



KTM VIRGO SERIES N TRUNNION BALL VALVES

TWO-PIECE CAST BODY, FULL AND REDUCED BORE

A two-piece, full and reduced bore, side entry cast trunnion ball valve available with O-ring or gland stem seal for improved safety and fugitive emissions performance



FEATURES

- Designed to ASME B16.34, B16.10, API 6D.
- Dual trunnion plates provide maximum stability and support to the ball.
- Engineered bi-directional soft seat.
- Compression springs provide uniform loading of seats, ensuring sealing at low pressures.
- Double block and bleed design.
- Bi-directional zero leakage - maximum life with minimum maintenance.
- Multi-sealing featuring a triple seal with dual O-ring seals and fire safe gasket.
- Optimized torque for easy automation.
- ISO 5211 mounting pads allow for easy automation.
- Fire safe designed.
- Meets ISO 15848 Fugitive Emission Standards.
- Anti-static design: provides continuity throughout the entire valve.
- Blowout proof stem.
- Increased corrosion allowance for longer life.
- Available in both full and reduced port configurations.
- Complete interchangeability between O-ring and gland stem seal options.
- Sealant injection available.

GENERAL APPLICATION

Midstream and Downstream applications in the Oil and Gas Industry.
Process Industry applications involving varied process fluids.

TECHNICAL DATA

Size range:	DN 50 - 900 NPS 2 - 36
End connections:	Flanged (B16.5) Butt weld Hub connection
Pressure rating:	ASME Class 150 to 1500
Temperature rating:	-50°C to +200°C

KTM VIRGO SERIES N TRUNNION BALL VALVES

OVERVIEW

OVERVIEW

The KTM Virgo Series N is a two-piece flanged/butt welded end side entry trunnion ball valve available with packed gland or O-ring stem sealing that provides bubble tight seat sealing at high and low pressures, optimizing torque performance. KTM Virgo Series N ball valves are fire safe designed and are also ISO 15848 fugitive emission tested.

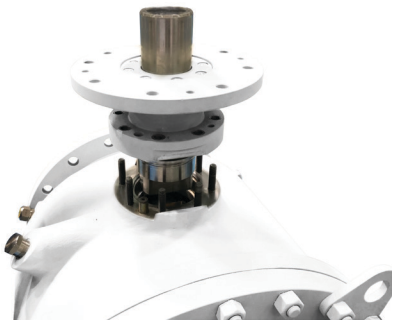
The Series N valve body has been optimized across the entire size range to ensure all horizontal parts and connectors are common. The interchangeable stem housing provides the flexibility to change between gland and O-ring sealing to meet Rate A and B fugitive emission standards without a full valve strip down or going back to the factory.

Optimize pipe routing with a reduced valve envelope size

The improved valve body and standardized stem housing machining has delivered design improvements that provide an overall reduction in valve envelope size in both the gland and no gland options. This helps customers unlock space efficiency savings through optimized pipe routing and plant layout.

Eliminate interface plates with a standardized mounting pattern

The Series N actuator mounting interface has been standardized across the entire range for both gland and no gland designs. Interfaces now match an ISO 5211 pattern, completely eliminating the need to stock non-standard mounting interface plates.

