A352 GR. LCC ASTM A182 GR. F316/ ASTM A351 GR. CF8M ASTM A350 GR. LCC/ ASTM A350 GR. LF2
1	Body	ASTM A216 GR. WCB	ASTM A216 GR. WCB	ASTM A352 GR. LCC	ASTM A352 GR. LCC
2	Adapter	ASTM A216 GR. WCB	ASTM A216 GR. WCB	ASTM A352 GR. LCC	ASTM A352 GR. LCC
3	Ball	ASTM A105 with ENP	ASTM A182 GR. F316/ ASTM A351 GR. CF8M	ASTM A350 GR. LF2 with ENP	ASTM A182 GR. F316/ ASTM A351 GR. CF8M
4	Stem	ASTM A322 GR. 4140 with ENP	ASTM A479 Type 316	ASTM A564 Type 630 17-4PH	ASTM A479 Type 316
5	Seat	ASTM A105 with ENP + Devlon	ASTM A182 GR. F316 + Devlon	ASTM A350 GR. LF2 with ENP + Devlon	ASTM A182 GR. F316 + Devlon
6	Housing	ASTM A216 GR. WCB/ ASTM A105	ASTM A216 GR. WCB/ ASTM A105	ASTM A352 GR. LCC/ ASTM A350 GR. LF2	ASTM A352 GR. LCC/ ASTM A350 GR. LF2
7	ISO pad	ASTM A216 GR. WCB/ ASTM A105	ASTM A216 GR. WCB/ ASTM A105	ASTM A352 GR. LCC/ ASTM A350 GR. LF2	ASTM A352 GR. LCC/ ASTM A350 GR. LF2
8	Fastener (ISO pad-housing)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
9	Fastener (Housing-body)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
10	O-ring (Body seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
11	Gasket (Body seal)	Graphite	Graphite	Graphite	Graphite
12	O-ring (Stem seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
13	Gasket (Stem seal)	Graphite	Graphite	Graphite	Graphite
14	O-ring (Housing seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
15	Gasket (Housing seal)	Graphite	Graphite	Graphite	Graphite
16	O-ring (Seat seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
17	Stud (Body-adapter)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M

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SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 2, 3, 4, 6 FB CLASS 150, 300



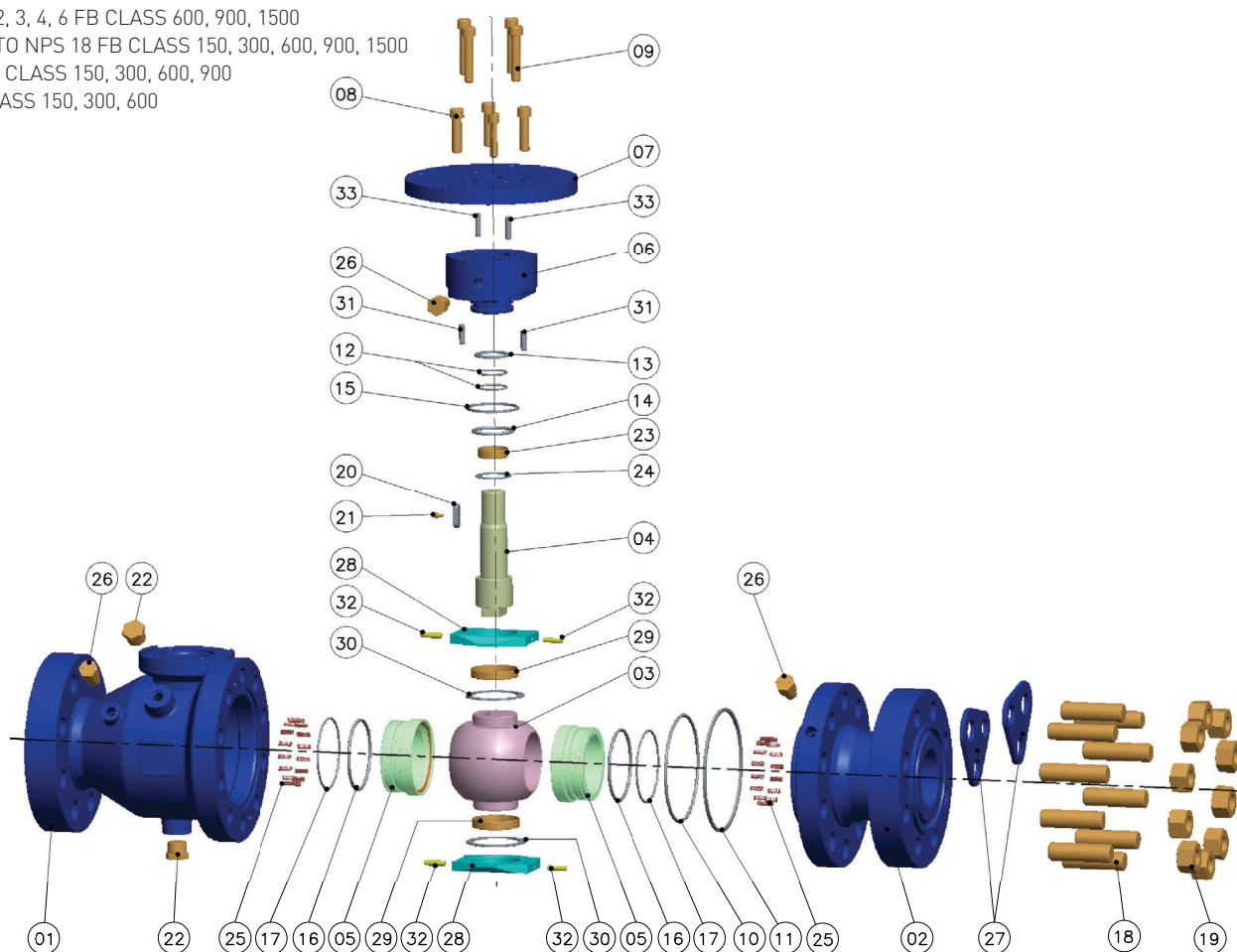
MATERIAL COMBINATION OF VALVE (CONTINUED)

Item no.	Part name	C1L Body - WCB Trim - CS with ENP Insert - Devlon	C6L Body - WCB Trim - SS Insert - Devlon	2LL Body - LCC Trim - CS with ENP Insert - Devlon	26L Body - LCC Trim - SS Insert - Devlon
18	Nut (Body-adapter)	ASTM A194 GR. 2HM	ASTM A194 GR. 2HM	ASTM A194 GR. 7M	ASTM A194 GR. 7M
19	Key	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51
20	Cap screw (Key-stem)	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M
21	Drain plug	ASTM A105	ASTM A105	ASTM A350 GR. LF2	ASTM A350 GR. LF2
22	Bearing (Stem)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
23	Thrust washer (Stem)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
24	Seat spring	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750
25	Sealant fitting for NPS 6	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316
26	Lifting hook for NPS 6	Carbon steel	Carbon steel	Low temperature carbon steel	Low temperature carbon steel
27	Trunnion	ASTM A216 GR. WCB/ ASTM A105	ASTM A216 GR. WCB/ ASTM A105	ASTM A352 GR. LCC/ ASTM A350 GR. LF2	ASTM A352 GR. LCC/ ASTM A350 GR. LF2
28	Bearing (Trunnion)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
29	Thrust washer (Trunnion plate)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
30	O-ring (Trunnion seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
31	Gasket (Trunnion seal)	Graphite	Graphite	Graphite	Graphite
32	Hex screw (Trunnion)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
33	Dowel (Body-housing)	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51
34	Dowel (ISO pad-housing)	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51

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SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 2, 3, 4, 6 FB CLASS 600, 900, 1500
 NPS 8 FB TO NPS 18 FB CLASS 150, 300, 600, 900, 1500
 NPS 20 FB CLASS 150, 300, 600, 900
 NPS 24 CLASS 150, 300, 600



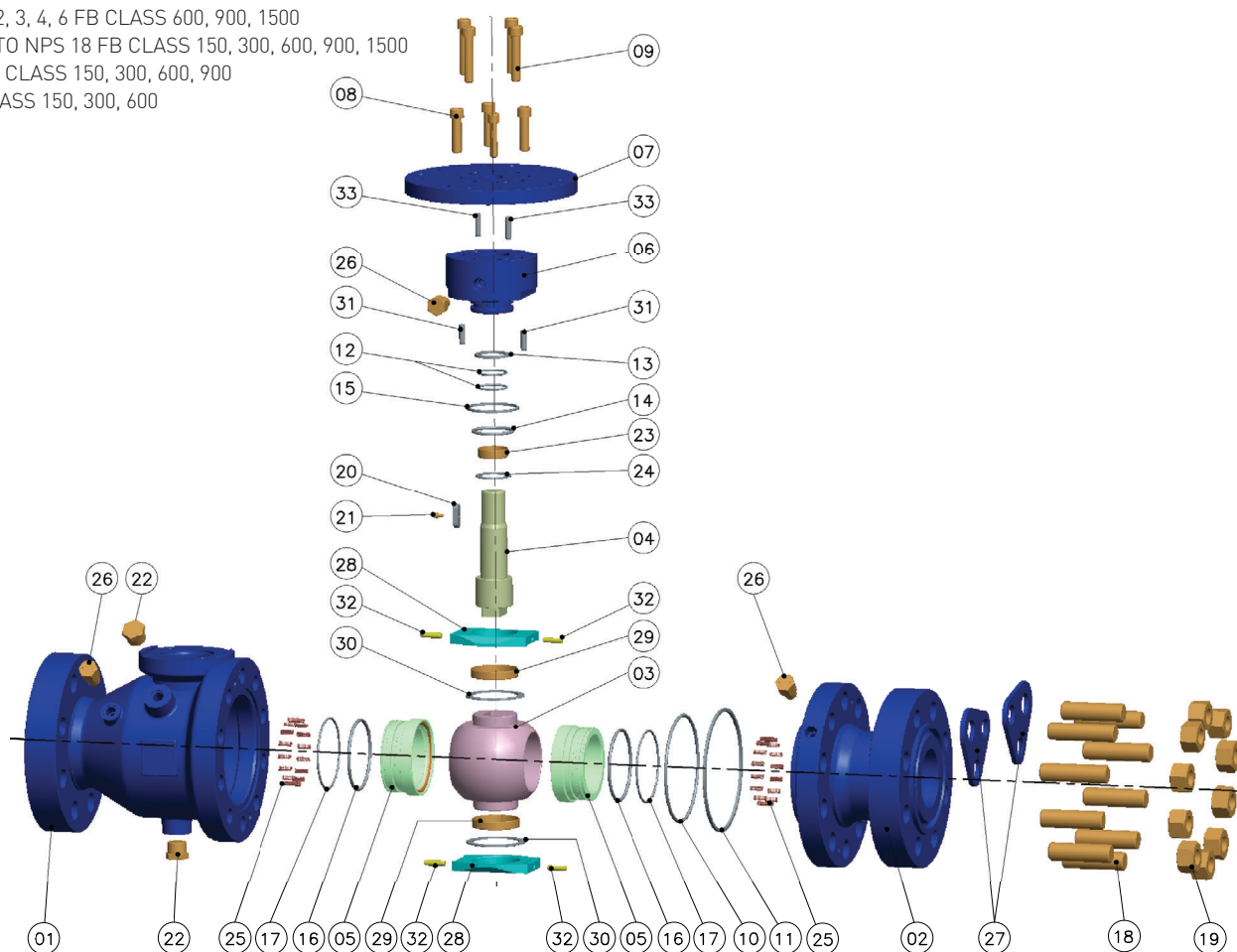
MATERIAL COMBINATION OF VALVE

Item no.	Part name	C1L Body - WCB Trim - CS with ENP Insert - Devlon	C6L Body - WCB Trim - SS Insert - Devlon	2LL Body - LCC Trim - CS with ENP Insert - Devlon	26L Body - LCC Trim - SS Insert - Devlon
1	Body	ASTM A216 GR. WCB	ASTM A216 GR. WCB	ASTM A352 GR. LCC	ASTM A352 GR. LCC
2	Adapter	ASTM A216 GR. WCB	ASTM A216 GR. WCB	ASTM A352 GR. LCC	ASTM A352 GR. LCC
3	Ball	ASTM A105 with ENP	ASTM A182GR.F316 / ASTM A351 GR. CF8M ASTM A182 GR. F51 / ASTM A890 GR. 4A (NPS 6 Class 1500, NPS 8 and above, Class 900 and 1500)	ASTM A350 GR. LF2 with ENP	ASTM A182GR.F316/ ASTM A351 GR. CF8M ASTM A182 GR. F51 / ASTM A890 GR. 4A (NPS 6 Class 1500, NPS 8 and above ,Class 900 and 1500)
4	Stem	ASTM A322 GR. 4140 with ENP	ASTM A479 Type 316 ASTM A182 GR. F51/ ASTM A479 UNS 31803 (NPS 16 and NPS 18 Class 1500)	ASTM A564 Type 630 17-4PH	ASTM A479 Type 316 ASTM A182 GR. F51/ ASTM A479 UNS 31803 (NPS 16 and NPS 18 Class 1500)
5	Seat	ASTM A105 with ENP + Devlon	ASTM A182 GR. F316 + Devlon	ASTM A350 GR. LF2 with ENP + Devlon	ASTM A182 GR. F316 + Devlon
6	Housing	ASTM A216 GR. WCB / ASTM A105	ASTM A216 GR. WCB / ASTM A105	ASTM A352 GR. LCC / ASTM A350 GR. LF2	ASTM A352 GR. LCC / ASTM A350 GR. LF2
7	ISO pad	ASTM A216 GR. WCB / ASTM A105	ASTM A216 GR. WCB / ASTM A105	ASTM A352 GR. LCC / ASTM A350 GR. LF2	ASTM A352 GR. LCC / ASTM A350 GR. LF2
8	Fastener (ISO pad-housing)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
9	Fastener (Housing-body)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
10	O-ring (Body seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
11	Gasket (Body seal)	Graphite	Graphite	Graphite	Graphite
12	O-ring (Stem seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)

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SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 2, 3, 4, 6 FB CLASS 600, 900, 1500
 NPS 8 FB TO NPS 18 FB CLASS 150, 300, 600, 900, 1500
 NPS 20 FB CLASS 150, 300, 600, 900
 NPS 24 CLASS 150, 300, 600

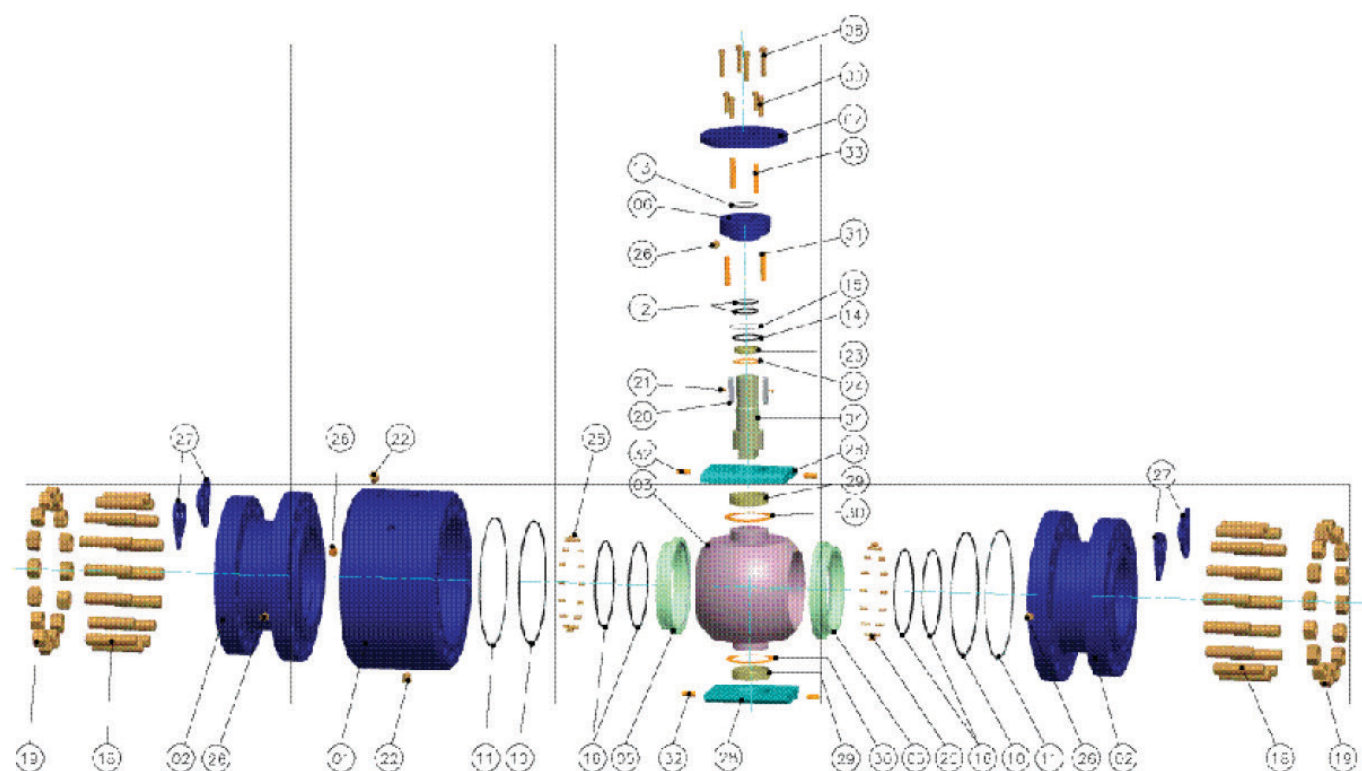


MATERIAL COMBINATION OF VALVE (CONTINUED)

Item no.	Part name	C1L Body - WCB Trim - CS with ENP Insert - Devlon	C6L Body - WCB Trim - SS Insert - Devlon	2LL Body - LCC Trim - CS with ENP Insert - Devlon	26L Body - LCC Trim - SS Insert - Devlon
13	Gasket (Stem seal)	Graphite	Graphite	Graphite	Graphite
14	O-ring (Housing seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
15	Gasket (Housing seal)	Graphite	Graphite	Graphite	Graphite
16	O-ring (Seat seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
17	O-ring (Seat sealant)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
18	Stud (Body-adapter)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR. L7M	ASTM A320 GR. L7M
19	Nut (Body-adapter)	ASTM A194 GR. 2HM	ASTM A194 GR. 2HM	ASTM A194 GR. 7M	ASTM A194 GR. 7M
20	Key	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51
21	Cap screw (Key-stem)	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M
22	Drain and vent plug	ASTM A105	ASTM A105	ASTM A350 GR. LF2	ASTM A350 GR. LF2
23	Bearing (Stem)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
24	Thrust washer (Stem)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
25	Seat spring	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750
26	Sealant fitting for NPS 4 Class 600 and above	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316
27	Lifting hook for NPS 3 Class 1500 and above	Carbon steel	Carbon steel	Low temperature carbon steel	Low temperature carbon steel
28	Trunnion plate	ASTM A216 GR. WCB / ASTM A105	ASTM A216 GR. WCB / ASTM A105	ASTM A352 GR. LCC / ASTM A350 GR. LF2	ASTM A352 GR. LCC / ASTM A350 GR. LF2
29	Bearing (Trunnion plate)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
30	Thrust washer (Trunnion)	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE	SS316 + PTFE
31	Dowel (Body-housing)	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51
32	Dowel (Trunnion plate-body / adapter)	ASTM A276 Type 316	ASTM A276 Type 316	ASTM A276 Type 316	ASTM A276 Type 316
33	Dowel (ISO pad-housing)	ASTM A321 GR. 1040	ASTM A321 GR. 1040	ASTM A182 GR. F51	ASTM A182 GR. F51