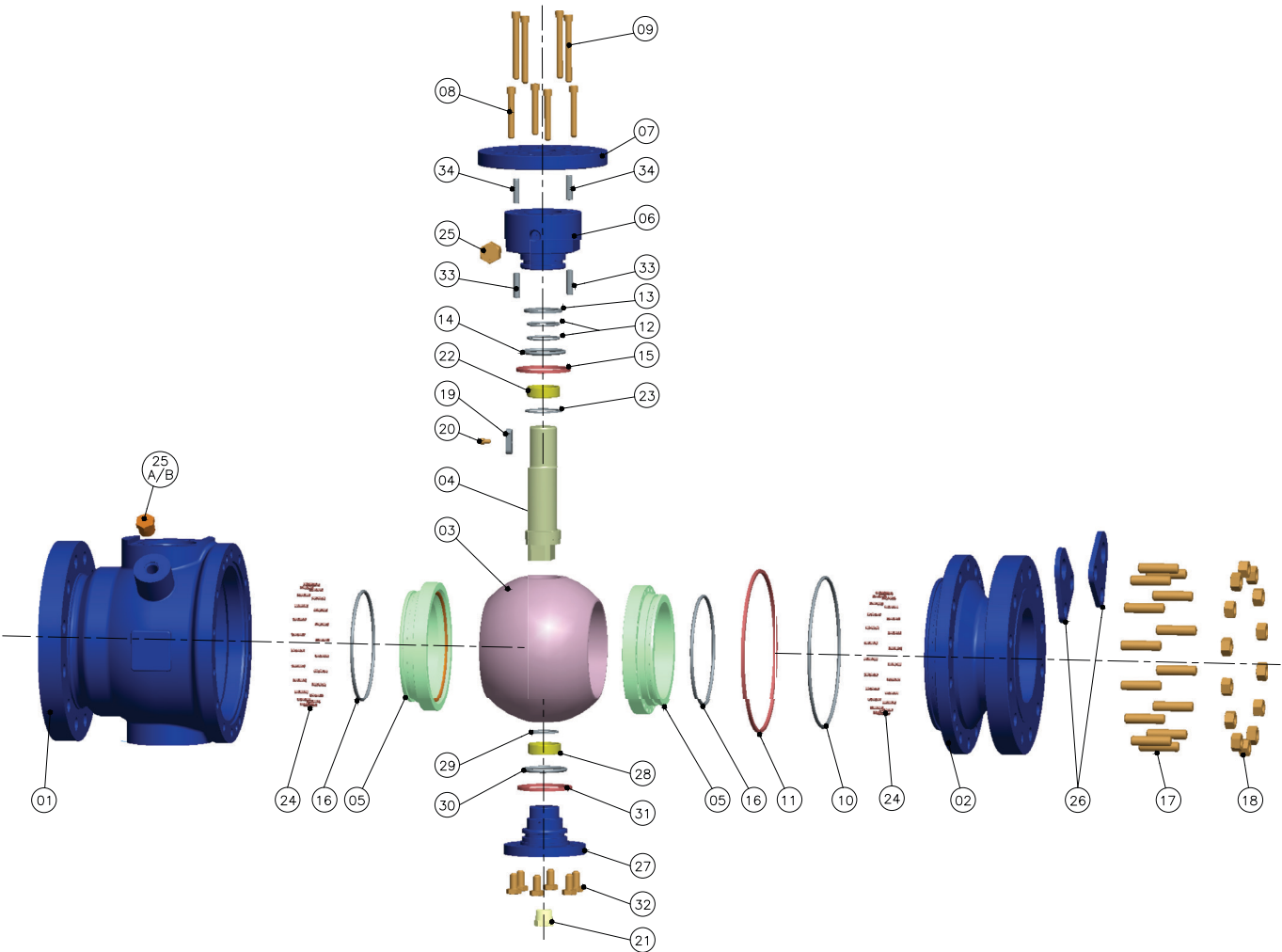


MATERIALS

Component	Available materials
Body	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
Seat	RPTFE, Devlon, PEEK, PCTFE (Kel F), Viton
Seal	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)

KTM VIRGO SERIES N TRUNNION BALL VALVES
PARTS LIST AND MATERIALS

FIGURE 1
DN 50, 80, 100, 150 (NPS 2, 3, 4, 6) Full bore Class 150, 300
DN 50x40 (NPS 2x1½) Class 150, 300, 600, 900, 1500



KTM VIRGO SERIES N TRUNNION BALL VALVES

PARTS LIST AND MATERIALS

VALVE MATERIAL COMBINATIONS - refer figure 1

Item No.	Part name	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
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 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/ A350 GR. LF6 Cl. 2	ASTM A352 GR. LCC/ ASTM A350 GR.LF2/ A350 GR. LF6 Cl. 2
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
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	A350 GR. LF2	A350 GR. LF2	A350 GR. LF6	A350 GR. LF6
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	ASTM A479 TYPE 316	ASTM A479 TYPE 316	ASTM A479 TYPE 316	ASTM A479 TYPE 316
25A	Sealant fitting	ASTM A479 TYPE 316	ASTM A479 TYPE 316	ASTM A479 TYPE 316	ASTM A479 TYPE 316
25B	Vent plug/Bleeder fitting	ASTM A182 GR. F316	ASTM A182 GR. F316	ASTM A182 GR. F316	ASTM A182 GR. F316
26	Lifting hook for NPS 6 and above	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/ A350 GR. LF6	ASTM A352 GR. LCC/ A350 GR. LF6
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

KTM VIRGO SERIES N TRUNNION BALL VALVES

PARTS LIST AND MATERIALS

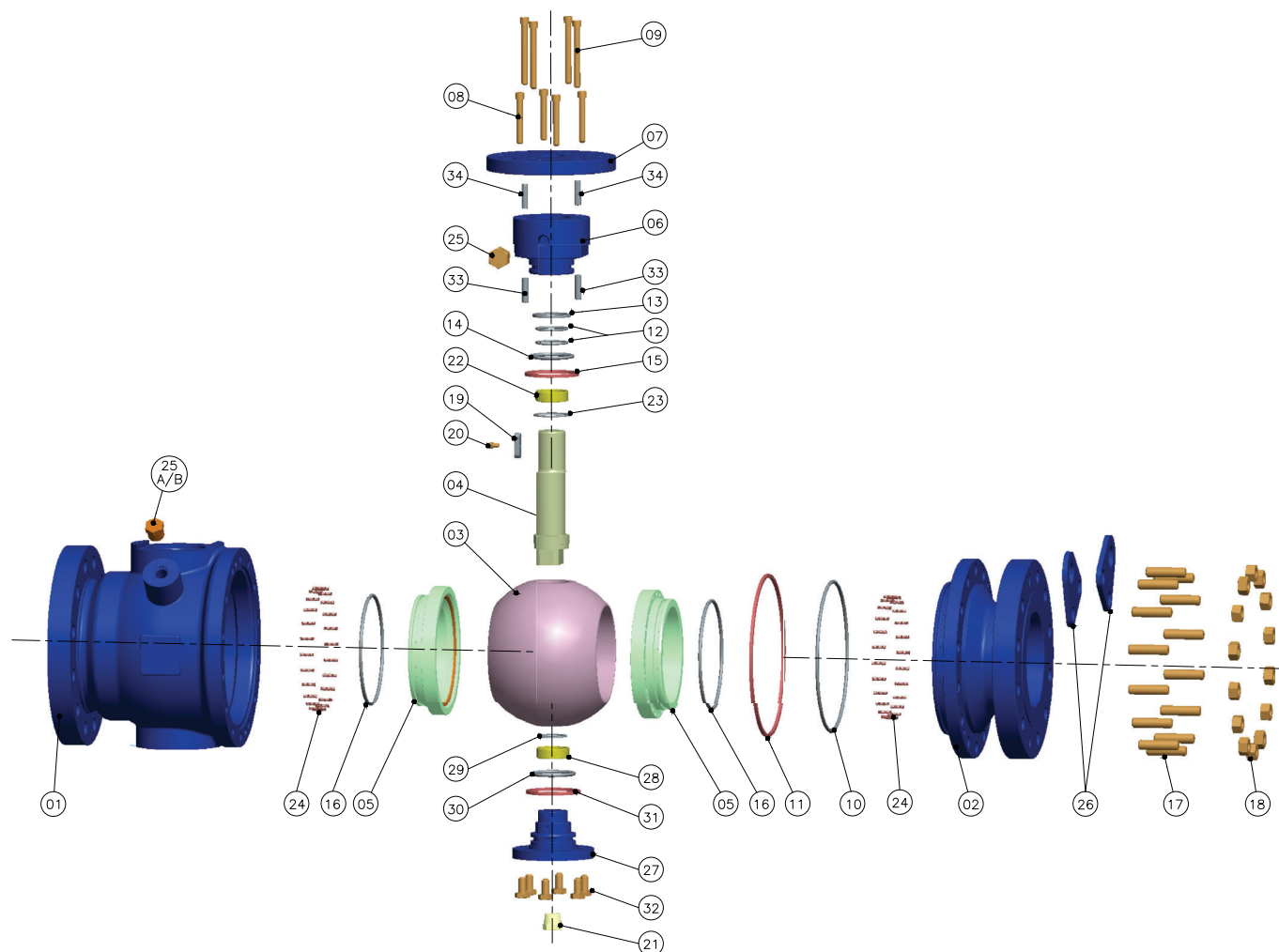
FIGURE 2

DN 50, 80, 100, 150 (NPS 2, 3, 4, 6) Full bore Class 600, 900, 1500

DN 200, 250, 300 (NPS 8, 10, 12) Full bore Class 150, 300, 600, 900, 1500

DN 350, 400, 450 (NPS 14, 16, 18) Full bore Class 150, 300, 600, 900

DN 500, 600 (NPS 20, 24) Full bore Class 150, 300, 600



KTM VIRGO SERIES N TRUNNION BALL VALVES

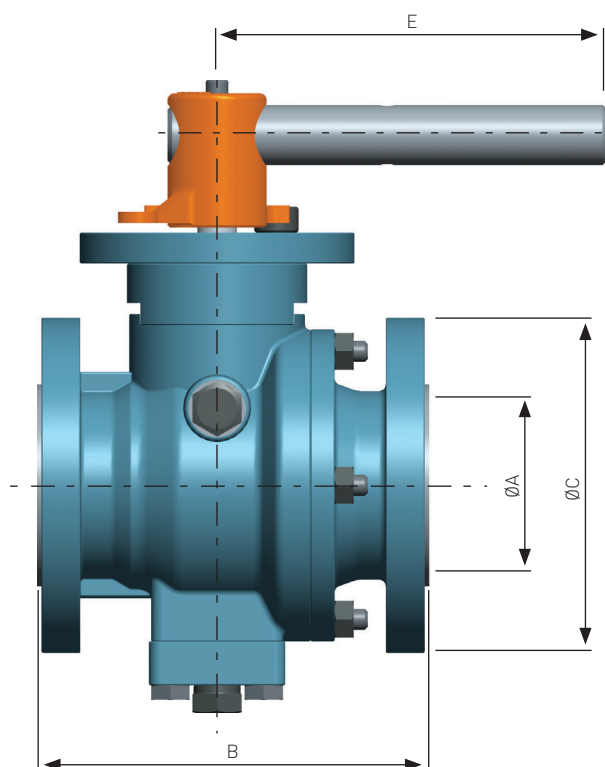
PARTS LIST AND MATERIALS

VALVE MATERIAL COMBINATIONS - refer figure 2

Material combination of valve					
Item No.	Part name	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
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 A352 GR. LCC
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	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 plug	A350 GR. LF2	A350 GR. LF2	A350 GR. LF6	A350 GR. LF6
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/ A516 Gr.70+ENP 25 mic.	ASTM A216 GR. WCB/ASTM A105/ A516 Gr.70+ENP 25 mic.	ASTM A352 GR. LCC/ASTM A350 GR.LF2/ A516 Gr.70+ENP 25 mic.	ASTM A352 GR. LCC/ASTM A350 GR.LF2/A516 Gr.70+ENP 25 mic.
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
34	Vent plug/Bleeder fitting	ASTM A182 GR. F316	ASTM A182 GR. F316	ASTM A182 GR. F316	ASTM A182 GR. F316