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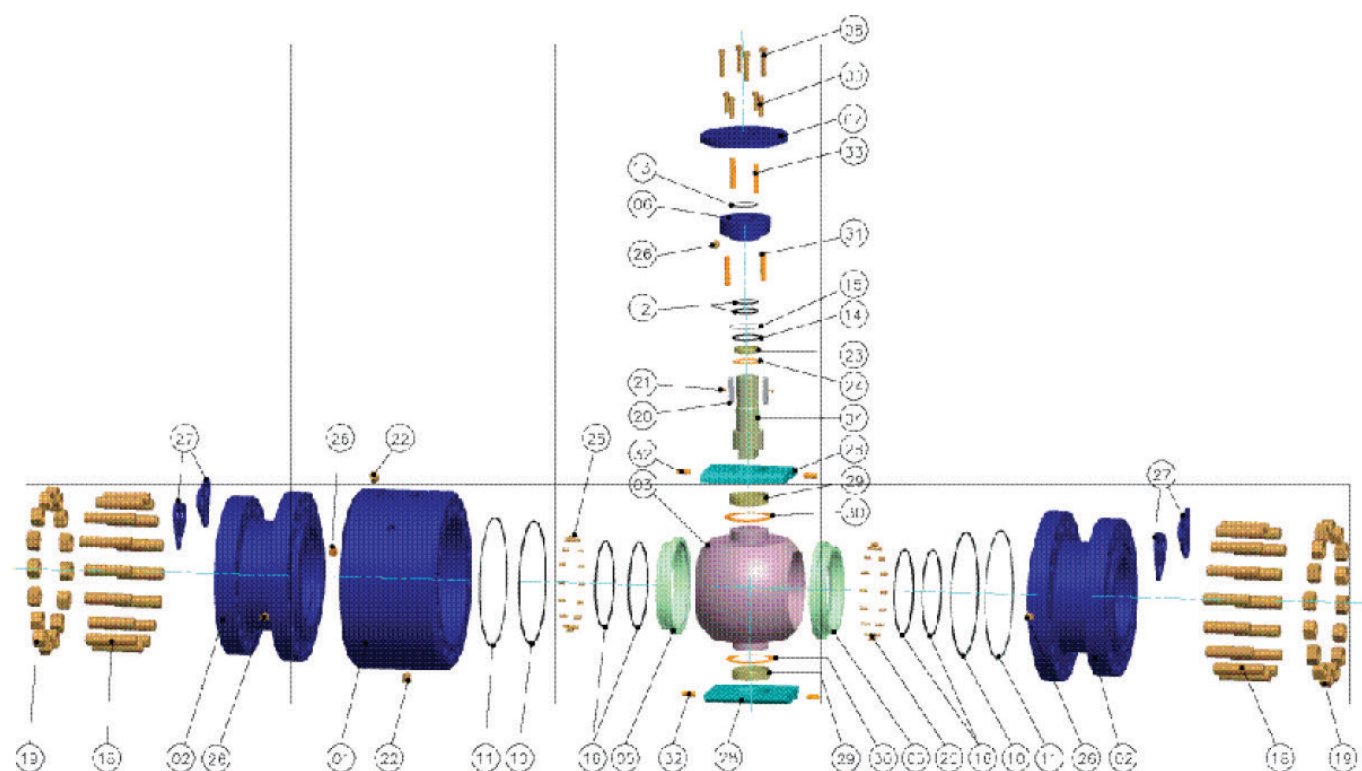


MATERIAL COMBINATION OF VALVE

Item no.	Part name	C1L Body - WCB Trim - CS with ENP Insert - Devlon	C6L Body - WCB Trim - SS Insert - Devlon	2LL Body - LCC Trim - CS with ENP Insert - Devlon	26L Body - LCC Trim - SS Insert - Devlon
1	Body	ASTM A105	ASTM A105	ASTM A350 GR. LF2	ASTM A350 GR. LF2
2	Adapter	ASTM A105	ASTM A105	ASTM A350 GR. LF2	ASTM A350 GR. LF2
3	Ball	ASTM A105 with ENP A694 F60 with ENP	ASTM A182 GR.F316 ASTM A182 GR. F51	ASTM A105 with ENP A694 F60 with ENP	ASTM A182 GR.F316 ASTM A182 GR. F51
4	Stem	ASTM A 182 Gr. FXM19 ASTM A182 Gr. F51	ASTM A 182 Gr. FXM19 ASTM A182 Gr. F51	ASTM A 182 Gr. FXM19 ASTM A182 Gr. F51	ASTM A 182 Gr. FXM19 ASTM A182 Gr. F51
5	Seat	ASTM A105 with ENP + Devlon	ASTM A182 GR.F316 + Devlon	ASTM A350 GR.LF2 with ENP + Devlon	ASTM A182 GR.F316 + Devlon
6	Housing	ASTM A105	ASTM A105	ASTM A350 GR.LF2	ASTM A350 GR.LF2
7	Iso pad	ASTM A105	ASTM A105	ASTM A350 GR.LF2	ASTM A350 GR.LF2
8	Fastener (ISO pad-housing)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR.L7M	ASTM A320 GR.L7M
9	Fastener (Housing-body)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR.L7M	ASTM A320 GR.L7M
10	O-ring (Body seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
11	Gasket (Body seal)	Graphite	Graphite	Graphite	Graphite
12	O-ring (Stem seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
13	Gasket (Stem seal)	Graphite	Graphite	Graphite	Graphite
14	O-ring (Housing seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
15	Gasket (Housing seal)	Graphite	Graphite	Graphite	Graphite
16	O-ring (Seat seal)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)
17	O-ring (Seat sealant)	HNBR	HNBR	HNBR (Low temperature)	HNBR (Low temperature)

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SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL



MATERIAL COMBINATION OF VALVE (CONTINUED)

Item no.	Part name	C1L	C6L	2LL	26L
		Body - WCB Trim - CS with ENP Insert - Devlon	Body - WCB Trim - SS Insert - Devlon	Body - LCC Trim - CS with ENP Insert - Devlon	Body - LCC Trim - SS Insert - Devlon
18	Stud (body-adapter)	ASTM A193 GR. B7M	ASTM A193 GR. B7M	ASTM A320 GR.L7M	ASTM A320 GR.L7M
19	Nut (body-adapter)	ASTM A194 GR. 2HM	ASTM A194 GR. 2HM	ASTM A194 GR.7M	ASTM A194 GR.7M
20	Key	ASTM A321 GR.1040	ASTM A321 GR.1040	ASTM A182 GR.F51	ASTM A182 GR.F51
21	Cap screw (key-stem)	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M	ASTM A193 GR. B8M
22	Drain and vent plug	ASTM A105	ASTM A105	ASTM A350 GR.LF2	ASTM A350 GR.LF2
23	Bearing (stem)	SS316+PTFE	SS316+PTFE	SS316+PTFE	SS316+PTFE
24	Thrust washer (stem)	SS316+PTFE	SS316+PTFE	SS316+PTFE	SS316+PTFE
25	Seat spring	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750	ASTM B637 UNS N07750
26	Sealant fitting for NPS 4 Class 600 and above	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316	ASTM A479 Type 316
27	Lifting hook for NPS 3 Class 1500 and above	Carbon steel	Carbon steel	Low temperature carbon steel	Low temperature carbon steel
28	Trunnion plate	ASTM A105	ASTM A105	ASTM A350 GR.LF2	ASTM A350 GR.LF2
29	Bearing (trunnion plate)	SS316+PTFE	SS316+PTFE	SS316+PTFE	SS316+PTFE
30	Thrust washer (trunnion)	SS316+PTFE	SS316+PTFE	SS316+PTFE	SS316+PTFE
31	Dowel (body-housing)	ASTM A321 GR.1040	ASTM A321 GR.1040	ASTM A182 GR.F51	ASTM A182 GR.F51
32	Dowel (trunnion plate-body/adapter)	ASTM A276 Type 316	ASTM A276 Type 316	ASTM A276 Type 316	ASTM A276 Type 316
33	Dowel (iso pad-housing)	ASTM A321 GR.1040	ASTM A321 GR.1040	ASTM A182 GR.F51	ASTM A182 GR.F51

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24

NPS	Bore	Pressure class	Sealing joint	O-ring size	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
					(ISO 3601-1)				
2	2"	150	Body to adapter	ID83.5x3.53 CS	-		1	OD103xID97x4.4 t	1
			Body to seat	ID61.6x2.62 CS	143		2	x	x
			Stem to housing	ID19.5x3.53 CS	-		2	x	x
			Body to housing	ID29.3x3.53 CS	-		1	OD47xID41x4.4 t	1
			Body to trunnion	ID26.57x3.53 CS	215		1	OD44xID38x4.4 t	1
			Housing to ISO pad	x	-		x	OD30xID20x4.4 t	1
3	3"	150	Body to adapter	ID123.42x3.53 CS	249		1	OD154xID146x4.4 t	1
			Body to seat	ID85.32x3.53 CS	237		2	x	x
			Stem to housing	ID27.4x3.53 CS	-		2	x	x
			Body to housing	ID42.85x3.53 CS	-		1	OD62xID56x4.4 t	1
			Body to trunnion	ID42.85x3.53 CS	-		1	OD62xID56x4.4 t	1
			Housing to ISO pad	x	-		x	OD42xID28x4.4 t	1
4	4"	150	Body to adapter	ID158.34x3.53 CS	259		1	OD184xID178x4.4 t	1
			Body to seat	ID113.97x2.62 CS	157		2	x	x
			Stem to housing	ID34.52x3.53 CS	220		2	x	x
			Body to housing	ID52.39x3.53 CS	-		1	OD76xID70x4.4 t	1
			Body to trunnion	ID39.69x3.53 CS	-		1	OD60xID54x4.4 t	1
			Housing to ISO pad	x	-		x	OD49xID35x4.4 t	1
6	6"	150	Body to adapter	ID227.97x5.33 CS	373		1	OD 262xID252x5 t	1
			Body to seat	ID164.47x5.33 CS	363		2	x	x
			Stem to housing	ID49x3.53 CS	-		2	x	x
			Body to housing	ID64.7x5.33 CS	-		1	OD 90xID82x5.4 t	1
			Body to trunnion	ID64.7x5.33 CS	-		1	OD 90xID82x5.4 t	1
			Housing to ISO pad	x	-		x	OD64xID50x4.4 t	1
8	8"	150	Body to adapter	ID304.17x5.33 CS	381		1	OD340xID330x5 t	1
			Body to seat	ID215.27x5.33 CS	371		2	x	x
			Body to seat sealant	ID202.79x3.53 CS	266		2	x	x
			Stem to housing	ID53.57x3.53 CS	227		2	x	x
			Body to housing	ID69.22x5.33 CS	335		1	OD99.9xID90.1x4.6 t	1
			Housing to ISO pad	x	-		x	OD69xID55x4.4	1
10	10"	150	Body to adapter	ID380.37x5.33 CS	384		1	OD415xID405x5 t	1
			Body to seat	ID266.07x5.33 CS	378		2	x	x
			Body to seat sealant	ID253.59x3.53 CS	274		2	x	x
			Stem to housing	ID63x5.33 CS	-		2	x	x
			Body to housing	ID78.74x5.33 CS	338		1	OD107xID97x5.4 t	1
			Housing to ISO pad	x	-		x	OD79xID65x4.4 t	1
12	12"	150	Body to adapter	ID443.36x6.99 CS	464		1	OD510.1xID500.3x5 t	1
			Body to seat	ID320x5.33 CS	-		2	x	x
			Body to seat sealant	ID304.39x3.53 CS	278		2	x	x
			Stem to housing	ID63.09x3.53 CS	230		2	x	x
			Body to housing	ID81.92x5.33 CS	339		1	OD110xID100x5.4 t	1
			Housing to ISO pad	x	-		x	OD79xID65x4.4 t	1
14	14"	150	Body to adapter	ID494.16x6.99 CS	468		1	OD550.1xID540.3x5 t	1
			Body to seat	ID345x5.33 CS	-		2	x	x
			Body to seat sealant	ID338x3.53 CS	-		2	x	x
			Stem to housing	ID73x5.33 CS	-		2	x	x
			Body to housing	ID94.62x5.33 CS	343		1	OD123xID113x5.4 t	1
			Housing to ISO pad	x	-		x	OD89xID75x4.4 t	1
16	16"	150	Body to adapter	ID557.66x6.99 CS	471		1	OD629.1xID615.3x6.9 t	1
			Body to seat	ID393x5.33 CS	-		2	x	x
			Body to seat sealant	ID386x3.53 CS	-		2	x	x
			Stem to housing	ID83.5x5.33 CS	-		2	x	x
			Body to housing	ID104.14x5.33 CS	346		1	OD133xID123x5.4 t	1
			Housing to ISO pad	x	-		x	OD99xID85x4.4 t	1
18	18"	150	Body to adapter	ID633.48x6.99 CS	474		1	OD704.1xID690.3x6.9 t	1
			Body to seat	ID443.36x6.99 CS	464		2	x	x
			Body to seat sealant	ID434x5.33 CS	-		2	x	x
			Stem to housing	ID94.62x5.33 CS	343		2	x	x
			Body to housing	ID113.67x5.33 CS	349		1	OD143xID133x5.4 t	1
			Housing to ISO pad	x	-		x	OD109xID95x4.4 t	1

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

NPS	Bore	Pressure class	Sealing joint	O-ring size	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
					(ISO 3601-1)				
20	20"	150	Body to adapter	ID710x6.99 CS	-		1	OD779.1xID765.3x6.9 t	1
			Body to seat	ID506.86x6.99 CS	469		2	x	x
			Body to seat sealant	ID490x5.33 CS	-		2	x	x
			Stem to housing	ID97.79x5.33 CS	344		2	x	x
			Body to housing	ID116.84x5.33 CS	350		1	OD150xID140x5.4 t	1
			Housing to ISO pad	x	-		x	OD114xID100x4.4 t	1
24	24"	150	Body to adapter	ID850x6.99 CS	-		1	OD939.1 x ID925.3x6.9 t	1
			Body to seat	ID608.08x6.99 CS	473		2	x	x
			Body to seat sealant	ID590x5.33 CS	-		2	x	x
			Stem to housing	ID113.67x5.33 CS	349		2	x	x
			Body to housing	ID142.24x5.33 CS	358		1	OD174.8xID165.2x4.6 t	1
			Housing to ISO pad	x	-		x	OD134xID115x5.4 t	1
2	2"	300	Body to adapter	ID83.5x3.53 CS	-		1	OD103xID97x4.4 t	1
			Body to seat	ID59.92x3.53 CS	229		2	x	x
			Stem to housing	ID23.39x3.53 CS	213		2	x	x
			Body to housing	ID32.92x3.53 CS	219		1	OD51xID45x4.4 t	1
			Body to trunnion	ID26.57x3.53 CS	215		1	OD44xID38x4.4 t	1
			Housing to ISO pad	x	-		x	OD34xID24x4.4 t	1
3	3"	300	Body to adapter	ID123.42x3.53 CS	249		1	OD148xID140x4.4 t	1
			Body to seat	ID85.32x3.53 CS	237		2	x	x
			Stem to housing	ID31.34x3.53 CS	218		2	x	x
			Body to housing	ID50.39x3.53 CS	226		1	OD70xID64x4.4 t	1
			Body to trunnion	ID50.39x3.53 CS	226		1	OD70xID64x4.4 t	1
			Housing to ISO pad	x	-		x	OD46xID32x4.4 t	1
4	4"	300	Body to adapter	ID158.12x5.33 CS	362		1	OD184xID178x4.4 t	1
			Body to seat	ID113.89x3.53 CS	246		2	x	x
			Stem to housing	ID39.2x3.53 CS	-		2	x	x
			Body to housing	ID54.5x5.33 CS	-		1	OD76xID70x4.4 t	1
			Body to trunnion	ID39.69x3.53 CS	-		1	OD60xID54x4.4 t	1
			Housing to ISO pad	x	-		x	OD54xID40x4.4 t	1
6	6"	300	Body to adapter	ID227.97x5.33 CS	373		1	OD 262xID252x5 t	1
			Body to seat	ID164.47x5.33 CS	363		2	x	x
			Stem to housing	ID49x3.53 CS	-		2	x	x
			Body to housing	ID64.7x5.33 CS	-		1	OD 90xID82x5.4 t	1
			Body to trunnion	ID64.7x5.33 CS	-		1	OD 90xID82x5.4 t	1
			Housing to ISO pad	x	-		x	OD64xID50x4.4 t	1
8	8"	300	Body to adapter	ID304.17x5.33 CS	381		1	OD345xID335x5 t	1
			Body to seat	ID215.27x5.33 CS	371		2	x	x
			Body to seat sealant	ID202.79x3.53 CS	266		2	x	x
			Stem to housing	ID59.92x3.53 CS	229		2	x	x
			Body to housing	ID75.57x5.33 CS	337		1	OD105xID95x5.4 t	1
			Housing to ISO pad	x	-		x	OD74xID60x4.4 t	1
10	10"	300	Body to adapter	ID380.37x5.33 CS	384		1	OD415xID405x5 t	x
			Body to seat	ID266.07x5.33 CS	378		2	x	x
			Body to seat sealant	ID253.59x3.53 CS	274		2	x	x
			Stem to housing	ID63x5.33 CS	-		2	x	x
			Body to housing	ID78.74x5.33 CS	338		1	OD107xID97x5.4 t	1
			Housing to ISO pad	x	-		x	OD79xID65x4.4 t	1
12	12"	300	Body to adapter	ID443.36x6.99 CS	464		1	OD510.1xID500.3x5 t	1
			Body to seat	ID320x5.33 CS	-		2	x	x
			Body to seat sealant	ID304.39x3.53 CS	278		2	x	x
			Stem to housing	ID73.6x3.53 CS	-		2	x	x
			Body to housing	ID94.62x5.33 CS	343		1	OD122xID112x5.4 t	1
			Housing to ISO pad	x	-		x	OD89xID75x4.4 t	1
14	14"	300	Body to adapter	ID494.16x6.99 CS	468		1	OD550.1xID540.3x5 t	1
			Body to seat	ID345x5.33 CS	-		2	x	x
			Body to seat sealant	ID338x3.53 CS	-		2	x	x
			Stem to housing	ID83.5x5.33 CS	-		2	x	x
			Body to housing	ID104.14x5.33 CS	346		1	OD133xID123x5.4 t	1
			Housing to ISO pad	x	-		x	OD99xID85x4.4 t	1

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

NPS	Bore	Pressure class	Sealing joint	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
				O-ring size	(ISO 3601-1)			
16	16"	300	Body to adapter	ID557.66x6.99 CS	471	1	OD629.1xID615.3x6.9 t	1
			Body to seat	ID393x5.33 CS	-	2	x	x
			Body to seat sealant	ID386x3.53 CS	-	2	x	x
			Stem to housing	ID94.62x5.33 CS	343	2	x	x
			Body to housing	ID113.67x5.33 CS	349	1	OD143xID133x5.4 t	1
			Housing to ISO pad	x	-	x	OD109xID95x4.4 t	1
18	18"	300	Body to adapter	ID633.48x6.99 CS	474	1	OD704.1xID690.3x6.9 t	1
			Body to seat	ID443.36x6.99 CS	464	2	x	x
			Body to seat sealant	ID434x5.33 CS	-	2	x	x
			Stem to housing	ID103.2x5.33 CS	-	2	x	x
			Body to housing	ID123.19x5.33 CS	352	1	OD152.8xID143.2x4.6 t	1
			Housing to ISO pad	x	-	x	OD119xID105x4.4 t	1
20	20"	300	Body to adapter	ID701.68x6.99 CS	-	1	OD779.1 x ID765.3x6.9 t	1
			Body to seat	ID506.86x6.99 CS	469	2	x	x
			Body to seat sealant	ID490x5.33 CS	-	2	x	x
			Stem to housing	ID113.67x5.33 CS	349	2	x	x
			Body to housing	ID135.89x5.33 CS	356	1	OD168xID158x5.4 t	1
			Housing to ISO pad	x	-	x	OD129xID115x4.4 t	1
24	24"	300	Body to adapter	ID850x6.99 CS	-	1	OD939.1xID925.3x6.9 t	1
			Body to seat	ID608.08x6.99 CS	473	2	x	x
			Body to seat sealant	ID590x5.33 CS	-	2	x	x
			Stem to housing	ID132.72x5.33 CS	355	2	x	x
			Body to housing	ID170.82x5.33 CS	364	1	OD205xID195x5.4 t	1
			Housing to ISO pad	x	-	x	OD154xID135x5.4 t	1
2	2"	600	Body to adapter	ID93x3.53 CS	-	1	OD118xID110x4.4 t	1
			Body to seat	ID59.92x3.53 CS	229	2	x	x
			Stem to housing	ID29.3x3.53 CS	-	2	x	x
			Body to housing	ID47.22x3.53 CS	225	1	OD70xID62x4.4 t	1
			Housing to ISO pad	x	-	x	OD44xID30x4.4 t	1
3	3"	600	Body to adapter	ID126.37x5.33 CS	353	1	OD155xID147x4.4 t	1
			Body to seat	ID85.09x5.33 CS	340	2	x	x
			Stem to housing	ID39.2x3.53 CS	-	2	x	x
			Body to housing	ID57.7x3.53 CS	-	1	OD80xID72x4.4 t	1
			Housing to ISO pad	x	-	x	OD54xID40x4.4 t	1
4	4"	600	Body to adapter	ID164.47x5.33 CS	363	1	OD198xID188x5.4 t	1
			Body to seat	ID113.67x5.33 CS	349	2	x	x
			Body to seat sealant	ID117.07x3.53 CS	247	2	x	x
			Stem to housing	ID44.04x3.53 CS	224	2	x	x
			Body to housing	ID59.69x5.33 CS	332	1	OD90xID80x5.4 t	1
6	6"	600	Housing to ISO pad	x	-	x	OD59xID45x4.4 t	1
			Body to adapter	ID227.97x5.33 CS	373	1	OD 265xID255x5 t	1
			Body to seat	ID164.47x5.33 CS	363	2	x	x
			Body to seat sealant	ID158.34x3.53 CS	259	2	x	x
			Stem to housing	ID48.7x5.33 CS	-	2	x	x
8	8"	600	Body to housing	ID64.7x5.33 CS	-	1	OD90xID80x5.4 t	1
			Housing to ISO pad	x	-	x	OD64x50x4.4 t	1
			Body to adapter	ID304.17x5.33 CS	381	1	OD345xID335x5 t	1
			Body to seat	ID215.27x5.33 CS	371	2	x	x
			Body to seat sealant	ID202.79x3.53 CS	266	2	x	x
10	10"	600	Stem to housing	ID58.2x3.53 CS	-	2	x	x
			Body to housing	ID75.57x5.33 CS	337	1	OD105xID95x5.4 t	1
			Housing to ISO pad	x	-	x	OD74xID60x4.4 t	1
			Body to adapter	ID380.37x5.33 CS	384	1	OD415xID405x5 t	1
			Body to seat	ID266.07x5.33 CS	378	2	x	x
			Body to seat sealant	ID253.59x3.53 CS	274	2	x	x
			Stem to housing	ID63x5.33 CS	-	2	x	x
			Body to housing	ID85.09x5.33 CS	340	1	OD115xID105x5.4 t	1
			Housing to ISO pad	x	-	x	OD79xID65x4.4 t	1