KTM VIRGO SERIES N TRUNNION BALL VALVES

DIMENSIONS – METRIC



DIMENSIONAL DATA (mm)

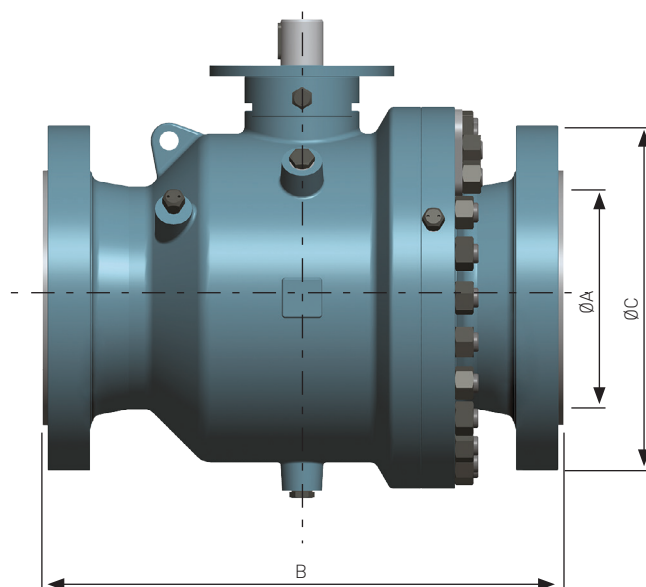
Size (DN)	Class	ØA	B (RF)	B (RTJ)	ØC	E
50x40	150	49x38	178±1.5	191±1.5	152	157.5
	300	49x38	216±1.5	232±1.5	165	227.5
	600	49x38	292±1.5	295±1.5	165	307.5
	900	49x38	368±1.5	371±1.5	216	472.0
	1500	49x38	368±1.5	371±1.5	216	472.0
50	150	49	178±1.5	191±1.5	152	180.0
	300	49	216±1.5	232±1.5	165	310.0
	600	49	292±1.5	295±1.5	165	375.0
	900	49	368±1.5	371±1.5	216	825.0
	1500	49	368±1.5	371±1.5	216	825.0
80	150	74	203±1.5	216±1.5	190	460.0
	300	74	283±1.5	298±1.5	210	550.0
100	150	100	229±1.5	241±1.5	230	730.0
	300	100	305±1.5	321±1.5	255	980.0

KTM VIRGO SERIES N TRUNNION BALL VALVES

DIMENSIONS – METRIC

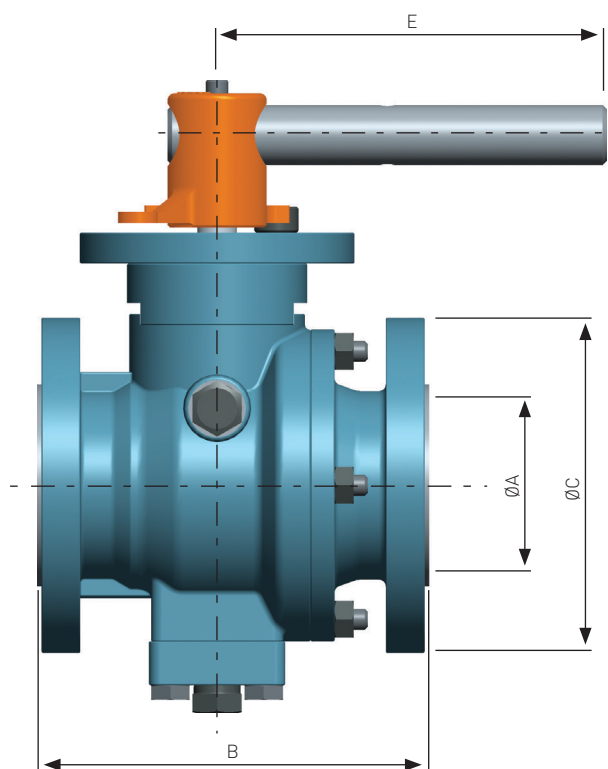
DIMENSIONAL DATA (mm)

Size (DN)	Class	ØA	B (RF)	B (RTJ)	ØC
80	600	74	356±1.5	359±1.5	210
	900	74	381±1.5	384±1.5	241
	1500	74	470±1.5	473±1.5	267
100	600	100	432±1.5	435±1.5	275
	900	100	457±1.5	460±1.5	292
	1500	100	546±1.5	549±1.5	311
150	150	150	394±1.5	406±1.5	280
	300	150	403±1.5	419±1.5	320
	600	150	559±1.5	562±1.5	356
	900	150	610±1.5	613±1.5	381
	1500	144	705±1.5	711±1.5	395
200	150	201	457±1.5	470±1.5	345
	300	201	502±1.5	518±1.5	381
	600	201	660±1.5	664±1.5	420
	900	201	737±1.5	740±1.5	470
	1500	192	832±1.5	841±1.5	485
250	150	252	533±1.5	546±1.5	406
	300	252	568±1.5	584±1.5	445
	600	252	787±1.5	791±1.5	510
	900	252	838±1.5	841±1.5	546
	1500	239	991±1.5	1000±1.5	585
300	150	303	610±3	622±3	485
	300	303	648±3	664±3	521
	600	303	838±1.5	841±3	560
	900	303	965±3	968±3	610
	1500	287	1130	1146	675
350	150	334	686±3	699±3	535
	300	334	762±3	778±3	585
	600	334	889±3	892±3	605
	900	322	1029±3	1038±3	641
400	150	385	762±3	775±3	597
	300	385	838±3	854±3	650
	600	385	991±3	994±3	686
	900	373	1130±3	1140±3	705
450	150	436	864±3	876±3	635
	300	436	914±3	930±3	711
	600	436	1092±3	1095±3	745
	900	423	1219	1232	787
500	150	487	914±3	927±3	700
	300	487	991±3	1010±3	775
	600	487	1194±3	1200±3	815
600	150	589	1067±3	1080±3	815
	300	589	1143±3	1165±3	915
	600	589	1397±3	1407±3	940



KTM VIRGO SERIES N TRUNNION BALL VALVES

DIMENSIONS – IMPERIAL



DIMENSIONAL DATA (inch)

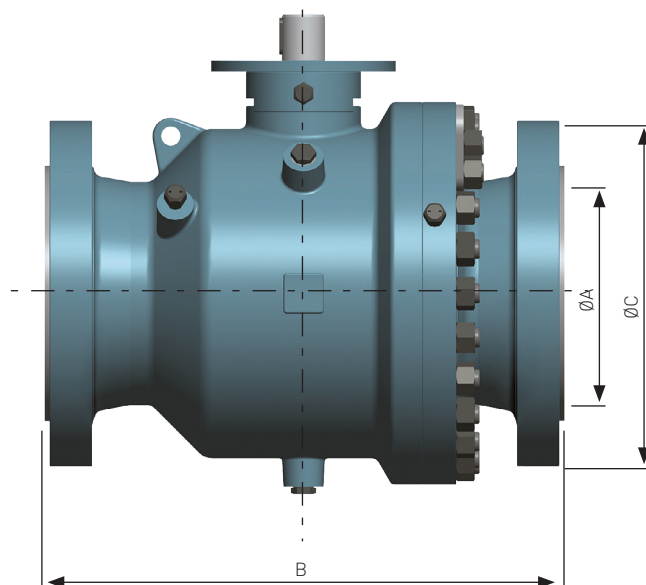
Size (NPS)	Class	ØA	B (RF)	B (RTJ)	ØC	E
2x1½	150	1.9x1.5	7.01±0.06	7.52±0.06	5.98	6.20
	300	1.9x1.5	8.50±0.06	9.13±0.06	6.50	8.96
	600	1.9x1.5	11.50±0.06	11.61±0.06	6.50	12.11
	900	1.9x1.5	14.49±0.06	14.61±0.06	8.50	18.58
	1500	1.9x1.5	14.49±0.06	14.61±0.06	8.50	18.58
2	150	1.9	7.01±0.06	7.52±0.06	5.98	7.09
	300	1.9	8.50±0.06	9.13±0.06	6.50	12.20
	600	1.9	11.50±0.06	11.61±0.06	6.50	14.76
	900	1.9	14.49±0.06	14.61±0.06	8.50	32.48
	1500	1.9	14.49±0.06	14.61±0.06	8.50	32.48
3	150	2.91	7.99±0.06	8.50±0.06	7.48	18.11
	300	2.91	11.14±0.06	11.73±0.06	8.27	21.65
4	150	3.94	9.02±0.06	9.49±0.06	9.06	28.74
	300	3.94	12.01±0.06	12.64±0.06	10.04	38.58

KTM VIRGO SERIES N TRUNNION BALL VALVES

DIMENSIONS – IMPERIAL

DIMENSIONAL DATA (inch)