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

NPS	Bore	Pressure class	Sealing joint	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
				O-ring size	(ISO 3601-1)			
12	12"	600	Body to adapter	ID443.36x6.99 CS	464	1	OD510.1xID500.3x5 t	1
			Body to seat	ID320x5.33 CS	-	2	x	x
			Body to seat sealant	ID304.39x3.53 CS	278	2	x	x
			Stem to housing	ID73x5.33 CS	-	2	x	x
			Body to housing	ID94.62x5.33 CS	343	1	OD123xID113x5.4 t	1
			Housing to ISO pad	x	-	x	OD89xID75x4.4 t	1
14	14"	600	Body to adapter	ID494.16x6.99 CS	468	1	OD554.1xID540.3x6.9 t	1
			Body to seat	ID345x5.33 CS	-	2	x	x
			Body to seat sealant	ID338x3.53 CS	-	2	x	x
			Stem to housing	ID88.27x5.33 CS	341	2	x	x
			Body to housing	ID116.84x5.33 CS	350	1	OD145xID135x5.4 t	1
			Housing to ISO pad	x	-	x	OD104xID90x4.4 t	1
16	16"	600	Body to adapter	ID557.66x6.99 CS	471	1	OD629.1xID615.3x6.9 t	1
			Body to seat	ID393x5.33 CS	-	2	x	x
			Body to seat sealant	ID386x3.53 CS	-	2	x	x
			Stem to housing	ID88.27x5.33 CS	341	2	x	x
			Body to housing	ID116.84x5.33 CS	350	1	OD145xID135x5.4 t	1
			Housing to ISO pad	x	-	x	OD104xID90x4.4 t	1
18	18"	600	Body to adapter	ID633.48x6.99 CS	474	1	OD704.1xID690.3x6.9 t	1
			Body to seat	ID443.36x6.99 CS	464	2	x	x
			Body to seat sealant	ID434x5.33 CS	-	2	x	x
			Stem to housing	ID113.67x5.33 CS	349	2	x	x
			Body to housing	ID139.07x5.33 CS	357	1	OD168xID158x5.4 t	1
			Housing to ISO pad	x	-	x	OD129xID115x4.4 t	1
20	20"	600	Body to adapter	ID701.68x6.99 CS	-	1	OD779.1xID765.3x6.9 t	1
			Body to seat	ID506.86x6.99 CS	469	2	x	x
			Body to seat sealant	ID490x5.33 CS	-	2	x	x
			Stem to housing	ID123.19x5.33 CS	352	2	x	x
			Body to housing	ID151.77x5.33 CS	361	1	OD185xID175x5.4 t	1
			Housing to ISO pad	x	-	x	OD144xID125x5.4 t	1
12	12"	600	Body to adapter	ID443.36x6.99 CS	464	1	OD510.1xID500.3x5 t	1
			Body to seat	ID320x5.33 CS	-	2	x	x
			Body to seat sealant	ID304.39x3.53 CS	278	2	x	x
			Stem to housing	ID73x5.33 CS	-	2	x	x
			Body to housing	ID94.62x5.33 CS	343	1	OD123xID113x5.4 t	1
			Housing to ISO pad	x	-	x	OD89xID75x4.4 t	1
14	14"	600	Body to adapter	ID494.16x6.99 CS	468	1	OD554.1xID540.3x6.9 t	1
			Body to seat	ID345x5.33 CS	-	2	x	x
			Body to seat sealant	ID338x3.53 CS	-	2	x	x
			Stem to housing	ID88.27x5.33 CS	341	2	x	x
			Body to housing	ID116.84x5.33 CS	350	1	OD145xID135x5.4 t	1
			Housing to ISO pad	x	-	x	OD104xID90x4.4 t	1
16	16"	600	Body to adapter	ID557.66x6.99 CS	471	1	OD629.1xID615.3x6.9 t	1
			Body to seat	ID393x5.33 CS	-	2	x	x
			Body to seat sealant	ID386x3.53 CS	-	2	x	x
			Stem to housing	ID88.27x5.33 CS	341	2	x	x
			Body to housing	ID116.84x5.33 CS	350	1	OD145xID135x5.4 t	1
			Housing to ISO pad	x	-	x	OD104xID90x4.4 t	1
18	18"	600	Body to adapter	ID633.48x6.99 CS	474	1	OD704.1xID690.3x6.9 t	1
			Body to seat	ID443.36x6.99 CS	464	2	x	x
			Body to seat sealant	ID434x5.33 CS	-	2	x	x
			Stem to housing	ID113.67x5.33 CS	349	2	x	x
			Body to housing	ID139.07x5.33 CS	357	1	OD168xID158x5.4 t	1
			Housing to ISO pad	x	-	x	OD129xID115x4.4 t	1
20	20"	600	Body to adapter	ID701.68x6.99 CS	-	1	OD779.1xID765.3x6.9 t	1
			Body to seat	ID506.86x6.99 CS	469	2	x	x
			Body to seat sealant	ID490x5.33 CS	-	2	x	x
			Stem to housing	ID123.19x5.33 CS	352	2	x	x
			Body to housing	ID151.77x5.33 CS	361	1	OD185xID175x5.4 t	1
			Housing to ISO pad	x	-	x	OD144xID125x5.4 t	1

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

NPS	Bore	Pressure class	Sealing joint	O-ring size	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
					(ISO 3601-1)				
24	24"	600	Body to adapter	ID850x6.99 CS	-		1	OD939.1xID925.3x6.9 t	1
			Body to seat	ID608.08x6.99 CS	473		2	x	x
			Body to seat sealant	ID590x5.33 CS	-		2	x	x
			Stem to housing	ID132.72x5.33 CS	355		2	x	x
			Body to housing	ID170.82x5.33 CS	364		1	OD203xID193x5.4 t	1
2	2"	900	Housing to ISO pad	x	-		x	OD154xID135x5.4 t	1
			Body to adapter	ID100.97x5.33 CS	345		1	OD130xID122x4.4 t	1
			Body to seat	ID59.92x3.53 CS	229		2	x	x
			Stem to housing	ID39.2x3.53 CS	-		2	x	x
			Body to housing	ID58x3.53 CS	-		1	OD80xID72x4.4 t	1
3	3"	900	Housing to ISO pad	x	-		x	OD54xID40x4.4 t	1
			Body to adapter	ID126.37x5.33 CS	353		1	OD155xID147x4.4 t	1
			Body to seat	ID85.09x5.33 CS	340		2	x	x
			Stem to housing	ID39.2x3.53 CS	-		2	x	x
			Body to housing	ID57.7x3.53 CS	-		1	OD80xID72x4.4 t	1
4	4"	900	Housing to ISO pad	x	-		x	OD54xID40x4.4 t	1
			Body to adapter	ID177.17x5.33 CS	365		1	OD210xID200x5.4 t	1
			Body to seat	ID113.67x5.33 CS	349		2	x	x
			Stem to housing	ID49x3.53 CS	-		2	x	x
			Body to housing	ID66.04x5.33 CS	334		1	OD92xID84x5.4 t	1
6	6"	900	Housing to ISO pad	x	-		x	OD64xID50x4.4 t	1
			Body to adapter	ID240.67x5.33 CS	375		1	OD285xID275x5 t	1
			Body to seat	ID164.47x5.33 CS	363		2	x	x
			Body to seat sealant	ID158.34x3.53 CS	259		2	x	x
			Stem to housing	ID53.57x3.53 CS	227		2	x	x
8	8"	900	Body to housing	ID75.57x5.33 CS	337		1	OD105xID95x5.4 t	1
			Housing to ISO pad	x	-		x	OD69xID55x4.4 t	1
			Body to adapter	ID310x5.33 CS	-		1	OD360.1xID350.3x5 t	1
			Body to seat	ID215.27x5.33 CS	371		2	x	x
			Body to seat sealant	ID209.14x3.53 CS	267		2	x	x
12	12"	900	Stem to housing	ID73x5.33 CS	-		2	x	x
			Body to housing	ID97.79x5.33 CS	344		1	OD130.2xID120.2x4.6 t	1
			Housing to ISO pad	x	-		x	OD89xID75x4.4 t	1
			Body to adapter	ID456.06x6.99 CS	465		1	OD519.1 x ID505.3x6.9 t	1
			Body to seat	ID329.57x5.33 CS	382		2	x	x
2	1½"	1500	Body to seat sealant	ID318x3.53 CS	-		2	x	x
			Stem to housing	ID83.5x5.33 CS	-		2	x	x
			Body to housing	ID107.32x5.33 CS	347		1	OD138xID128x5.4 t	1
			Housing to ISO pad	x	-		x	OD99xID85x4.4 t	1
			Body to adapter	ID72.62x3.53 CS	233		1	OD95xID89x4.4 t	1
2	2"	1500	Body to seat	ID50.47x2.62 CS	136		2	x	x
			Stem to housing	ID26.57x3.53 CS	215		2	x	x
			Body to housing	ID36.09x3.53 CS	221		1	OD55xID49x4.4 t	1
			Housing to ISO pad	x	-		x	OD37xID27x4 t	1
			Body to adapter	ID100.97x5.33 CS	345		1	OD130xID122x4.4 t	1
3	3"	1500	Body to seat	ID59.92x3.53 CS	229		2	x	x
			Stem to housing	ID39.2x3.53 CS	-		2	x	x
			Body to housing	ID58x3.53 CS	-		1	OD80xID72x4.4 t	1
			Housing to ISO pad	x	-		x	OD54xID40x4.4 t	1
			Body to adapter	ID135.89x5.33 CS	356		1	OD168xID160x4.4 t	1
3	3"	1500	Body to seat	ID85.09x5.33 CS	340		2	x	x
			Stem to housing	ID49x3.53 CS	-		2	x	x
			Body to housing	ID66.04x5.33 CS	334		1	OD93xID85x4.4 t	1
			Housing to ISO pad	x	-		x	OD64xID50x4.4 t	1

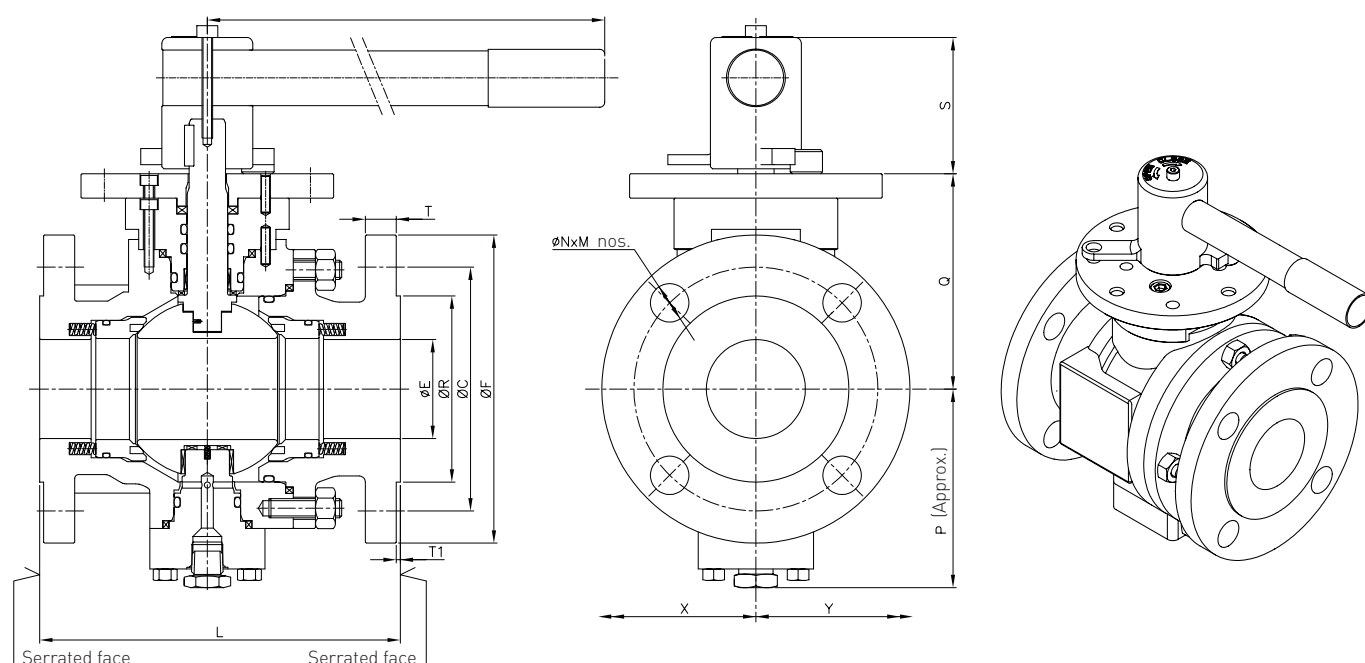
KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

NPS	Bore	Pressure class	Sealing joint	O-ring size code		Qty. per valve (nos.)	Gasket size	Qty. per valve (nos.)
				O-ring size	(ISO 3601-1)			
4	4"	1500	Body to adapter	ID177.17x5.33 CS	365	1	OD215xID205x5.4 t	1
			Body to seat	ID113.67x5.33 CS	349	2	x	x
			Stem to housing	ID49x3.53 CS	-	2	x	x
			Body to housing	ID66.04x5.33 CS	334	1	OD93xID85x4.4 t	1
			Housing to ISO pad	x	-	x	OD64xID50x4.4 t	1
6	6"	1500	Body to adapter	ID240.67x5.33 CS	375	1	OD290xID280x5 t	1
			Body to seat	ID164.47x5.33 CS	363	2	x	x
			Body to seat sealant	ID158.34x3.53 CS	259	2	x	x
			Stem to housing	ID63x5.33 CS	-	2	x	x
			Body to housing	ID83.5x5.33 CS	-	1	OD115xID105x5.4 t	1
			Housing to ISO pad	x	-	x	OD79xID65x4.4 t	1

SIZE NPS 2, 3, 4 FB, CLASS 150 AND 300



DIMENSIONS

Size	Class	øE	øR	øC	øF	øN	M	T1	T	L	H	P (Approx.)	Q	S	Weight Approx.		
															in Kg	X ^[3]	Y ^[3]
NPS 2	150	49	92.1	120.7	150	19.05	4	2	14.3 + 3	178 ± 1.5	180	100	111.5	67.5	20	77	77
	300	49	92.1	127.0	165	19.05	8	2	20.7 + 3	216 ± 1.5	310	100	111.0	68.5	25	83	83
NPS 3	150	74	127.0	152.4	190	19.05	4	2	17.5 + 3	203 ± 1.5	460	120	141.5	74.5	35	100	100
	300	74	127.0	168.3	210	22.22	8	2	27 + 3	283 ± 1.5	550	120	139.0	73.0	50	105	105
NPS 4	150	100	157.2	190.5	230	19.05	8	2	22.3 + 3	229 ± 1.5	730	145	166.0	73.5	55	115	115
	300	100	157.2	200.0	255	22.22	8	2	30.2 + 3	305 ± 1.5	980	145	171.0	73.5	80	128	128

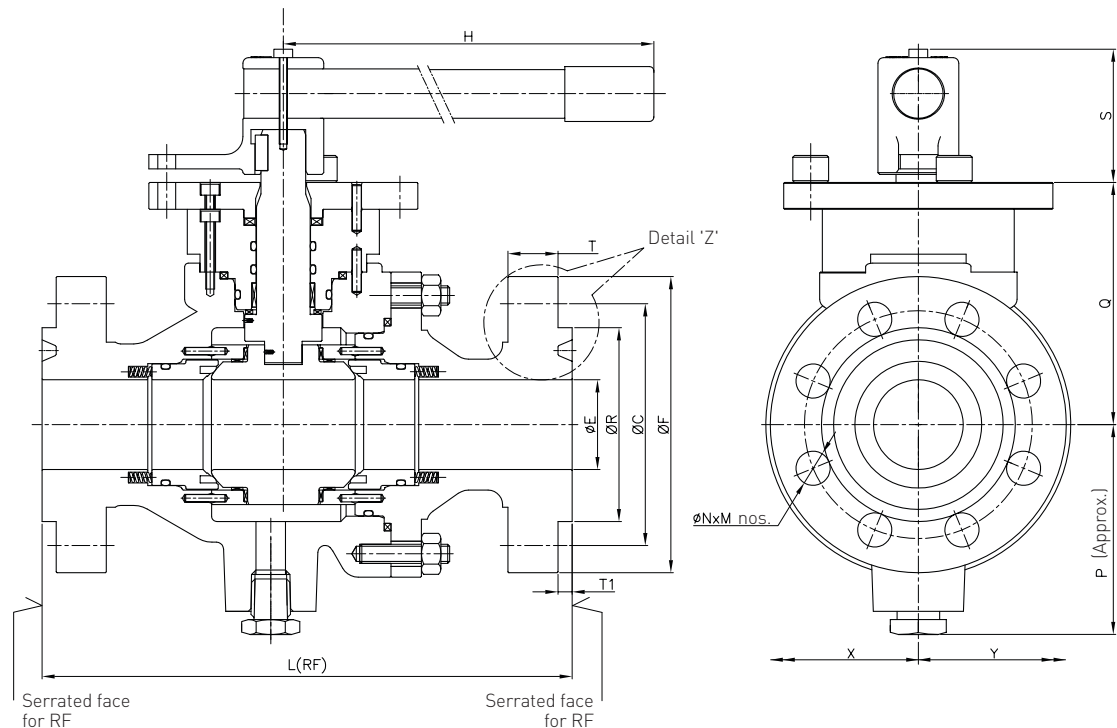
NOTES

- All dimensions are in mm, unless otherwise specified.
- For top mounting details refer document TDS-278 (latest revision).
- 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 2 FB, CLASS 600, 900 AND 1500



DIMENSIONS

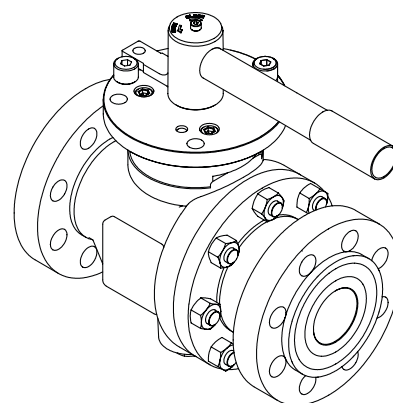
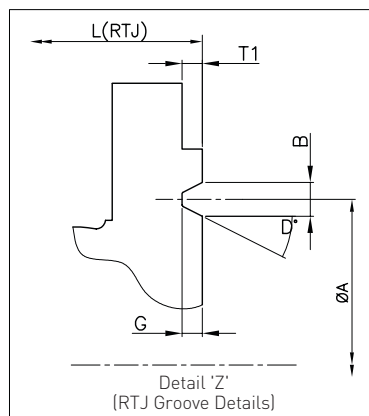
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 2	600	49	92.1	108	127.0	165	19.05	8	7	7.92	25.4 + 3	292 ± 1.5	295 ± 1.5
	900/1500	49	92.1	124	165.1	215	25.40	8	7	7.92	38.1 + 3	368 ± 1.5	371 ± 1.5

DIMENSIONS (CONTINUED)