Size (NPS)	Class	ØA	B (RF)	B (RTJ)	ØC
3	600	2.91	14.02±0.06	14.13±0.06	8.27
	900	2.91	15.00±0.06	15.12±0.06	9.49
	1500	2.91	18.50±0.06	18.62±0.06	10.51
4	600	3.94	17.01±0.06	17.13±0.06	10.83
	900	3.94	17.99±0.06	18.11±0.06	11.50
	1500	3.94	21.50±0.06	21.61±0.06	12.24
6	150	5.91	15.51±0.06	15.98±0.06	11.02
	300	5.91	15.87±0.06	16.50±0.06	12.60
	600	5.91	22.01±0.06	22.13±0.06	14.02
	900	5.91	24.02±0.06	24.13±0.06	15.00
	1500	5.67	27.76±0.06	27.99±0.06	15.55
8	150	7.91	17.99±0.06	18.50±0.06	13.58
	300	7.91	19.76±0.06	20.39±0.06	15.00
	600	7.91	25.98±0.06	26.14±0.06	16.54
	900	7.91	29.02±0.06	29.13±0.06	18.50
	1500	7.56	32.76±0.06	33.11±0.06	19.09
10	150	9.92	20.98±0.06	21.50±0.06	15.98
	300	9.92	22.36±0.06	22.99±0.06	17.52
	600	9.92	30.98±0.06	31.14±0.06	20.08
	900	9.92	32.99±0.06	33.11±0.06	21.50
	1500	9.41	39.02±0.06	39.37±0.06	23.03
12	150	11.93	24.02±0.12	24.49±0.12	19.09
	300	11.93	25.51±0.12	26.14±0.12	20.51
	600	11.93	32.99±0.06	33.11±0.12	22.05
	900	11.93	37.99±0.12	38.11±0.12	24.02
	1500	11.30	44.49	45.12	26.57
14	150	13.15	27.01±0.12	27.52±0.12	21.06
	300	13.15	30.00±0.12	30.63±0.12	23.03
	600	13.15	35.00±0.12	35.12±0.12	23.82
	900	12.68	40.51±0.12	40.87±0.12	25.24
16	150	15.16	30.00±0.12	30.51±0.12	23.50
	300	15.16	32.99±0.12	33.62±0.12	25.59
	600	15.16	39.02±0.12	39.13±0.12	27.01
	900	14.69	44.49±0.12	44.88±0.12	27.76
18	150	17.17	34.02±0.12	34.49±0.12	25.00
	300	17.17	35.98±0.12	36.61±0.12	27.99
	600	17.17	42.99±0.12	43.11±0.12	29.33
	900	16.65	47.99	48.50	30.98
20	150	19.17	35.98±0.12	36.50±0.12	27.56
	300	19.17	39.02±0.12	39.76±0.12	30.51
	600	19.17	47.01±0.12	47.24±0.12	32.09
24	150	23.19	42.01±0.12	42.52±0.12	32.09
	300	23.19	45.00±0.12	45.87±0.12	36.02
	600	23.19	55.00±0.12	55.39±0.12	37.01



KTM VIRGO SERIES N TRUNNION BALL VALVES

TOP MOUNTING DIMENSIONS – METRIC

FIGURE 3
Series N with gland side view

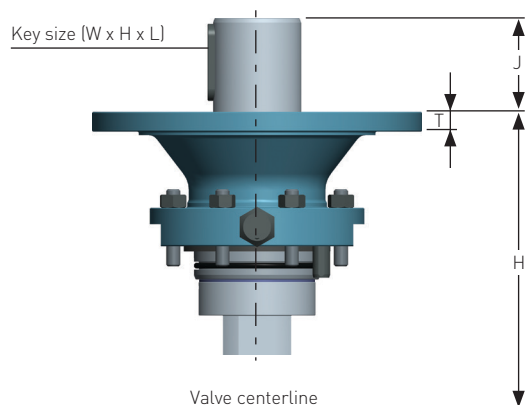


FIGURE 4
Series N with gland top view

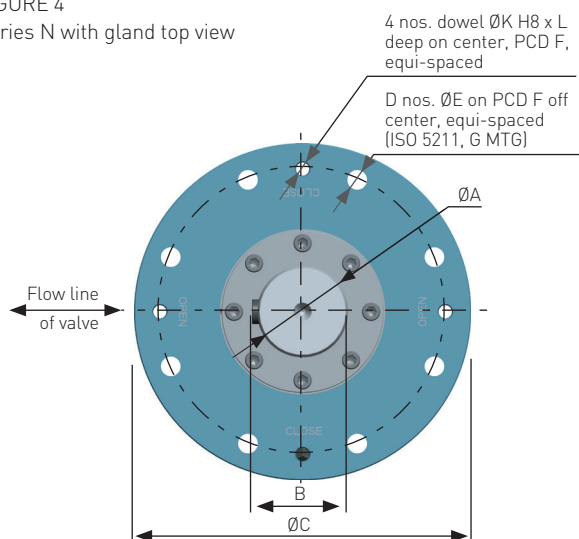


FIGURE 5
Series N without gland side view

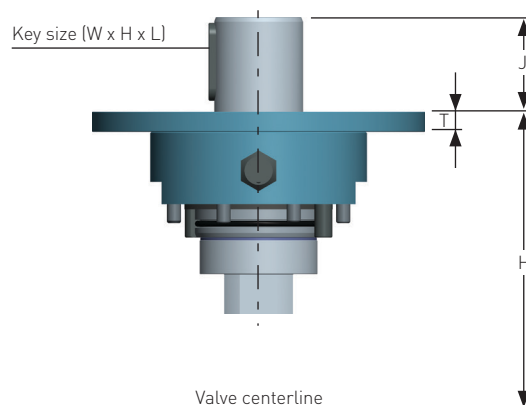
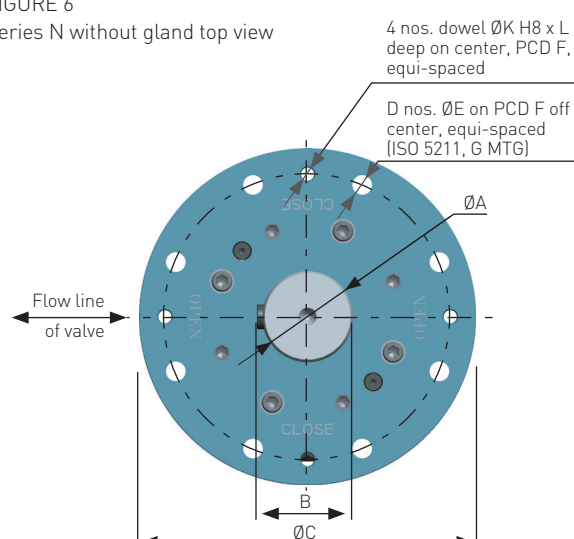


FIGURE 6
Series N without gland top view



TOP MOUNTING DIMENSIONS (mm)

Valve size DN	Class	Flange type (DIN EN ISO-5211)	Flange OD (øC)	Hole PCD (F)	Diameter of hole (øE)	Fastener size for øE hole	No. of holes	Flange thickness (T)	Stem diameter (øA)	Key size WxHxL	Stem + key dimension (B)	Dowel diameter (øK)	Dowel depth (L)	Stem protrusion (J)	Center to top height (H)	
															With gland	Without gland
50x40	150•	F10	125	102	M10	M10	4	12	18	6x6x20	20.5	8	10	27.5	157.0	107.5
	300•	F10	125	102	M10	M10	4	12	20	6x6x20	22.5	8	10	29.0	163.0	107.5
	600•	F10	125	102	M10	M10	4	12	22	6x6x20	24.5	8	10	27.0	163.0	107.0
	900/1500•	F10	125	102	M10	M10	4	15	25	8x7x25	28.0	8	10	35.0	188.5	127.0
50	150•	F10	125	102	M10	M10	4	14	18	6x6x20	20.5	8	10	27.5	206.0	115.0
	300•	F10	125	102	M10	M10	4	14	22	6x6x20	24.5	8	10	27.0	216.0	115.0
	600•	F12	150	125	M12	M12	4	15	25	8x7x20	28.0	10	10	27.5	216.0	135.0
	900/1500•	F14	175	140	M16	M16	4	18	35	10x8x25	38.0	10	14	35.5	244.0	155.0
80	150•	F10	125	102	M10	M10	4	14	25	8x7x25	28.0	8	10	34.5	226.0	141.5
	300•	F12	150	125	M12	M12	4	14	28	8x7x25	31.0	10	10	32.5	239.0	139.0
	600	F14	175	140	17.5	M16	4	18	35	10x8x30	38.0	10	14	40.0	256.0	167.5
	900	F14	175	140	17.5	M17	4	18	35	10x8x31	38.0	10	14	40.0	256.0	167.5
	1500	F25	300	254	17.5	M16	8	25	45	14x9x35	48.5	12	15	46.0	266.0	200.0

KTM VIRGO SERIES N TRUNNION BALL VALVES

TOP MOUNTING DIMENSIONS – METRIC

TOP MOUNTING DIMENSIONS (mm) (Continued)