Size	Class	H	P (Approx.)	Q	S	øA	B	G	D	Groove No.	Weight Approx.		
											in Kg	X ^[3]	Y ^[3]
NPS 2	600	375	115	135	70	82.55	11.91	7.92	23°	R23	40	85	85
	900/1500	825	120	155	76	95.25	11.91	7.92	23°	R24	75	108	108

NOTES

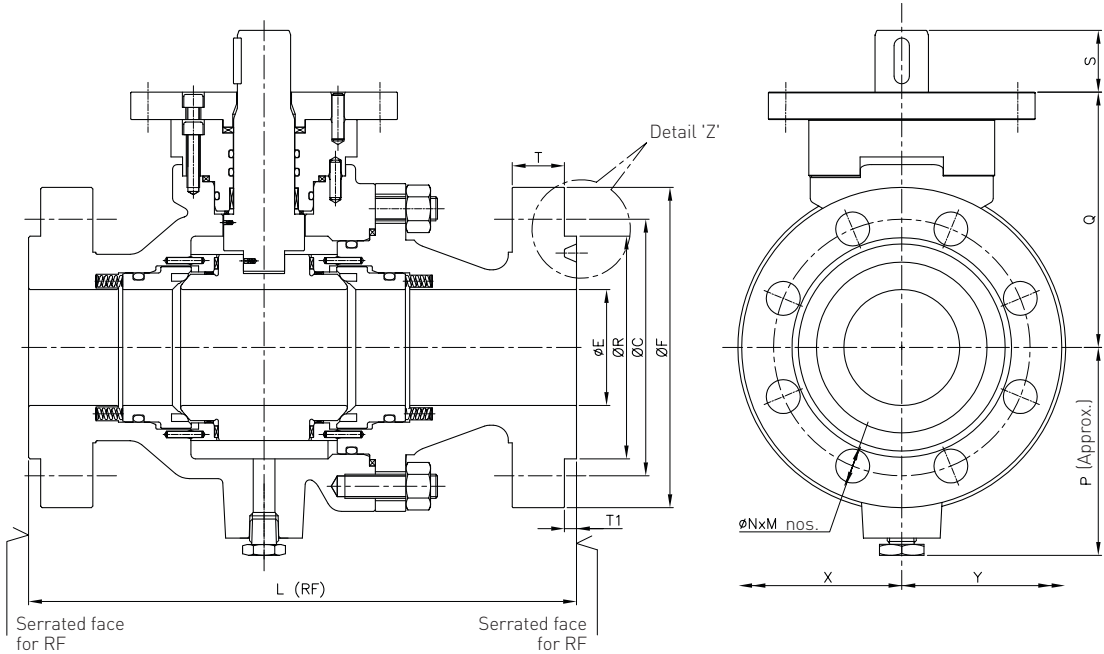
- All dimensions are in mm, unless otherwise specified.
- For top mounting details refer document TDS-278 (latest revision).
- 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 3 FB, CLASS 600, 900



DIMENSIONS

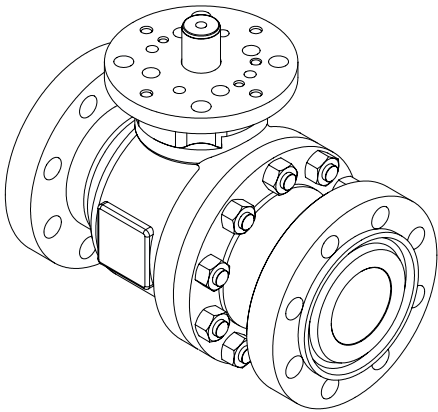
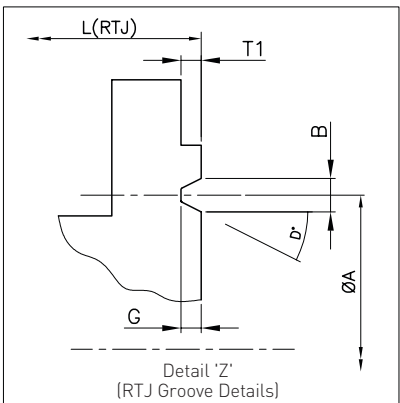
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 3	600	74	127	146	168.3	210	22.22	8	7	7.92	31.8 +3	356 ± 1.5	359 ± 1.5
	900	74	127	156	190.5	240	25.40	8	7	7.92	38.1 +3	381 ± 1.5	384 ± 1.5

DIMENSIONS (CONTINUED)

Size	Class	P (Approx.)	Q	S	øA	B	G	D	Groove No.	Weight Approx.		
										in Kg	X ^[3]	Y ^[3]
NPS 3	600	135	167.5	40	123.83	11.91	7.92	23°	R31	70	108 [4.25]	108 [4.25]
	900	135	167.5	40	123.83	11.91	7.92	23°	R31	85	120 [4.72]	120 [4.72]

NOTES

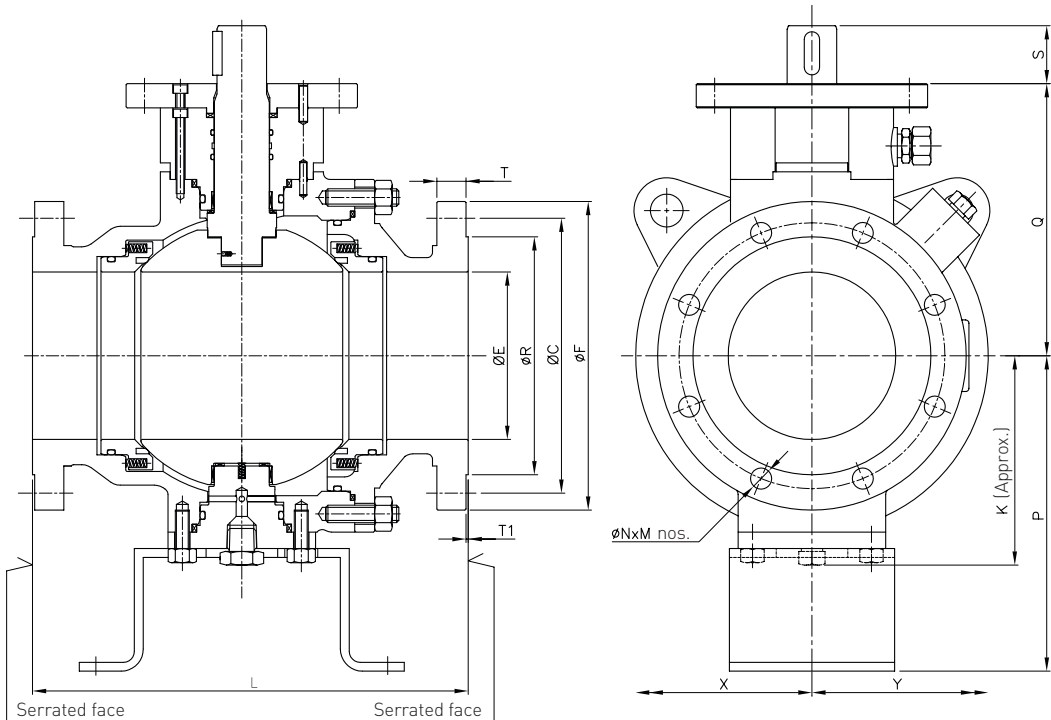
- 1. All dimensions are in mm, unless otherwise specified.
- 2. For top mounting details refer document TDS-278 (latest revision).
- 3. 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 6 FB, CLASS 150 AND 300

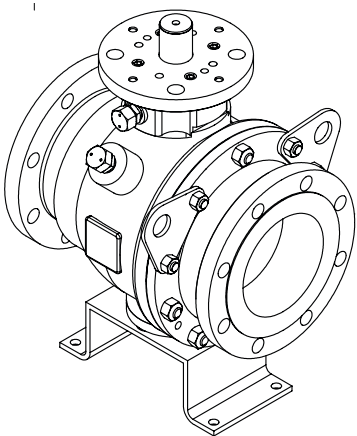


DIMENSIONS

Size	Class	øE	øR	øC	øF	øN	M	T1	T	L	P (Approx.)	Q	S	Weight Approx.			
														in Kg	K (Approx.)	X ^[3]	Y ^[3]
NPS 6	150	150	215.9	241.3	280	22.22	8	2	23.9 + 3	394 ± 1.5	275	243	51.5	145	185	190	190
	300	150	215.9	269.9	320	22.22	12	2	35 + 3	403 ± 1.5	275	243	51.5	165	185	211	211

NOTES

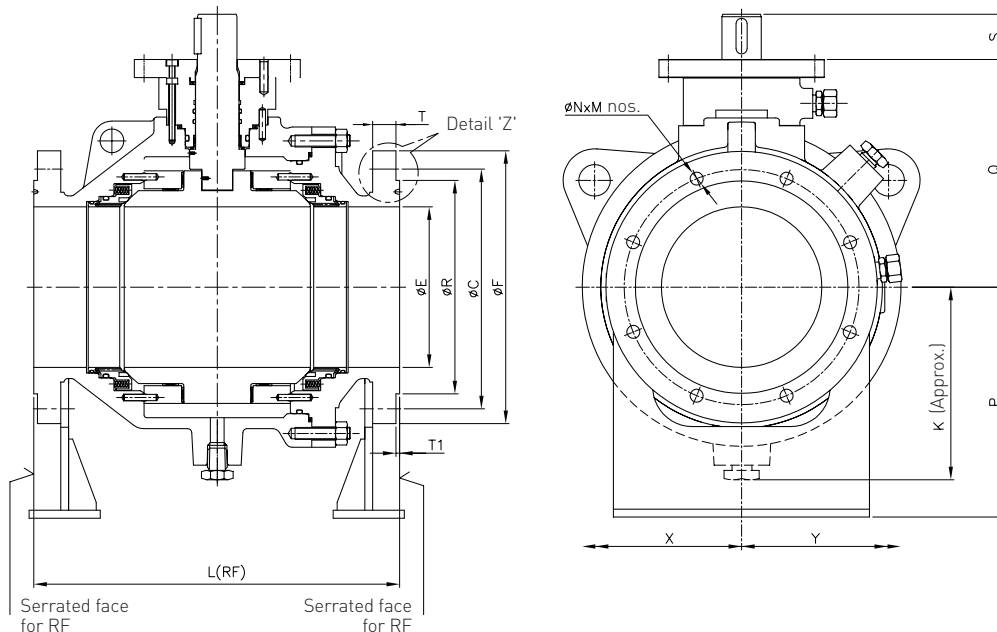
1. All dimensions are in mm, unless otherwise specified.
2. For top mounting details refer document TDS-278 (latest revision).
3. 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 6 FB, CLASS 600, 900, 1500, NPS 8 – NPS 10 FB, CLASS 150, 300, 600



DIMENSIONS

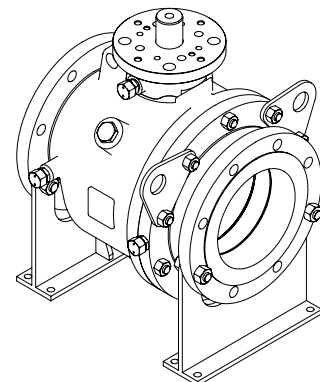
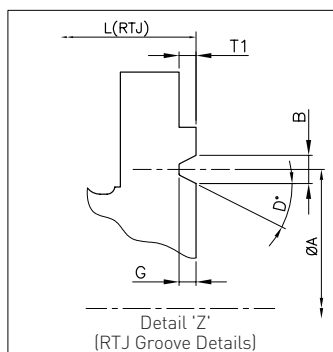
Size	Class	øE	øR			øC	øF	øN	M	T1			L	
			RF	RTJ						RF	RTJ	T	RF	RTJ
NPS 6	600	150	215.9	241	292.1	355	28.58	12	7	7.92	7.92	47.7 + 3	559 ± 1.5	562 ± 1.5
	900	150	215.9	241	317.5	380	31.75	12	7	7.92	7.92	55.6 + 3	610 ± 1.5	613 ± 1.5
	1500	144	215.9	248	317.5	395	38.10	12	7	9.53	9.53	82.6 + 3	705 ± 1.5	711 ± 1.5
NPS 8	150	201	269.9	273	298.5	345	22.22	8	2	6.35	6.35	27 + 3	457 ± 1.5	470 ± 1.5
	300	201	269.9	302	330.2	380	25.40	12	2	7.92	7.92	39.7 + 3	502 ± 1.5	518 ± 1.5
	600	201	269.9	302	349.2	420	31.75	12	7	7.92	7.92	55.6 + 3	660 ± 1.5	664 ± 1.5
NPS 10	150	252	323.8	330	362.0	405	25.40	12	2	6.35	6.35	28.6 + 3	533 ± 1.5	546 ± 1.5
	300	252	323.8	356	387.4	445	28.58	16	2	7.92	7.92	46.1 + 3	568 ± 1.5	584 ± 1.5
	600	252	323.8	356	431.8	510	34.92	16	7	7.92	7.92	63.5 + 3	787 ± 1.5	791 ± 1.5

DIMENSIONS (CONTINUED)

Size	Class	P (Approx.)	Q	S	øA	B	G	D	Groove No.	Weight Approx.		K (Approx.)	X ^[3]	Y ^[3]
										in Kg				
NPS 6	600	284	255.5	51.5	211.12	11.91	7.92	23°	R45	240		195	225	225
	900	287	267.5	62.5	211.12	11.91	7.92	23°	R45	345		205	212	212
	1500	275	292.5	71.0	211.14	13.49	9.53	23°	R46	520		210	252	252
NPS 8	150	292	288.0	57.0	247.65	8.74	6.35	23°	R48	240		235	227	233
	300	300	290.0	63.0	269.88	11.91	7.92	23°	R49	305		237	240	240
	600	340	290.0	61.0	269.88	11.91	7.92	23°	R49	415		237	233	236
NPS 10	150	341	326.0	62.0	304.88	8.74	6.35	23°	R52	380		280	264	264
	300	342	326.0	67.0	323.85	11.91	7.92	23°	R53	445		282	241	258
	600	350	328.0	71.0	323.85	11.91	7.92	23°	R53	625		282	255	262

NOTES

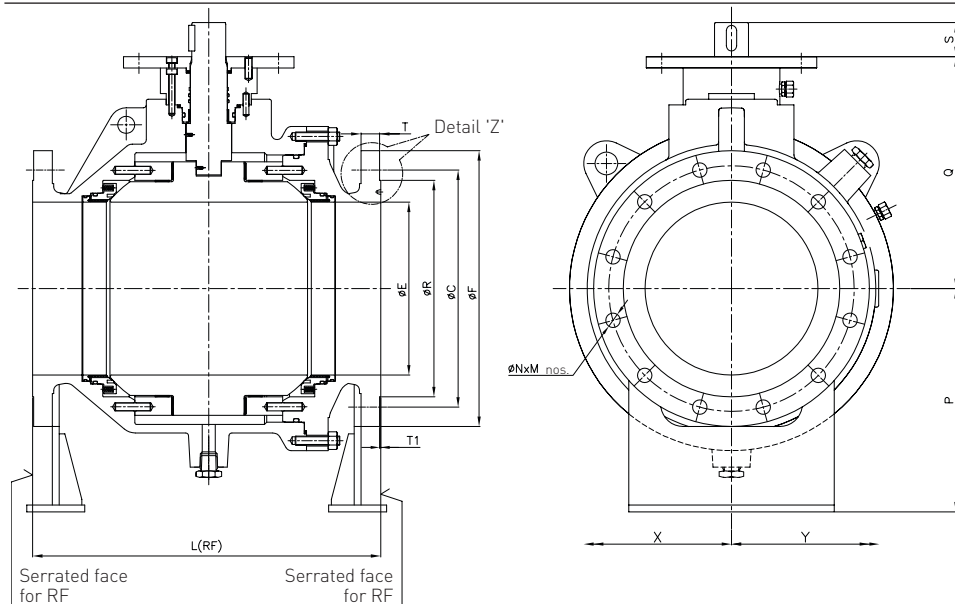
- All dimensions are in mm, unless otherwise specified.
- For top mounting details refer document TDS-278 (latest revision).
- 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 8 TO NPS 24 FB, CLASS 150, 300, 600, 900, 1500



DIMENSIONS

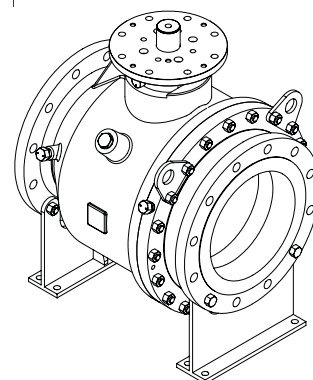
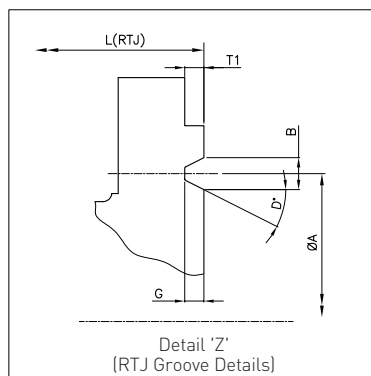
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 8	900	201	269.9	308	393.7	470	38.10	12	7	7.92	63.5 +3	737 ± 1.5	740 ± 1.5
	1500	192	269.9	318	393.7	485	44.45	12	7	11.13	92.1 +3	832 ± 1.5	841 ± 1.5
NPS 10	900	252	323.8	362	469.9	545	38.10	16	7	7.92	69.9 +3	838 ± 1.5	841 ± 1.5
	1500	239	323.8	371	482.6	585	50.80	12	7	11.13	108 +3	991 ± 1.5	1000 ± 1.5
NPS 12	150	303	381.0	-	431.8	485	25.40	12	2	-	30.2 +3	610 ± 3	-
	300	303	381.0	-	450.8	520	31.75	16	2	-	49.3 +3	648 ± 3	-
	600	303	381.0	413	489.0	560	34.92	20	7	7.92	66.7 +3	838 ± 3	841 ± 3
	900	303	381.0	419	533.4	610	38.10	20	7	7.92	79.4 +3	965 ± 3	968 ± 3

DIMENSIONS (CONTINUED)

Size	Class	P	Q	S	øA	B	G	D	Groove No.	Weight Approx.				
										in Kg	K [Approx.]	X ^[3]	Y ^[3]	
NPS 8	900	310	322	80.0	269.88	11.91	7.92	23°	R49	575	245	290	290	
	1500	340	387	82.5	269.88	16.66	11.13	23°	R50	995	260	335	335	
NPS 10	900	380	360	76.0	323.85	11.91	7.92	23°	R53	850	300	325	325	
	1500	380	420	91.5	323.85	16.66	11.13	23°	R54	1480	310	365	365	
NPS 12	150	393	408	60.0	-	-	-	-	-	590	325	288	288	
	300	386	408	70.0	-	-	-	-	-	690	325	294	294	
	600	393	401	75.0	381.00	11.91	7.92	23°	R57	905	325	321	321	
	900	419	496	85.5	381.00	11.91	7.92	23°	R57	1460	338	350	350	

NOTES

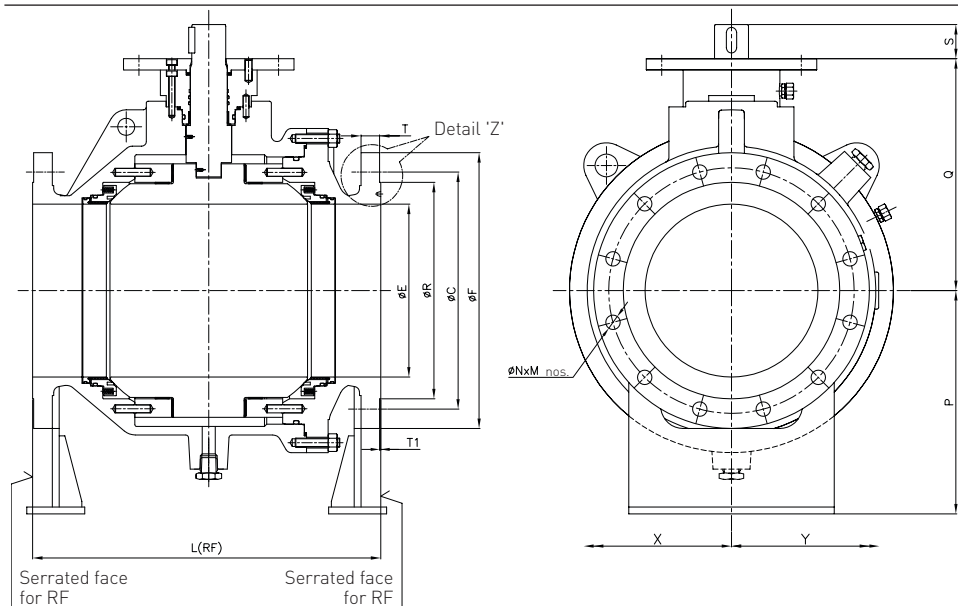
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KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 8 TO NPS 24 FB, CLASS 150, 300, 600, 900, 1500



DIMENSIONS

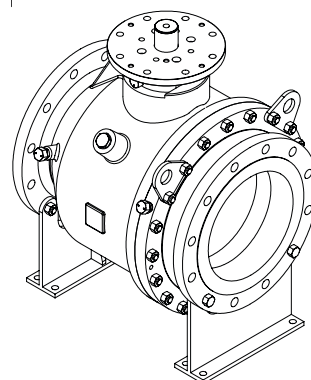
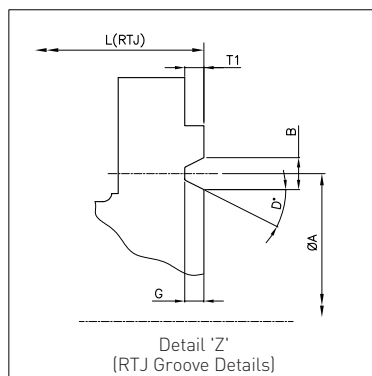
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 14	150	334	412.8	-	476.3	535	28.58	12	2	-	33.4 + 3	686 ± 3	-
	300	334	412.8	-	514.4	585	31.75	20	2	-	52.4 + 3	762 ± 3	-
	600	334	412.8	457	527.0	605	38.10	20	7	7.92	69.9 + 3	889 ± 3	892 ± 3
NPS 16	150	385	469.9	-	539.8	595	28.58	16	2	-	35 + 3	762 ± 3	-
	300	385	469.9	-	571.5	650	34.92	20	2	-	55.6 + 3	838 ± 3	-
	600	385	469.9	508	603.2	685	41.27	20	7	7.92	76.2 + 3	991 ± 3	994 ± 3
	900	373	469.9	524	616.0	705	44.45	20	7	11.13	88.9 + 3	1130 ± 3	1140 ± 3

DIMENSIONS (CONTINUED)

Size	Class	P	Q	S	øA	B	G	D	Groove No.	Weight Approx.			
										in Kg	K (Approx.)	X ^[3]	Y ^[3]
NPS 14	150	409	418	75.0	-	-	-	-	-	710	345	335	335
	300	416	423	81.0	-	-	-	-	-	875	345	324	324
	600	407	446	90.0	419.10	11.91	7.92	23°	R61	1155	345	338	338
NPS 16	150	454	458	86.0	-	-	-	-	-	990	385	357	357
	300	455	478	90.0	-	-	-	-	-	1215	385	371	371
	600	486	482	90.0	469.90	11.91	7.92	23°	R65	1610	385	391	391
	900	507	483	113.0	469.90	16.66	11.13	23°	R66	2215	405	466	466

NOTES

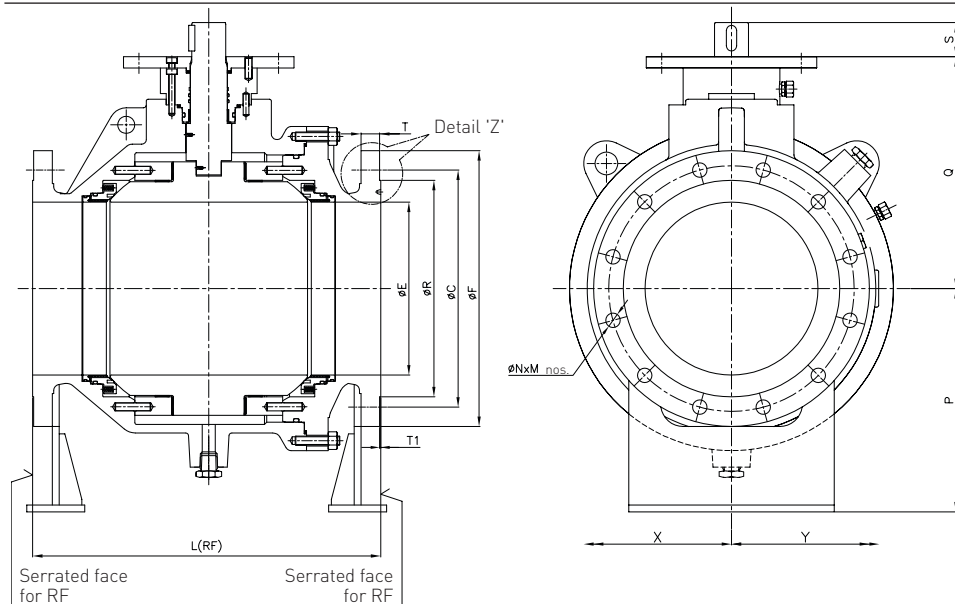
- All dimensions are in mm, unless otherwise specified.
- For top mounting details refer document TDS-278 (latest revision).
- 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 8 TO NPS 24 FB, CLASS 150, 300, 600, 900, 1500



DIMENSIONS

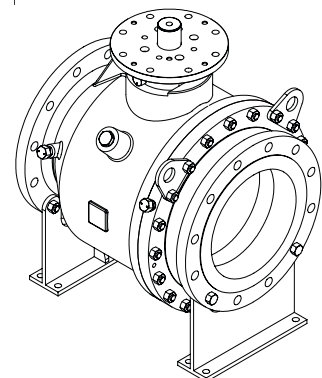
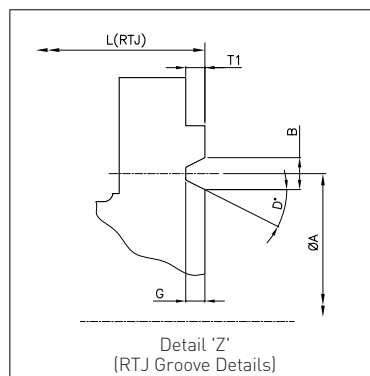
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 18	150	436	533.4	-	577.9	635	31.75	16	2	-	38.1 + 3	864 ± 3	-
	300	436	533.4	-	628.6	710	34.92	24	2	-	58.8 + 3	914 ± 3	-
	600	436	533.4	575	654.0	745	44.45	20	7	7.92	82.6 + 3	1092 ± 3	1095 ± 3
NPS 20	150	487	584.2	-	635.0	700	31.75	20	2	-	41.3 + 5	914 ± 3	-
	300	487	584.2	-	685.8	775	34.92	24	2	-	62 + 5	991 ± 3	-
	600	487	584.2	635	723.9	815	44.45	24	7	9.53	88.9 + 5	1194 ± 3	1200 ± 3
NPS 24	150	589	692.2	-	749.3	815	34.92	20	2	-	46.1 + 5	1067 ± 3	-
	300	589	692.2	-	812.8	915	41.27	24	2	-	68.3 + 5	1143 ± 3	-
	600	589	692.2	749	838.2	940	50.80	24	7	11.13	101.6 + 5	1397 ± 3	1407 ± 3

DIMENSIONS (CONTINUED)

Size	Class	P	Q	S	øA	B	G	D	Groove No.	Weight Approx.			
										in Kg	K (Approx.)	X ^[3]	Y ^[3]
NPS 18	150	496	516	96.0	-	-	-	-	-	1315	425	400	400
	300	492	516	100.0	-	-	-	-	-	1555	425	495	495
	600	502	553	115.0	533.40	11.91	7.92	23°	R69	2140	420	423	423
NPS 20	150	530	554	100.0	-	-	-	-	-	1740	460	438	438
	300	530	562	125.0	-	-	-	-	-	2065	460	438	438
	600	538	588	130.0	584.20	13.49	9.53	23°	R73	2765	460	468	468
NPS 24	150	605	642	128.0	-	-	-	-	-	2800	535	520	520
	300	608	672	152.0	-	-	-	-	-	3490	535	528	528
	600	665	703	145.0	692.15	16.66	11.13	23°	R77	4790	535	583	583

NOTES

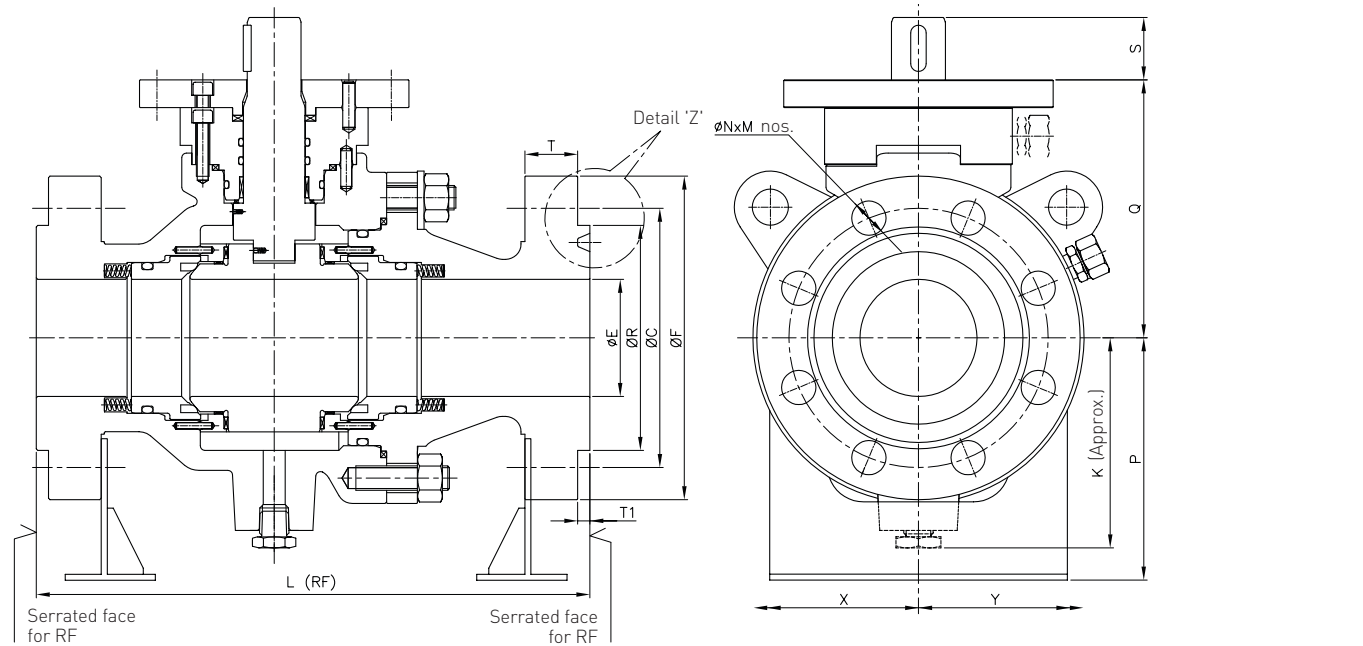
- All dimensions are in mm, unless otherwise specified.
- For top mounting details refer document TDS-278 (latest revision).
- 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 4 FB, CLASS 600, 900



DIMENSIONS

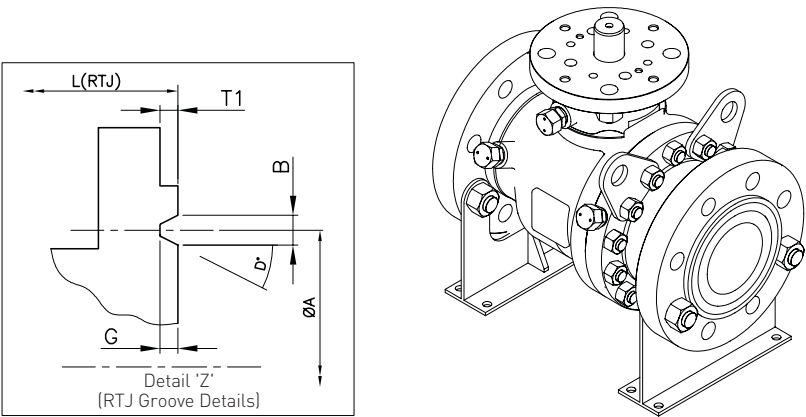
Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 4	600	100	157.2	175	215.9	275	25.40	8	7	7.92	38.1 + 3	432 ± 1.5	435 ± 1.5
	900	100	157.2	181	235.0	290	31.75	8	7	7.92	44.5 + 3	457 ± 1.5	460 ± 1.5

DIMENSIONS (CONTINUED)

Size	Class	P	Q	S	øA	B	G	D	Groove No.	Weight Approx.			
										in Kg	K (Approx.)	X ^[3]	Y ^[3]
NPS 4	600	202	213	45	149.23	11.91	7.92	23°	R37	130	155	128	128
	900	237	228	50	149.23	11.91	7.92	23°	R37	160	160	166	174

NOTES

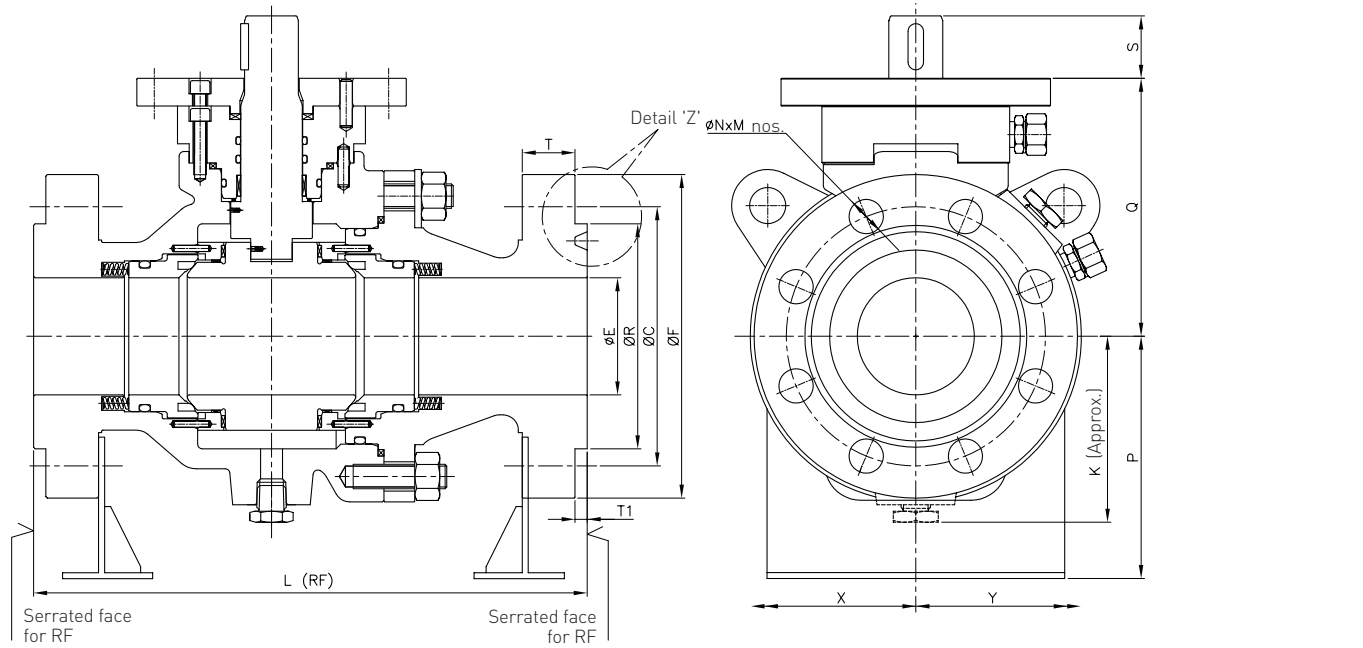
1. All dimensions are in mm, unless otherwise specified.
2. For top mounting details refer document TDS-278 (latest revision).
3. 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 4 FB, CLASS 1500



DIMENSIONS

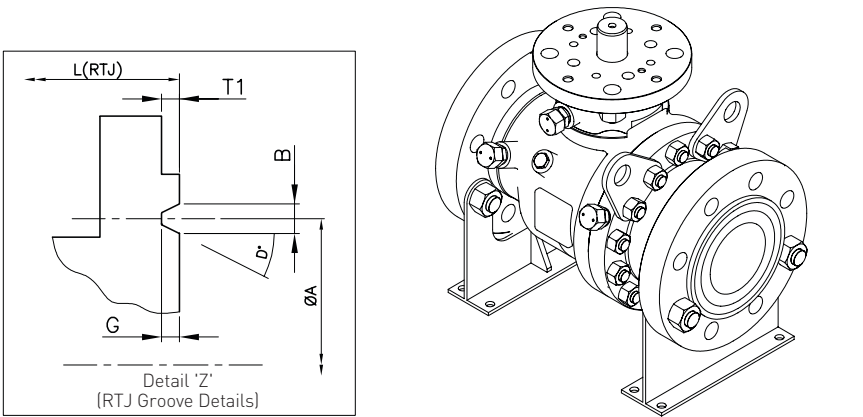
Size	Class	ϕE	ϕR		ϕC	ϕF	ϕN	M	T_1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 4	1500	100	157.2	194	241.3	310	34.93	8	7	7.92	54 + 3	546 ± 1.5	549 ± 1.5

DIMENSIONS (CONTINUED)

Size	Class	P	Q	S	ϕA	B	G	D	Groove No.	Weight Approx.		X ^[3]	Y ^[3]
										in Kg	K (Approx.)		
NPS 4	1500	222	255	51	161.93	11.91	7.92	23°	R39	240	160	175	175

NOTES

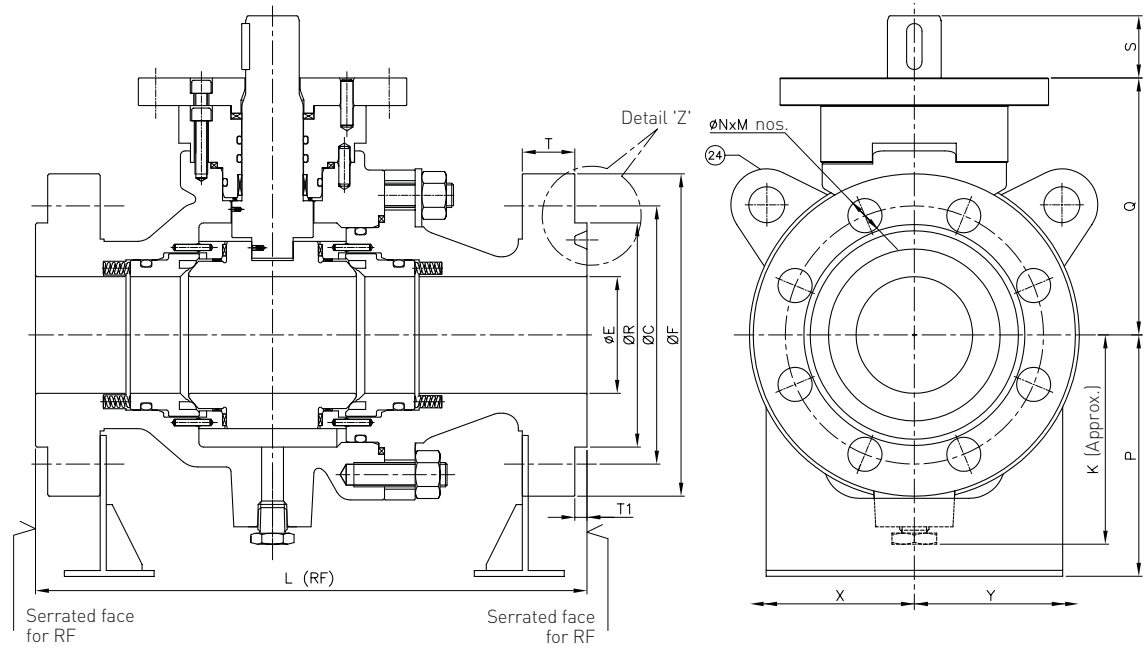
1. All dimensions are in mm, unless otherwise specified.
2. For top mounting details refer document TDS-278 (latest revision).
3. 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

SIZE NPS 3 FB, CLASS 1500



DIMENSIONS

Size	Class	øE	øR		øC	øF	øN	M	T1		T	L	
			RF	RTJ					RF	RTJ		RF	RTJ
NPS 3	1500	74	127	168	203.2	265	31.75	8	7	7.92	47.7 + 3	470 ± 1.5	473 ± 1.5

DIMENSIONS (CONTINUED)

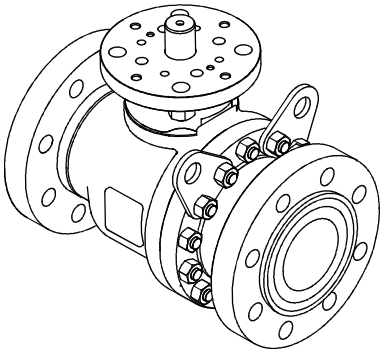
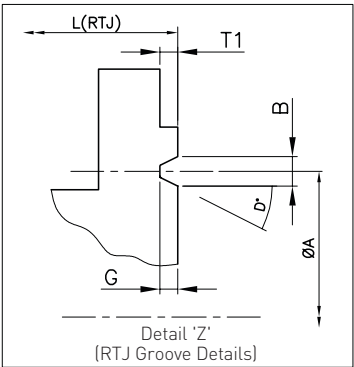
Size	Class	P (Approx.)	Q	S	øA	B	G	D	Groove No.	Weight Approx.		X ^[3]	Y ^[3]
										in Kg	K (Approx.)		
NPS 3	1500	140	198	46	136.53	11.91	7.92	23°	R35	150	-	187	187

NOTES

1. All dimensions are in mm, unless otherwise specified.

2. For top mounting details refer document TDS-278 (latest revision).

3. 'X' and 'Y' are maximum envelope dimensions considering maximum dimension of customer side flange, body diameter, vent, sealant bosses or lifting hooks.



KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

TOP MOUNTING DETAILS OF SERIES NL

Soft Seated, Bolted Body, Side Entry

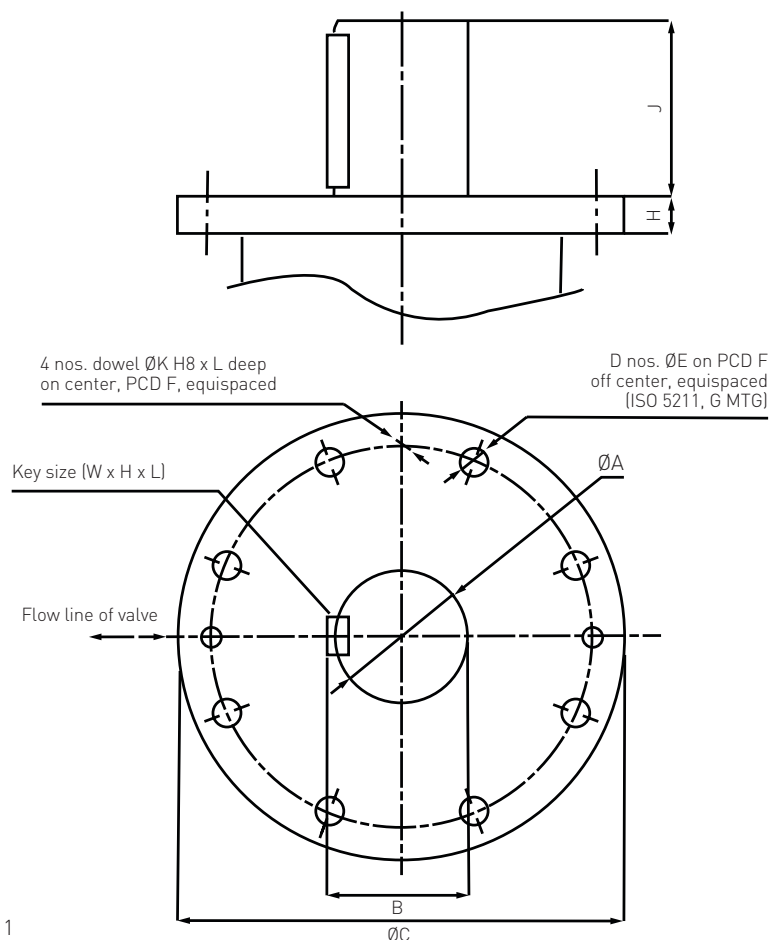


FIGURE 1

DIMENSIONS

Valve Size		Flange type (DIN EN ISO-5211)	Flange OD	Hole PCD	Dia. of Hole	Fastner Size for øE Hole	No. of Holes	Thk. of Flange	Stem Dia.	Key Size	Stem + Key Dimension	Dowel Dia.	Dowel Dia.	Stem Protrusion
NPS	Class	[G]	[øC]	[F]	[øE]		[D]	[H]	[øA]	[WxHxL]	[B]	[øK]	Deep [L]	[J]
2 x 1½	900/1500	F10	125	102	M10	M10	4	15	25	8 x 7 x 25	28.0	-	-	35.0
2	150	F10	125	102	M10	M10	4	12	18	6 x 6 x 20	20.5	-	-	27.5
	300								22	6 x 6 x 20	24.5	-	-	26.5
	600	F12	150	125	M12	M12	4	15	25	8 x 7 x 20	28.0	-	-	27.5
	900/1500	F14	175	140	M16	M16	4	18	35	10 x 8 x 25	38.0	-	-	35.5
3	150	F10	125	102	M10	M10	4	12	25	8 x 7 x 25	28.0	-	-	34.5
	300	F12	150	125	M12	M12	4	14	28	8 x 7 x 25	31.0	-	-	32.5
	600	F14	175	140	17.5	M16	4	18	35	10 x 8 x 30	38.0	10	14	40.0
	900													
	1500	F25	300	254	17.5	M16	8	25	45	14 x 9 x 35	48.5	12	15	46.0
4	150	F12	150	125	M12	M12	4	14	30	8 x 7 x 25	33.0	-	-	33.5
	300								35	10 x 8 x 25	38.0	-	-	
	600	F16	210	165	22.0	M20	4	23	40	12 x 8 x 35	43.0	12	15	45.0
	900								45	14 x 9 x 40	48.5			50.0
	1500	F25	300	254	17.5	M16	8	25						51.0
6	150	F16	210	165	22.0	M20	4	23	45	14 x 9 x 40	48.5	12	15	51.5
	300													51.5
	600	F25	300	254	17.5	M16	8	20	50	14 x 9 x 50	53.5			62.5
	900							28	60	18 x 11 x 55	64.0			71.0
	1500													

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

TOP MOUNTING DETAILS OF SERIES NL

Soft Seated, Bolted Body, Side Entry

DIMENSIONS (CONTINUED)

Valve Size		Flange type (DIN EN ISO-5211)	Flange OD	Hole PCD	Dia. of Hole	Fastner Size for øE Hole	No. of Holes	Thk. of Flange	Stem Dia.	Key Size	Stem + Key Dimension	Dowel Dia.	Dowel Dia. Deep	Stem Protrusion
NPS	Class	[G]	[øC]	[F]	[øE]		[D]	[H]	[øA]	[WxHxL]	[B]	[øK]	[L]	[J]
8	150	F16	210	165	22.0	M20	4	23	50	14 x 9 x 45	53.5	12	15	57.0
	300								55	16 x 10 x 50	59.0			63.0
	600	F25	300	254	17.5	M16	8	18	70	20 x 12 x 60	74.5			61.0
	900	F25	300	254	17.5	M16	8	25	70	20 x 12 x 60	74.5	80.0		
	1500	F30	350	298	22.0	M20	8	32	75	20 x 12 x 70	79.5	20	22	82.5
10	150	F16	210	165	22.0	M20	4	23	60	18 x 11 x 50	64.0	12	15	62.0
	300									18 x 11 x 55				67.0
	600	F25	300	254	17.5	M16	8	18	70	18 x 11 x 60	74.5			71.0
	900	F25	300	254	17.5	M16	8	30	70	20 x 12 x 60	74.5	12	15	76.0
	1500	F35	415	356	33.0	M30	8	35	90	25 x 14 x 75	95.0	20	24	91.5
12	150	F25	300	254	17.5	M16	8	20	60	18 x 11 x 45	64.0	12	15	60.0
	300								70	20 x 12 x 55	74.5			70.0
	600							18	20 x 12 x 60	74.5	75.0			
	900	F25	300	254	17.5	M16	8	28	80	22 x14 x 70	85.0	12	15	85.5
14	150	F25	300	254	17.5	M16	8	18	70	20 x 12 x 60	74.5	12	15	75.0
	300								80	22 x 14 x 65	85.0			81.0
	600							25	85	22 x 14 x 75	90.0			90.0
16	150	F25	300	254	17.5	M16	8	18	80	22 x 14 x 70	85.0	12	15	86.0
	300								90	25 x 14 x 75	95.0			90.0
	600							25	85	22 x 14 x 75	90.0			
	900	F30	350	298	22.0	M20	8	30	105	28 x 16 x 95	111.0	20	22	113.0
18	150	F25	300	254	17.5	M16	8	18	90	25 x 14 x 80	95.0	12	15	96.0
	300								100	28 x 16 x 85	106.0			100.0
	600	F30	350	298	22.0	M20	8	28	110	28 x 16 x100	116.0	20	22	115.0
20	150	F25	300	254	17.5	M16	8	20	95	25 x 14 x 85	100.0	12	15	100.0
	300	F30					8	25	110	28 x 16 x110	116.0	20	22	125.0
	600							30	120	32 x 18 x115	127.0			130.0
24	150	F30	350	298	22.0	M20	8	25	110	28 x 16 x110	116.0	20	22	128.0
	300	F35	415	356	33.0	M30	8	30	130	32 x 18 x135	137.0	20	24	152.0
	600							33	130	32 x 18 x130	137.0			145.0

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES FOR SERIES NL

Class	Size	Seat material	BTO	RUN	ETO	BTC	ETC
	NPS (DN)		Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)
150	2 (50)	Devlon	36 (318)	16 (141)	23 (203)	31 (274)	28 (247)
	3 (80)	Devlon	104 (920)	46 (407)	68 (601)	88 (778)	83 (734)
	4 (100)	Devlon	169 (1495)	76 (672)	110 (973)	144 (1274)	135 (1194)
	6 (150)	Devlon	423 (3743)	190 (1681)	275 (2433)	360 (3186)	338 (2991)
	8 (200)	Devlon	810 (7169)	364 (3221)	527 (4664)	689 (6098)	648 (5735)
	10 (250)	Devlon	1152 (10196)	518 (4584)	749 (6629)	979 (8664)	921 (8151)
	12 (300)	Devlon	1540 (13630)	693 (6133)	1001 (8859)	1309 (11585)	1232 (10904)
	14 (350)	Devlon	2235 (19781)	1005 (8895)	1453 (12860)	1900 (16816)	1788 (15825)
	16 (400)	Devlon	3042 (26923)	1368 (12107)	1977 (17497)	2586 (22888)	2433 (21533)
	18 (450)	Devlon	4069 (36013)	1831 (16205)	2645 (23410)	3459 (30614)	3255 (28809)
	20 (500)	Devlon	5157 (45643)	2320 (20533)	3352 (29667)	4383 (38792)	4125 (36509)
	24 (600)	Devlon	8933 (79063)	4019 (35571)	5806 (51387)	7593 (67203)	7146 (63247)
300	2 (50)	Devlon	70 (619)	31 (274)	46 (407)	60 (531)	56 (495)
	3 (80)	Devlon	124 (1097)	55 (486)	81 (716)	105 (929)	99 (876)
	4 (100)	Devlon	226 (2000)	101 (893)	147 (1301)	192 (1699)	180 (1593)
	6 (150)	Devlon	540 (4779)	243 (2150)	351 (3106)	459 (4062)	432 (3823)
	8 (200)	Devlon	1073 (9496)	482 (4266)	697 (6168)	912 (8071)	858 (7593)
	10 (250)	Devlon	1260 (11151)	567 (5018)	819 (7248)	1071 (9479)	1008 (8921)
	12 (300)	Devlon	2460 (21772)	1107 (9797)	1599 (14152)	2091 (18506)	1968 (17418)
	14 (350)	Devlon	3131 (27711)	1408 (12461)	2035 (18011)	2661 (23551)	2504 (22162)
	16 (400)	Devlon	3871 (34261)	1741 (15409)	2516 (22268)	3290 (29118)	3096 (27401)
	18 (450)	Devlon	6406 (56697)	2882 (25507)	4164 (36854)	5445 (48192)	5124 (45351)
	20 (500)	Devlon	8876 (78559)	3994 (35349)	5769 (51059)	7545 (66778)	7100 (62840)
	24 (600)	Devlon	13339 (118060)	6002 (53122)	8670 (76736)	11338 (100349)	10671 (94446)
600	2 (50)	Devlon	102 (902)	45 (398)	66 (584)	87 (770)	81 (716)
	3 (80)	Devlon	248 (2194)	111 (982)	161 (1424)	211 (1867)	198 (1752)
	4 (100)	Devlon	351 (3106)	157 (1389)	228 (2017)	298 (2637)	280 (2478)
	6 (150)	Devlon	584 (5168)	262 (2318)	380 (3363)	496 (4389)	467 (4133)
	8 (200)	Devlon	1092 (9665)	491 (4345)	710 (6284)	928 (8213)	873 (7726)
	10 (250)	Devlon	1530 (13541)	688 (6089)	995 (8806)	1301 (11514)	1224 (10833)
	12 (300)	Devlon	2539 (22472)	1142 (10107)	1650 (14603)	2158 (19099)	2031 (17975)
	14 (350)	Devlon	4285 (37925)	1928 (17064)	2785 (24649)	3642 (32234)	3428 (30340)
	16 (400)	Devlon	4498 (39810)	2024 (17913)	2924 (25879)	3823 (33836)	3598 (31844)
	18 (450)	Devlon	9109 (80621)	4099 (36279)	5921 (52405)	7743 (68531)	7287 (64495)
	20 (500)	Devlon	12624 (111731)	5680 (50272)	8206 (72629)	10730 (94968)	10099 (89383)
	24 (600)	Devlon	15745 (139355)	7085 (62707)	10234 (90578)	13383 (118449)	12596 (111484)

Legends

RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES FOR SERIES NL (CONTINUED)

Class	Size	Seat material	BTO	RUN	ETO	BTC	ETC
	NPS (DN)		Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)
900	2 (50)	Devlon	135 (1194)	60 (531)	81 (716)	115 (1017)	108 (955)
	3 (80)	Devlon	250 (2212)	112 (991)	150 (1327)	213 (1885)	200 (1770)
	4 (100)	Devlon	434 (3841)	195 (1725)	260 (2301)	369 (3265)	347 (3071)
	6 (150)	Devlon	725 (6416)	326 (2885)	435 (3850)	616 (5452)	580 (5133)
	8 (200)	Devlon	2209 (19551)	994 (8797)	1325 (11727)	1878 (16621)	1767 (15639)
	10 (250)	Devlon	2261 (20011)	1017 (9001)	1357 (12010)	1922 (17011)	1808 (16002)
	12 (300)	Devlon	3450 (30535)	1552 (13736)	2070 (18321)	2933 (25959)	2760 (24428)
	14 (350)	Devlon	6678 (59105)	3005 (26596)	4007 (35464)	5676 (50236)	5342 (47280)
	16 (400)	Devlon	8298 (73443)	3734 (33048)	4979 (44067)	7053 (62424)	6638 (58751)
	18 (450)	Devlon	13664 (120936)	6148 (54414)	8198 (72558)	11614 (102792)	10931 (96747)
1500	20 (500)	Devlon	18462 (163402)	8307 (73523)	11077 (98039)	15693 (138894)	14769 (130716)
	2 (50)	Devlon	216 (1911)	97 (858)	130 (1150)	184 (1628)	172 (1522)
	3 (80)	Devlon	452 (4000)	203 (1796)	271 (2398)	384 (3398)	361 (3195)
	4 (100)	Devlon	561 (4965)	252 (2230)	337 (2982)	477 (4221)	448 (3965)
	6 (150)	Devlon	1409 (12470)	634 (5611)	845 (7478)	1198 (10603)	1127 (9974)
	8 (200)	Devlon	2628 (23259)	1182 (10461)	1577 (13957)	2234 (19772)	2102 (18604)
	10 (250)	Devlon	4413 (39058)	1985 (17568)	2648 (23436)	3751 (33199)	3530 (31243)
	12 (300)	Devlon	7074 (62610)	3183 (28171)	4244 (37562)	6013 (53219)	5659 (50086)
	14 (350)	Devlon	12931 (114449)	5818 (51493)	7759 (68672)	10991 (97278)	10344 (91552)
	16 (400)	Devlon	13100 (115944)	5895 (52175)	7860 (69566)	11135 (98553)	10480 (92755)
	18 (450)	Devlon	28381 (251193)	12771 (113032)	17029 (150719)	24124 (213515)	22704 (200947)

Legends

RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2 TORQUES BASED ON TEMPERATURE AND SEAT MATERIAL

Seat material at various temperature	Final Valve Torque (FBTO)
Devlon from (-) 29 °C to high temperature as per PT rating chart	= (Refer to Torque Table)
Devlon from (-) 30 °C to (-) 50 °C Non-Operable Valve	= (Refer to Torque Table)
Peek from (-) 29 °C to high temperature as per PT rating chart	= 1.3 x Torques given in Torque Table
Devlon/Peek from (-) 30 °C to (-) 50 °C Operable Valve with extended bonnet for low temperature service	= 2 x Torques given in Torque Table

2.0.1 For valves with extended stem (length up to 2.5 meters), increase Final valve torque (BTO) values by 10%.

Example: Underground / buried applications

2.1 Consideration of safety factors for actuator selection

2.1.1 The service fluid factor (SFF) has to be determined from the table below:

Fluid	SFF
Clean, particle-free, non-viscous liquids	1
Dry gas, steam	1.2

2.1.2 The frequency of operation factor (FOF) shall be taken from project specification.

If it is not available in project specification, it has to be determined from table below:

Application	FOF
Process on-off valves	1.3
Emergency Shutdown Valves (ESDV)	1.5
ESDV Valves Long Stand Still applications (operated once in 6 months or longer durations)	2

2.1.3 **Actuator selection torque = VALVE TORQUES x SFF x FOF**

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO Nm (lbf·in)	RUN Nm (lbf·in)	ETO Nm (lbf·in)	BTC Nm (lbf·in)	ETC Nm (lbf·in)
2 (50)	150	Devlon	0-10	28 (244)	19 (170)	18 (159)	23 (208)	22 (195)
	150	Devlon	11-20*	36 (319)	19 (170)	23 (207)	31 (271)	29 (255)
	300	Devlon	0-10	50 (446)	37 (325)	33 (290)	43 (379)	40 (356)
	300	Devlon	11-20	55 (489)	37 (325)	36 (318)	47 (416)	44 (391)
	300	Devlon	21-35	63 (554)	37 (325)	41 (360)	53 (471)	50 (443)
	300	Devlon	36-50*	70 (620)	37 (325)	46 (403)	60 (527)	56 (496)
	600	Devlon	0-20	61 (537)	39 (342)	39 (349)	52 (456)	49 (430)
	600	Devlon	21-50	76 (671)	41 (366)	49 (436)	64 (570)	61 (537)
	600	Devlon	51-80	91 (805)	44 (390)	59 (523)	77 (684)	73 (644)
	600	Devlon	81-102*	102 (903)	46 (407)	66 (587)	87 (767)	82 (722)
	900	Devlon	0-50	89 (790)	53 (467)	54 (474)	76 (672)	71 (632)
	900	Devlon	51-80	103 (908)	55 (488)	62 (545)	87 (772)	82 (726)
	900	Devlon	81-100	111 (987)	57 (502)	67 (592)	95 (839)	89 (789)
	900	Devlon	101-125	123 (1085)	59 (520)	74 (651)	104 (922)	98 (868)
	900	Devlon	126-153*	135 (1195)	61 (540)	81 (717)	115 (1016)	108 (956)
	1500	Devlon	0-100	150 (1324)	85 (754)	90 (794)	127 (1125)	120 (1059)
	1500	Devlon	101-150	171 (1513)	89 (788)	103 (908)	145 (1286)	137 (1211)
	1500	Devlon	151-175	182 (1608)	91 (805)	109 (965)	154 (1367)	145 (1287)
	1500	Devlon	176-200	192 (1703)	93 (822)	115 (1022)	164 (1448)	154 (1362)
	1500	Devlon	201-225	203 (1798)	95 (838)	122 (1079)	173 (1528)	163 (1438)
	1500	Devlon	226-255*	216 (1912)	97 (859)	130 (1147)	184 (1625)	173 (1529)
3 (80)	150	Devlon	0-10	80 (710)	56 (499)	52 (461)	68 (603)	64 (568)
	150	Devlon	11-20*	104 (920)	56 (499)	68 (598)	88 (782)	83 (736)
	300	Devlon	0-10	102 (907)	94 (828)	67 (590)	87 (771)	82 (726)
	300	Devlon	11-20	111 (986)	94 (828)	72 (641)	95 (838)	89 (788)
	300	Devlon	21-35	125 (1104)	94 (828)	81 (717)	106 (938)	100 (883)
	300	Devlon	36-50*	138 (1221)	94 (828)	90 (794)	117 (1038)	110 (977)
	600	Devlon	0-20	164 (1450)	104 (921)	106 (942)	139 (1232)	131 (1160)
	600	Devlon	21-50	205 (1813)	111 (986)	133 (1178)	174 (1541)	164 (1450)
	600	Devlon	51-80	246 (2176)	119 (1050)	160 (1415)	209 (1850)	197 (1741)
	600	Devlon	81-102*	276 (2443)	124 (1097)	179 (1588)	235 (2076)	221 (1954)
	900	Devlon	0-50	238 (2105)	151 (1340)	143 (1263)	202 (1789)	190 (1684)
	900	Devlon	51-80	254 (2252)	158 (1401)	153 (1351)	216 (1914)	204 (1802)
	900	Devlon	81-100	266 (2350)	163 (1442)	159 (1410)	226 (1998)	212 (1880)
	900	Devlon	101-125	279 (2473)	169 (1492)	168 (1484)	238 (2102)	224 (1979)
	900	Devlon	126-153*	295 (2611)	175 (1549)	177 (1567)	251 (2219)	236 (2089)
	1500	Devlon	0-100	368 (3261)	210 (1858)	221 (1957)	313 (2772)	295 (2609)
	1500	Devlon	101-150	421 (3728)	219 (1941)	253 (2237)	358 (3169)	337 (2982)
	1500	Devlon	151-175	448 (3961)	224 (1983)	269 (2377)	380 (3367)	358 (3169)
	1500	Devlon	176-200	474 (4195)	229 (2024)	284 (2517)	403 (3566)	379 (3356)
	1500	Devlon	201-225	500 (4428)	233 (2066)	300 (2657)	425 (3764)	400 (3543)
	1500	Devlon	226-255*	532 (4709)	239 (2115)	319 (2825)	452 (4002)	426 (3767)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL (CONTINUED)

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO Nm (lbf · in)	RUN Nm (lbf · in)	ETO Nm (lbf · in)	BTC Nm (lbf · in)	ETC Nm (lbf · in)
4 (100)	150	Devlon	0-10	141 (1246)	94 (828)	91 (810)	120 (1059)	113 (997)
	150	Devlon	11-20*	188 (1664)	94 (828)	122 (1082)	160 (1414)	150 (1331)
	300	Devlon	0-10	160 (1420)	138 (1217)	104 (923)	136 (1207)	128 (1136)
	300	Devlon	11-20	183 (1622)	138 (1217)	119 (1055)	156 (1379)	147 (1298)
	300	Devlon	21-35	218 (1926)	138 (1217)	141 (1252)	185 (1637)	174 (1541)
	300	Devlon	36-50*	252 (2230)	138 (1217)	164 (1450)	214 (1896)	202 (1784)
	600	Devlon	0-20	232 (2056)	148 (1307)	151 (1336)	197 (1748)	186 (1645)
	600	Devlon	21-50	290 (2570)	158 (1399)	189 (1670)	247 (2184)	232 (2056)
	600	Devlon	51-80	348 (3084)	168 (1491)	226 (2004)	296 (2621)	279 (2467)
	600	Devlon	81-102*	391 (3461)	176 (1558)	254 (2249)	332 (2942)	313 (2769)
	900	Devlon	0-50	337 (2985)	199 (1762)	202 (1791)	287 (2538)	270 (2388)
	900	Devlon	51-80	388 (3433)	208 (1841)	233 (2060)	330 (2918)	310 (2747)
	900	Devlon	81-100	422 (3732)	214 (1895)	253 (2239)	358 (3172)	337 (2985)
	900	Devlon	101-125	464 (4105)	222 (1961)	278 (2463)	394 (3489)	371 (3284)
	900	Devlon	126-153*	511 (4523)	230 (2036)	307 (2714)	434 (3844)	409 (3618)
	1500	Devlon	0-100	457 (4048)	261 (2309)	274 (2429)	389 (3441)	366 (3239)
	1500	Devlon	101-150	523 (4627)	273 (2412)	314 (2776)	444 (3933)	418 (3701)
	1500	Devlon	151-175	555 (4916)	278 (2464)	333 (2950)	472 (4179)	444 (3933)
	1500	Devlon	176-200	588 (5205)	284 (2515)	353 (3123)	500 (4425)	470 (4164)
	1500	Devlon	201-225	621 (5495)	290 (2567)	372 (3297)	528 (4670)	497 (4396)
	1500	Devlon	226-255*	660 (5842)	297 (2629)	396 (3505)	561 (4965)	528 (4673)
6 (150)	150	Devlon	0-10	352 (3112)	233 (2064)	229 (2023)	299 (2645)	281 (2490)
	150	Devlon	11-20*	470 (4160)	233 (2064)	306 (2704)	400 (3536)	376 (3328)
	300	Devlon	0-10	442 (3908)	281 (2491)	287 (2541)	375 (3322)	353 (3127)
	300	Devlon	11-20	481 (4259)	295 (2609)	313 (2768)	409 (3620)	385 (3407)
	300	Devlon	21-35	541 (4785)	315 (2787)	351 (3110)	460 (4067)	432 (3828)
	300	Devlon	36-50*	600 (5310)	335 (2965)	390 (3452)	510 (4514)	480 (4248)
	600	Devlon	0-20	489 (4330)	315 (2785)	318 (2814)	416 (3680)	391 (3464)
	600	Devlon	21-50	548 (4851)	337 (2981)	356 (3153)	466 (4123)	438 (3880)
	600	Devlon	51-80	607 (5371)	359 (3176)	394 (3491)	516 (4566)	485 (4297)
	600	Devlon	81-102*	650 (5753)	375 (3319)	423 (3739)	553 (4890)	520 (4602)
	900	Devlon	0-50	635 (5621)	358 (3171)	381 (3373)	540 (4778)	508 (4497)
	900	Devlon	51-80	718 (6356)	374 (3315)	431 (3813)	610 (5402)	574 (5084)
	900	Devlon	81-100	773 (6845)	385 (3410)	464 (4107)	657 (5818)	619 (5476)
	900	Devlon	101-125	843 (7457)	399 (3530)	506 (4474)	716 (6339)	674 (5966)
	900	Devlon	126-153*	920 (8143)	414 (3664)	552 (4886)	782 (6921)	736 (6514)
	1500	Devlon	0-100	1086 (9607)	619 (5481)	651 (5764)	923 (8166)	868 (7686)
	1500	Devlon	101-150	1241 (10979)	647 (5726)	744 (6588)	1054 (9332)	992 (8783)
	1500	Devlon	151-175	1318 (11665)	661 (5848)	791 (6999)	1120 (9915)	1054 (9332)
	1500	Devlon	176-200	1396 (12351)	675 (5971)	837 (7411)	1186 (10499)	1116 (9881)
	1500	Devlon	201-225	1473 (13037)	688 (6093)	884 (7822)	1252 (11082)	1178 (10430)
	1500	Devlon	226-255*	1566 (13860)	705 (6240)	940 (8316)	1331 (11781)	1253 (11088)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL (CONTINUED)

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO	RUN	ETO	BTC	ETC
				Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)
8 (200)	150	Devlon	0-10	673 (5954)	365 (3226)	437 (3870)	572 (5061)	538 (4763)
	150	Devlon	11-20*	900 (7966)	405 (3585)	585 (5178)	765 (6771)	720 (6373)
	300	Devlon	0-10	863 (7635)	546 (4833)	561 (4963)	733 (6489)	690 (6108)
	300	Devlon	11-20	945 (8366)	572 (5063)	614 (5438)	803 (7111)	756 (6693)
	300	Devlon	21-35	1069 (9462)	611 (5408)	695 (6151)	909 (8043)	855 (7570)
	300	Devlon	36-50*	1193 (10559)	650 (5753)	775 (6863)	1014 (8975)	954 (8447)
	600	Devlon	0-20	721 (6380)	458 (4056)	469 (4147)	613 (5423)	577 (5104)
	600	Devlon	21-50	901 (7977)	490 (4340)	586 (5185)	766 (6780)	721 (6382)
	600	Devlon	51-80	1082 (9574)	522 (4624)	703 (6223)	919 (8138)	865 (7659)
	600	Devlon	81-102*	1214 (10745)	546 (4833)	789 (6984)	1032 (9133)	971 (8596)
	900	Devlon	0-50	1621 (14343)	956 (8463)	972 (8606)	1377 (12192)	1296 (11475)
	900	Devlon	51-80	1864 (16494)	1000 (8846)	1118 (9897)	1584 (14020)	1491 (13195)
	900	Devlon	81-100	2026 (17928)	1028 (9102)	1215 (10757)	1722 (15239)	1621 (14343)
	900	Devlon	101-125	2228 (19721)	1065 (9422)	1337 (11833)	1894 (16763)	1783 (15777)
	900	Devlon	126-153*	2455 (21729)	1105 (9779)	1473 (13037)	2087 (18469)	1964 (17383)
	1500	Devlon	0-100	2024 (17915)	1154 (10216)	1214 (10749)	1720 (15227)	1619 (14332)
	1500	Devlon	101-150	2313 (20475)	1206 (10672)	1388 (12285)	1966 (17404)	1851 (16380)
	1500	Devlon	151-175	2458 (21756)	1232 (10900)	1475 (13053)	2089 (18492)	1966 (17405)
	1500	Devlon	176-200	2603 (23036)	1257 (11128)	1562 (13822)	2212 (19581)	2082 (18429)
	1500	Devlon	201-225	2747 (24317)	1283 (11356)	1648 (14590)	2335 (20669)	2198 (19453)
	1500	Devlon	226-255*	2921 (25853)	1314 (11630)	1753 (15512)	2483 (21975)	2337 (20682)
10 (250)	150	Devlon	0-10	957 (8468)	518 (4588)	622 (5504)	813 (7198)	765 (6775)
	150	Devlon	11-20*	1280 (11329)	576 (5098)	832 (7364)	1088 (9630)	1024 (9063)
	300	Devlon	0-10	834 (7385)	529 (4684)	542 (4800)	709 (6277)	668 (5908)
	300	Devlon	11-20	976 (8637)	554 (4907)	634 (5614)	829 (7341)	781 (6909)
	300	Devlon	21-35	1188 (10514)	592 (5241)	772 (6834)	1010 (8937)	950 (8411)
	300	Devlon	36-50*	1400 (12391)	630 (5576)	910 (8054)	1190 (10532)	1120 (9913)
	600	Devlon	0-20	1159 (10256)	878 (7771)	753 (6666)	985 (8718)	927 (8205)
	600	Devlon	21-50	1448 (12818)	878 (7771)	941 (8332)	1231 (10895)	1159 (10254)
	600	Devlon	51-80	1738 (15380)	878 (7771)	1130 (9997)	1477 (13073)	1390 (12304)
	600	Devlon	81-102*	1950 (17259)	878 (7771)	1267 (11218)	1657 (14670)	1560 (13807)
	900	Devlon	0-50	1659 (14681)	979 (8662)	995 (8809)	1410 (12479)	1327 (11745)
	900	Devlon	51-80	1908 (16884)	1023 (9055)	1145 (10130)	1621 (14351)	1526 (13507)
	900	Devlon	81-100	2073 (18352)	1053 (9317)	1244 (11011)	1762 (15599)	1659 (14681)
	900	Devlon	101-125	2281 (20187)	1090 (9644)	1368 (12112)	1939 (17159)	1825 (16149)
	900	Devlon	126-153*	2513 (22242)	1131 (10010)	1508 (13345)	2136 (18906)	2010 (17794)
	1500	Devlon	0-100	3399 (30082)	1939 (17159)	2039 (18049)	2889 (25570)	2719 (24066)
	1500	Devlon	101-150	3884 (34379)	2025 (17925)	2331 (20628)	3302 (29222)	3107 (27504)
	1500	Devlon	151-175	4127 (36528)	2069 (18308)	2476 (21917)	3508 (31049)	3302 (29223)
	1500	Devlon	176-200	4370 (38677)	2112 (18691)	2622 (23206)	3714 (32875)	3496 (30941)
	1500	Devlon	201-225	4613 (40826)	2155 (19074)	2768 (24495)	3921 (34702)	3690 (32660)
	1500	Devlon	226-255*	4904 (43404)	2207 (19534)	2942 (26042)	4168 (36893)	3923 (34723)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL (CONTINUED)

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO	RUN	ETO	BTC	ETC
				Nm (lbf·in)	Nm (lbf·in)	Nm (lbf·in)	Nm (lbf·in)	Nm (lbf·in)
12 (300)	150	Devlon	0-10	1151 (10189)	624 (5520)	748 (6623)	978 (8660)	921 (8151)
	150	Devlon	11-20*	1540 (13630)	693 (6134)	1001 (8860)	1309 (11586)	1232 (10904)
	300	Devlon	0-10	1466 (12977)	930 (8230)	953 (8435)	1246 (11030)	1173 (10381)
	300	Devlon	11-20	1715 (15176)	974 (8622)	1115 (9864)	1457 (12899)	1372 (12141)
	300	Devlon	21-35	2087 (18474)	1041 (9210)	1357 (12008)	1774 (15703)	1670 (14779)
	300	Devlon	36-50*	2460 (21773)	1107 (9798)	1599 (14152)	2091 (18507)	1968 (17418)
	600	Devlon	0-20	2133 (18881)	959 (8490)	1387 (12272)	1813 (16048)	1707 (15104)
	600	Devlon	21-50	2282 (20198)	1026 (9085)	1483 (13129)	1940 (17168)	1826 (16158)
	600	Devlon	51-80	2431 (21515)	1094 (9680)	1580 (13985)	2066 (18288)	1945 (17212)
	600	Devlon	81-102*	2540 (22481)	1143 (10116)	1651 (14613)	2159 (19109)	2032 (17985)
	900	Devlon	0-50	2278 (20158)	1344 (11895)	1367 (12095)	1936 (17134)	1822 (16126)
	900	Devlon	51-80	2619 (23180)	1405 (12434)	1571 (13908)	2226 (19703)	2095 (18544)
	900	Devlon	81-100	2847 (25195)	1445 (12793)	1708 (15117)	2420 (21416)	2277 (20156)
	900	Devlon	101-125	3131 (27714)	1496 (13242)	1879 (16629)	2662 (23557)	2505 (22171)
	900	Devlon	126-153*	3450 (30536)	1553 (13745)	2070 (18321)	2933 (25955)	2760 (24428)
	1500	Devlon	0-100	4969 (43981)	2884 (25525)	2982 (26389)	4224 (37384)	3975 (35185)
	1500	Devlon	101-150	5648 (49990)	3013 (26664)	3389 (29994)	4801 (42492)	4519 (39992)
	1500	Devlon	151-175	5988 (52995)	3077 (27234)	3593 (31797)	5089 (45046)	4790 (42396)
	1500	Devlon	176-200	6327 (56000)	3141 (27804)	3796 (33600)	5378 (47600)	5062 (44800)
	1500	Devlon	201-225	6667 (59004)	3206 (28373)	4000 (35402)	5667 (50154)	5333 (47203)
	1500	Devlon	226-255*	7074 (62610)	3283 (29057)	4244 (37566)	6013 (53218)	5659 (50088)
14 (350)	150	Devlon	0-10	1857 (16435)	1006 (8906)	1207 (10683)	1578 (13970)	1486 (13148)
	150	Devlon	11-20*	2484 (21985)	1118 (9895)	1615 (14290)	2111 (18687)	1987 (17588)
	300	Devlon	0-10	2170 (19204)	1407 (12453)	1410 (12483)	1844 (16324)	1736 (15363)
	300	Devlon	11-20	2497 (22101)	1474 (13046)	1623 (14366)	2123 (18786)	1998 (17681)
	300	Devlon	21-35	2988 (26446)	1575 (13935)	1942 (17190)	2540 (22480)	2390 (21157)
	300	Devlon	36-50*	3479 (30792)	1675 (14825)	2261 (20015)	2957 (26173)	2783 (24633)
	600	Devlon	0-20	2765 (24470)	1674 (14818)	1797 (15906)	2350 (20800)	2212 (19576)
	600	Devlon	21-50	3321 (29393)	1792 (15857)	2159 (19105)	2823 (24984)	2657 (23514)
	600	Devlon	51-80	3877 (34315)	1909 (16896)	2520 (22305)	3296 (29168)	3102 (27452)
	600	Devlon	81-102*	4285 (37925)	1995 (17657)	2785 (24651)	3642 (32236)	3428 (30340)
	900	Devlon	0-50	4408 (39011)	2600 (23016)	2645 (23406)	3746 (33159)	3526 (31208)
	900	Devlon	51-80	5069 (44863)	2718 (24059)	3041 (26918)	4309 (38134)	4055 (35891)
	900	Devlon	81-100	5510 (48765)	2797 (24754)	3306 (29259)	4683 (41450)	4408 (39012)
	900	Devlon	101-125	6061 (53642)	2895 (25623)	3636 (32185)	5152 (45596)	4849 (42914)
	900	Devlon	126-153*	6678 (59105)	3005 (26596)	4007 (35463)	5676 (50239)	5342 (47284)
	1500	Devlon	0-100	8962 (79321)	5112 (45241)	5377 (47593)	7618 (67423)	7170 (63457)
	1500	Devlon	101-150	10243 (90656)	5340 (47261)	6146 (54393)	8706 (77057)	8194 (72524)
	1500	Devlon	151-175	10883 (96323)	5454 (48271)	6530 (57794)	9251 (81874)	8706 (77058)
	1500	Devlon	176-200	11523 (101990)	5568 (49281)	6914 (61194)	9795 (86691)	9219 (81592)
	1500	Devlon	201-225	12164 (107657)	5682 (50291)	7298 (64594)	10339 (91508)	9731 (86126)
	1500	Devlon	226-255*	12932 (114457)	5819 (51502)	7759 (68674)	10992 (97289)	10346 (91566)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL (CONTINUED)

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO	RUN	ETO	BTC	ETC
				Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)
16 (400)	150	Devlon	0-10	2527 (22362)	1369 (12116)	1642 (14535)	2148 (19008)	2021 (17889)
	150	Devlon	11-20*	3380 (29916)	1521 (13462)	2197 (19445)	2873 (25428)	2704 (23932)
	300	Devlon	0-10	3116 (27582)	1974 (17471)	2026 (17929)	2649 (23445)	2493 (22066)
	300	Devlon	11-20	3413 (30206)	2068 (18303)	2218 (19634)	2901 (25675)	2730 (24165)
	300	Devlon	21-35	3857 (34141)	2209 (19551)	2507 (22192)	3279 (29020)	3086 (27313)
	300	Devlon	36-50*	4302 (38076)	2350 (20799)	2796 (24749)	3657 (32365)	3442 (30461)
	600	Devlon	0-20	2672 (23648)	1699 (15034)	1737 (15371)	2271 (20100)	2137 (18918)
	600	Devlon	21-50	3340 (29561)	1818 (16087)	2171 (19215)	2839 (25127)	2672 (23649)
	600	Devlon	51-80	4008 (35474)	1937 (17141)	2605 (23058)	3407 (30153)	3206 (28380)
	600	Devlon	81-102*	4498 (39811)	2024 (17914)	2924 (25877)	3823 (33839)	3598 (31849)
	900	Devlon	0-50	5477 (48475)	3231 (28599)	3286 (29085)	4655 (41203)	4382 (38780)
	900	Devlon	51-80	6299 (55747)	3378 (29895)	3779 (33448)	5354 (47385)	5039 (44598)
	900	Devlon	81-100	6846 (60596)	3475 (30759)	4108 (36357)	5819 (51506)	5477 (48477)
	900	Devlon	101-125	7531 (66656)	3597 (31839)	4519 (39994)	6401 (56658)	6025 (53325)
	900	Devlon	126-153*	8298 (73444)	3734 (33049)	4979 (44066)	7053 (62427)	6638 (58755)
	1500	Devlon	0-100	9079 (80354)	5178 (45832)	5447 (48212)	7717 (68301)	7263 (64283)
	1500	Devlon	101-150	10376 (91835)	5410 (47878)	6226 (55101)	8820 (78060)	8301 (73468)
	1500	Devlon	151-175	11025 (97575)	5525 (48901)	6615 (58545)	9371 (82939)	8820 (78060)
	1500	Devlon	176-200	11673 (103316)	5641 (49924)	7004 (61989)	9922 (87818)	9338 (82653)
	1500	Devlon	201-225	12322 (109056)	5756 (50947)	7393 (65434)	10473 (92698)	9857 (87245)
	1500	Devlon	226-255*	13100 (115944)	5895 (52175)	7860 (69567)	11135 (98553)	10480 (92756)
18 (450)	150	Devlon	0-10	3380 (29918)	1832 (16210)	2197 (19447)	2873 (25430)	2704 (23935)
	150	Devlon	11-20*	4522 (40024)	2035 (18011)	2939 (26016)	3844 (34020)	3618 (32019)
	300	Devlon	0-10	4242 (37547)	2691 (23813)	2757 (24406)	3606 (31915)	3394 (30038)
	300	Devlon	11-20	4961 (43910)	2819 (24947)	3225 (28542)	4217 (37324)	3969 (35128)
	300	Devlon	21-35	6040 (53455)	3011 (26648)	3926 (34746)	5134 (45437)	4832 (42764)
	300	Devlon	36-50*	7118 (63000)	3203 (28349)	4627 (40950)	6050 (53550)	5694 (50400)
	600	Devlon	0-20	6127 (54233)	3776 (33425)	3983 (35251)	5208 (46098)	4902 (43386)
	600	Devlon	21-50	7219 (63890)	4041 (35767)	4692 (41529)	6136 (54307)	5775 (51112)
	600	Devlon	51-80	8310 (73548)	4306 (38110)	5401 (47806)	7063 (62516)	6648 (58839)
	600	Devlon	81-102*	9110 (80631)	4500 (39828)	5922 (52410)	7744 (68536)	7288 (64505)
	900	Devlon	0-50	9019 (79826)	5321 (47096)	5411 (47896)	7666 (67852)	7215 (63861)
	900	Devlon	51-80	10372 (91803)	5562 (49230)	6223 (55082)	8816 (78032)	8298 (73442)
	900	Devlon	81-100	11274 (99787)	5723 (50653)	6765 (59872)	9583 (84819)	9020 (79829)
	900	Devlon	101-125	12402 (109767)	5924 (52431)	7441 (65860)	10542 (93302)	9922 (87814)
	900	Devlon	126-153*	13665 (120945)	6149 (54423)	8199 (72567)	11615 (102803)	10932 (96756)
	1500	Devlon	0-100	19670 (174092)	11220 (99303)	11802 (104455)	16719 (147978)	15736 (139273)
	1500	Devlon	101-150	22480 (198965)	11721 (103736)	13488 (119379)	19108 (169120)	17984 (159172)
	1500	Devlon	151-175	23885 (211402)	11971 (105952)	14331 (126841)	20302 (179692)	19108 (169122)
	1500	Devlon	176-200	25290 (223839)	12221 (108169)	15174 (134303)	21497 (190263)	20232 (179071)
	1500	Devlon	201-225	26696 (236276)	12472 (110385)	16017 (141765)	22691 (200834)	21356 (189021)
	1500	Devlon	226-255*	28382 (251200)	12772 (113045)	17029 (150720)	24125 (213520)	22705 (200960)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

Soft Seated, Bolted Body, Side Entry

TORQUE VALUES AT DIFFERENTIAL PRESSURE FOR SERIES NL (CONTINUED)

Size NPS (DN)	Class	Seat	Pressure range (bar)	BTO	RUN	ETO	BTC	ETC
				Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)	Nm (lbf · in)
20 (500)	150	Devlon	0-10	4284 (37917)	2321 (20543)	2785 (24646)	3641 (32229)	3427 (30333)
	150	Devlon	11-20*	5731 (50725)	2579 (22826)	3725 (32971)	4871 (43116)	4585 (40580)
	300	Devlon	0-10	5523 (48883)	3728 (32995)	3590 (31774)	4695 (41550)	4418 (39106)
	300	Devlon	11-20	6608 (58486)	3905 (34566)	4295 (38016)	5617 (49713)	5286 (46789)
	300	Devlon	21-35	8236 (72890)	4172 (36923)	5353 (47379)	7000 (61957)	6588 (58312)
	300	Devlon	36-50*	9863 (87295)	4438 (39280)	6411 (56742)	8384 (74201)	7890 (69836)
	600	Devlon	0-20	8505 (75273)	5245 (46423)	5528 (48927)	7229 (63982)	6804 (60218)
	600	Devlon	21-50	10012 (88611)	5613 (49677)	6508 (57597)	8510 (75320)	8009 (70889)
	600	Devlon	51-80	11519 (101950)	5980 (52931)	7487 (66267)	9791 (86657)	9215 (81560)
	600	Devlon	81-102*	12624 (111732)	6250 (55317)	8206 (72626)	10730 (94972)	10099 (89385)
	900	Devlon	0-50	12186 (107854)	7189 (63632)	7312 (64713)	10358 (91676)	9749 (86283)
	900	Devlon	51-80	14014 (124036)	7515 (66515)	8408 (74421)	11912 (105430)	11211 (99229)
	900	Devlon	81-100	15233 (134823)	7732 (68438)	9140 (80894)	12948 (114600)	12186 (107859)
	900	Devlon	101-125	16757 (148308)	8004 (70840)	10054 (88985)	14243 (126062)	13405 (118646)
	900	Devlon	126-153*	18463 (163411)	8308 (73532)	11078 (98046)	15693 (138899)	14770 (130729)
24 (600)	150	Devlon	0-10	7420 (65676)	4020 (35583)	4823 (42689)	6307 (55825)	5936 (52541)
	150	Devlon	11-20*	9927 (87862)	4467 (39536)	6453 (57110)	8438 (74683)	7942 (70290)
	300	Devlon	0-10	8833 (78178)	5602 (49582)	5741 (50816)	7508 (66451)	7066 (62542)
	300	Devlon	11-20	10330 (91427)	5869 (51943)	6714 (59428)	8780 (77713)	8264 (73142)
	300	Devlon	21-35	12575 (111302)	6269 (55484)	8174 (72346)	10689 (94606)	10060 (89041)
	300	Devlon	36-50*	14821 (131176)	6669 (59026)	9634 (85264)	12598 (111500)	11857 (104941)
	600	Devlon	0-20	9353 (82778)	5946 (52625)	6079 (53805)	7950 (70361)	7482 (66222)
	600	Devlon	21-50	11691 (103477)	6363 (56314)	7599 (67260)	9938 (87955)	9353 (82781)
	600	Devlon	51-80	14030 (124176)	6779 (60002)	9119 (80714)	11925 (105549)	11224 (99341)
	600	Devlon	81-102*	15745 (139355)	7085 (62707)	10234 (90581)	13383 (118452)	12596 (111484)
	600	Devlon	0-20	9353 (82778)	5946 (52625)	6079 (53805)	7950 (70361)	7482 (66222)
	600	Devlon	21-50	11691 (103477)	6363 (56314)	7599 (67260)	9938 (87955)	9353 (82781)
	600	Devlon	51-80	14030 (124176)	6779 (60002)	9119 (80714)	11925 (105549)	11224 (99341)
	600	Devlon	81-102*	15745 (139355)	7085 (62707)	10234 (90581)	13383 (118452)	12596 (111484)

* Indicates full rated pressure

Legends	
RUN	Running Torque
ETO	End To Open Torque
BTO	Break To Open Torque (Under rated differential pressure)
ETC	End To Close Torque
BTC	Break To Close Torque

NOTE

For Reduced Bore Valves, consider torque values corresponding to the required Ball Bore Size.

Example: For NPS 14 x NPS 10 Reduced Bore Valve, consider the torque value corresponding to NPS 10.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

1 CALCULATION OF FINAL VALVE TORQUE (FBTO) FOR SELECTION OF GEARBOX OR ACTUATOR MODELS

1.1 Calculated final valve torque (FBTO) based on temperature and seat material:

1.1.1 For valves with extended stem (length up to 2.5 meters), increase Final valve torque (BTO) values by 10%.

Example: Underground / buried applications

Seat material at various temperature	Final Valve Torque (FBTO)
Devlon from (-) 29 °C to high temperature as per PT rating chart	= BTO (Refer Table A)
Devlon from (-) 30 °C to (-) 40 °C Non-Operable Valve	= BTO (Refer Table A)
Peek from (-) 29 °C to high temperature as per PT rating chart	= 1.3 x BTO (Refer Table A)
Devlon/Peek from (-) 30 °C to (-) 46 °C Operable Valve with extended bonnet for low temperature service	= 1.5 x BTO (Refer Table A)

1.2 Consideration of safety factors for gearbox selection:

1.2.1 Maximum pull force required at the handwheel = 360 N considered on FBTO.

1.2.2 **Gear Box Selection Torque = FBTO x 1.5**

1.3 Consideration of safety factors for Actuator selection:

1.3.1 The service fluid factor (SFF) has to be determined from the table below:

Fluid	SFF
Clean, particle-free, non-viscous liquids	1
Dry gas, steam	1.2

1.3.2 The frequency of operation factor (FOF) shall be taken from project specification.

If it is not available in project specification, it has to be determined from table below:

Application	FOF
Process on-off valves (For differential pressure range above 50% of rated pressure)	1.3
Process on-off valves (For differential pressure range up to 50% of rated pressure)	1.5
Emergency Shutdown Valves (ESDV)	1.5
ESDV Valves Long Stand Still applications (operated once in 6 months or longer durations)	2

1.3.3 **Actuator selection torque = FBTO x SFF x FOF**

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24

Pressure class	Stem material	Maximum allowable stem torque (MAST): Nm (lb·in)					
		NPS 2	NPS 3	NPS 4	NPS 6	NPS 8	NPS 10
150	ASTM A479 Type 316 / ASTM A182 Gr. F316	94 [831]	270 [2389]	486 [4301]	1702 [15063]	2376 [21029]	4072 [36040]
	ASTM A182 Gr. F51	206 [1823]	592 [5239]	1066 [9434]	3738 [33084]	5218 [5218]	8938 [79107]
	ASTM A322 Gr. 4140	236 [2088]	682 [6036]	1226 [10851]	4294 [38005]	5996 [53069]	10270 [90897]
	ASTM A564 Type 630 UNS NO.: S17400	332 [2938]	956 [8461]	1720 [15223]	6022 [53299]	8408 [74417]	14402 [127468]
	API 6A718 UNS NO.: N07718	378 [3345]	1090 [9647]	1962 [17365]	6870 [60804]	9590 [84878]	16428 [145400]
300	ASTM A479 Type 316 / ASTM A182 Gr.F316	182 [1610]	390 [3451]	762 [6744]	1702 [15063]	3176 [28109]	4072 [36040]
	ASTM A182 Gr. F51	398 [3522]	856 [7576]	1672 [14798]	3738 [33084]	6974 [61725]	8938 [79107]
	ASTM A322 Gr. 4140	458 [4053]	984 [8709]	1922 [17011]	4294 [38005]	8012 [70912]	10270 [90897]
	ASTM A564 Type 630 UNS NO.: S17400	642 [5682]	1380 [12214]	2696 [23861]	6022 [53299]	11236 [99446]	14402 [127468]
	API 6A718 UNS NO.: N07718	734 [6496]	1574 [13931]	3074 [27207]	6870 [60804]	12816 [113431]	16428 [145400]
600	ASTM A479 Type 316/ ASTM A182 Gr.F316	270 [2389]	762 [6744]	1186 [10496]	1702 [15063]	3176 [28109]	4072 [36040]
	ASTM A182 Gr. F51	592 [5239]	1672 [14798]	2604 [23047]	3738 [33084]	6974 [61725]	8938 [79107]
	ASTM A322 Gr. 4140	682 [6036]	1922 [17011]	2992 [26481]	4294 [38005]	8012 [70912]	10270 [90897]
	ASTM A564 Type 630 UNS NO.: S17400	956 [8461]	2696 [23861]	4196 [37137]	6022 [53299]	11236 [99446]	14402 [127468]
	API 6A718 UNS NO.: N07718	1090 [9647]	3074 [27207]	4788 [42377]	6870 [60804]	12816 [113431]	16428 [145400]
900	ASTM A479 Type 316 ASTM A182 Gr.F316	762 [6744]	762 [6744]	1702 [15063]	2376 [21029]	6568 [58131]	6568 [58131]
	ASTM A182 Gr. F51	1672 [14798]	1672 [14798]	3738 [33084]	5218 [46183]	14416 [127592]	14416 [127592]
	ASTM A322 Gr. 4140	1922 [17011]	1922 [17011]	4294 [38005]	5996 [53069]	16564 [146603]	16564 [146603]
	ASTM A564 Type 630 UNS NO.: S17400	2696 [23861]	2696 [23861]	6022 [53299]	8408 [74417]	23228 [205585]	23228 [205585]
	API 6A718 UNS NO.: N07718	3074 [27207]	3074 [27207]	6870 [60804]	9590 [84878]	26496 [234509]	26496 [234509]
1500	ASTM A479 Type 316 ASTM A182 Gr.F316	762 [6744]	1704 [15081]	1702 [15063]	4072 [36040]	8156 [72186]	14124 [125007]
	ASTM A182 Gr. F51	1672 [14798]	3740 [33101]	3738 [33084]	8938 [79107]	17906 [158481]	31008 [274443]
	ASTM A322 Gr. 4140	1922 [17011]	4298 [38040]	4294 [38005]	10270 [90897]	20572 [182077]	35624 [315298]
	ASTM A564 Type 630 UNS NO.: S17400	2696 [23861]	6026 [53334]	6022 [53299]	14402 [127468]	28850 [255344]	49956 [442147]
	API 6A718 UNS NO.: N07718	3074 [27207]	6874 [60840]	6870 [60804]	16428 [145400]	32908 [291260]	56986 [504368]

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

2PC CAST DESIGN BALL VALVE FROM NPS 2 TO NPS 24 (CONTINUED)

Pressure class	Stem material	Maximum allowable stem torque (MAST): Nm (lb·in)					
		NPS 12	NPS 14	NPS 16	NPS 18	NPS 20	NPS 24
150	ASTM A479 Type 316 / ASTM A182 Gr. F316	4072 [36040]	6568 [58131]	9674 [85622]	14124 [125007]	16732 [148090]	26118 [231163]
	ASTM A182 Gr. F51	8938 [79107]	14416 [127592]	21238 [187972]	31008 [274443]	36730 [325087]	57334 [507448]
	ASTM A322 Gr. 4140	10270 [90897]	16564 [146603]	24402 [215975]	35624 [315298]	42200 [373501]	65870 [582998]
	ASTM A564 Type 630 UNS NO.: S17400	14402 [127468]	23228 [205585]	34218 [302854]	49956 [442147]	59178 [523769]	92372 [817561]
	API 6A718 UNS NO.: N07718	16428 [145400]	26496 [234509]	39034 [345480]	56986 [504368]	67504 [597460]	105366 [932567]
300	ASTM A479 Type 316/ ASTM A182 Gr. F316	6568 [58131]	9674 [85622]	14124 [125007]	19382 [171545]	26118 [231163]	43548 [385432]
	ASTM A182 Gr. F51	14416 [127592]	21238 [187972]	31008 [274443]	42546 [376563]	57334 [507448]	95596 [846095]
	ASTM A322 Gr. 4140	16564 [146603]	24402 [215975]	35624 [315298]	48882 [432642]	65870 [582998]	109830 [972077]
	ASTM A564 Type 630 UNS NO.: S17400	23228 [205585]	34218 [302854]	49956 [442147]	68548 [606700]	92372 [817561]	154016 [1363156]
	API 6A718 UNS NO.: N07718	26496 [234509]	39034 [345480]	56986 [504368]	78192 [692057]	105366 [932567]	175684 [1554934]
600	ASTM A479 Type 316/ ASTM A182 Gr. F316	6568 [58131]	11704 [103589]	11704 [103589]	26118 [231163]	33926 [300270]	43548 [385432]
	ASTM A182 Gr. F51	14416 [127592]	25694 [227411]	25694 [227411]	57334 [507448]	74474 [659150]	95596 [846095]
	ASTM A322 Gr. 4140	16564 [146603]	29518 [261256]	29518 [261256]	65870 [582998]	85562 [757287]	109830 [972077]
	ASTM A564 Type 630 UNS NO.: S17400	23228 [205585]	41396 [366385]	41396 [366385]	92372 [817561]	119984 [1061947]	154016 [1363156]
	API 6A718 UNS NO.: N07718	26496 [234509]	47220 [417932]	47220 [417932]	105366 [932567]	136866 [1211366]	175684 [1554934]
900	ASTM A479 Type 316/ ASTM A182 Gr. F316	9674 [85622]	19382 [171545]	22586 [199902]	38540 [341107]	-	-
	ASTM A182 Gr. F51	21238 [187972]	42546 [376563]	49578 [438802]	84602 [748790]	-	-
	ASTM A322 Gr. 4140	24402 [215975]	48882 [432642]	56960 [504138]	97198 [860274]	-	-
	ASTM A564 Type 630 UNS NO.: S17400	34218 [302854]	68548 [606700]	79878 [706979]	136302 [1206374]	-	-
	API 6A718 UNS NO.: N07718	39034 [345480]	78192 [692057]	91116 [806444]	155480 [1376113]	-	-
1500	ASTM A479 Type 316/ ASTM A182 Gr. F316	19382 [171545]	33926 [300270]	-	-	-	-
	ASTM A182 Gr. F51	42546 [376563]	74474 [659150]	-	-	-	-
	ASTM A322 Gr. 4140	48882 [432642]	85562 [757287]	-	-	-	-
	ASTM A564 Type 630 UNS NO.: S17400	68548 [606700]	119984 [1061947]	-	-	-	-
	API 6A718 UNS NO.: N07718	78192 [692057]	136866 [1211366]	-	-	-	-

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

FLOW COEFFICIENT INFORMATION

Scope

The values given below are applicable to Floating Ball Valve / Trunnion Mounted Ball Valve, when the ball valve is in full open condition.

Flow Coefficient C_v

It is the full capacity flow rate through the valve in US gallons / min. of water at 60 °F with a pressure drop of 1 psi.

Flow Coefficient K_v

Volumetric flow rate of water at a temperature between 5 °C (40 °F) and 40 °C (104 °F) passing through a valve and resulting in a pressure loss of 0.1 MPa (1 bar; 14.5 psi).

K_v is expressed in SI units of cubic meters per hour.

$$K_v = C_v / 1.156$$

C_v (IN USGPM*) FOR FULL BORE BALL VALVES

Size		Class					
Mm	Inch	#150	#300	#600	#900	#1500	#2500
15	½"	20	18	17	15	15	14
20	¾"	49	44	40	37	37	34
25	1"	94	84	75	69	69	64
40	1½"	239	224	201	181	181	164
50	2"	449	411	358	323	323	191
80	3"	1222	1054	947	918	835	457
100	4"	2374	2095	1788	1743	1606	1003
150	6"	5247	5196	4493	4320	3586	2464
200	8"	10192	9788	8686	8262	6887	5172
250	10"	16546	16106	13985	13602	11042	8181
300	12"	24735	24116	21606	20318	16513	12048
350	14"	30003	28710	26881	23011	19908	-
400	16"	40855	39267	36597	31944	26701	-
450	18"	52808	51588	47845	42305	34492	-
500	20"	67883	65650	60699	53471	-	-
600	24"	101990	99164	91198	80055	-	-
650	26"	118518	114449	107461	-	-	-
700	28"	138680	134349	126710	-	-	-
750	30"	163044	158125	147549	-	-	-
900	36"	234261	222624	205959	-	-	-

* USGPM stands for US gallons per minute.

KTM VIRGO SERIES NL TRUNNION BALL VALVE - PRODUCT BULLETIN

SIDE ENTRY BALL VALVE WITH O-RING STEM SEAL

C_v (IN USGPM*) FOR REDUCED BORE BALL VALVES

Size		Class					
Mm	Inch	#150	#300	#600	#900	#1500	#2500
20 x 15	¾" x ½"	12	11	11	11	11	-
25 x 20	1" x ¾"	31	28	26	24	24	-
40 x 25	1½" x 1"	38	37	38	37	37	-
50 x 40	2" x 1½"	126	119	122	113	113	-
80 x 50	3" x 2"	126	145	143	138	136	86
100 x 80	4" x 3"	333	366	405	405	404	218
150 x 100	6" x 4"	604	601	593	568	613	379
200 x 150	8" x 6"	1641	1587	1691	1554	1503	1007
250 x 200	10" x 8"	3643	3484	3447	3439	2974	2246
300 x 250	12" x 10"	6288	6255	6171	5959	5279	4277
350 x 250	14" x 10"	4643	4600	4717	4844	4104	-
350 x 300	14" x 12"	12263	12155	11799	13369	10282	-
400 x 300	16" x 12"	7501	7447	7019	8021	6661	-
400 x 350	16" x 14"	12733	12685	12605	11550	10446	-
450 x 350	18" x 14"	8438	8305	8444	7629	7403	-
450 x 400	18" x 16"	18129	17811	17358	15640	14682	-
500 x 400	20" x 16"	12481	12203	11821	11225	10463	-
500 x 450	20" x 18"	24962	24422	24289	22015	19445	-
600 x 500	24" x 20"	23139	22980	21872	21133	19580	-
650 x 600	26" x 24"	58897	58371	55941	-	-	-
700 x 600	28" x 24"	47661	47345	45043	-	-	-
750 x 600	30" x 24"	40265	38251	41903	-	-	-
750 x 650	30" x 26"	55004	54335	51884	-	-	-

* USGPM stands for US gallons per minute.

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