Valve size DN	Class	Flange type	Flange OD (øC)	Hole PCD (F)	Diameter of hole (øE)	Fastner size for øE hole	No. of holes	Flange thickness (T)	Stem diameter (øA)	Key size WxHxL	Stem + key dimension (B)	Dowel diameter (øK)	Dowel diameter depth (L)	Stem protrusion (J)	Center to top height (H)	
		(DIN EN ISO-5211)													With gland	Without gland
100	150•	F12	150	125	M12	M12	4	14	30	8x7x25	33.0	10	10	33.5	251.0	170.0
	300•	F12	150	125	M12	M12	4	14	35	10x8x25	38.0	10	10	33.5	271.0	173.0
	600	F16	210	165	22.0	M20	4	23	40	12x8x35	43.0	12	15	45.0	289.0	213.0
	900	F16	210	165	22.0	M20	4	23	45	14x9x40	48.5	12	15	51.0	301.0	228.0
	1500	F25	300	254	17.5	M16	8	25	45	14x9x40	48.5	12	15	51.0	309.0	257.0
150	150	F16	210	165	22.0	M20	4	23	45	14x9x40	48.5	12	15	51.0	301.0	248.0
	300	F16	210	165	22.0	M20	4	23	45	14x9x40	48.5	12	15	51.0	301.0	248.0
	600	F16	210	165	22.0	M20	4	23	45	14x9x40	48.5	12	15	51.0	321.0	255.5
	900	F25	300	254	17.5	M16	8	20	50	14x9x50	53.5	12	15	62.5	346.0	267.5
	1500	F25	300	254	17.5	M16	8	28	60	18x11x55	64.0	12	15	71.0	354.0	296.0
200	150	F16	210	165	22.0	M20	4	23	50	14x9x45	53.5	12	15	57.0	331.0	288.0
	300	F16	210	165	22.0	M20	4	23	55	16x10x50	59.0	12	15	63.0	339.0	290.0
	600	F25	300	254	17.5	M16	8	20	55	16x10x50	59.0	12	15	63.0	366.0	300.0
	900	F25	300	254	17.5	M16	8	25	70	20x12x60	74.5	12	15	77.5	384.0	322.0
	1500	F30	350	298	22.0	M20	8	32	75	20x12x70	79.5	20	22	82.5	415.0	382.0
250	150	F16	210	165	22.0	M20	4	25	60	18x11x50	64.0	12	15	62.0	379.0	328.0
	300	F16	210	165	22.0	M20	4	25	60	18x11x55	64.0	12	15	67.0	404.0	329.0
	600	F25	300	254	17.5	M16	8	20	60	18x11x60	64.0	12	15	71.0	414.0	339.0
	900	F25	300	254	17.5	M16	8	30	70	20x12x60	74.5	12	15	76.0	432.0	368.0
	1500	F35	415	356	33.0	M30	8	35	90	25x14x75	95.0	20	24	91.5	487.0	415.0
300	150	F25	300	254	17.5	M16	8	20	60	18x11x45	64.0	12	15	60.0	415.0	370.0
	300	F25	300	254	17.5	M16	8	18	70	20x12x55	74.5	12	15	69.0	436.0	371.0
	600	F25	300	254	17.5	M16	8	18	70	20x12x60	74.5	12	15	75.0	454.0	377.0
	900	F25	300	254	17.5	M16	8	28	80	22x14x80	85.0	12	15	93.5	482.0	420.0
	1500	F40	475	406	39.0	M36	8	40	100	28x16x85	106.0	30	34	98.0	530.0	480.0
350	150	F25	300	254	17.5	M16	8	18	70	20x12x60	74.5	12	15	76.0	439.0	390.0
	300	F25	300	254	17.5	M16	8	18	80	22x14x65	85.0	12	15	80.0	476.0	394.0
	600	F25	300	254	17.5	M16	8	25	85	22x14x75	90.0	12	15	90.0	494.0	422.0
	900	F35	415	356	33.0	M30	8	35	100	28x16x85	106.0	20	24	101.0	534.0	472.0
400	150	F25	300	254	17.5	M16	8	18	80	22x14x70	85.0	12	15	85.0	471.0	426.0
	300	F25	300	254	17.5	M16	8	18	90	25x14x75	95.0	12	15	90.0	509.0	437.0
	600	F25	300	254	17.5	M16	8	25	85	22x14x75	90.0	12	15	90.0	529.0	464.0
	900	F30	350	298	22.0	M20	8	30	105	28x16x95	111.0	20	22	113.0	563.0	504.0
450	150	F25	300	254	17.5	M16	8	18	90	25x14x80	95.0	12	15	95.0	516.0	470.0
	300*	F25	300	254	17.5	M16	8	18	100	28x16x85	106.0	12	15	100.0	524.0	477.0
	300**	F30	350	298	22.0	M20	8	25	100	28x16x85	106.0	20	22	100.0	524.0	484.0
	600	F30	350	298	22.0	M20	8	28	110	28x16x100	116.0	20	22	116.5	557.0	525.0
	900	F35	415	356	33.0	M30	8	35	125	32x18x120	132.0	20	24	134.5	643.0	555.0
500	150	F25	300	254	17.5	M16	8	20	95	25x14x85	100.0	12	15	100.0	559.0	511.0
	300*	F30	350	298	22.0	M20	8	25	110	28x16x110	116.0	20	22	125.5	582.0	544.0
	600*	F30	350	298	22.0	M20	8	30	120	32x18x115	127.0	20	22	130.5	606.0	564.0
	300**	F35	415	356	33.0	M30	8	30	110	28x16x110	116.0	20	24	125.5	582.0	549.0
	600**	F35	415	356	33.0	M30	8	30	120	32x18x115	127.0	20	24	130.5	606.0	564.0
600	150	F30	350	298	22.0	M20	8	25	110	28x16x110	116.0	20	22	128.0	649.0	627.0
	300	F35	415	356	33.0	M30	8	30	130	32x18x130	137.0	20	24	145.0	667.0	637.0
	600	F35	415	356	33.0	M30	8	33	130	32x18x130	137.0	20	24	145.0	721.0	664.0

NOTES

Top mounting details of full opening sizes are also applicable to respective reduced opening sizes.

Data is common for both soft seated and metal seated valves, unless specified.

- Sizes are primarily lever operated valves. A bracket or coupling is required if gear or actuator mounting is required.

* Soft seated.

** Metal seated.

KTM VIRGO SERIES N TRUNNION BALL VALVES

TOP MOUNTING DIMENSIONS – IMPERIAL

FIGURE 3
Series N with gland side view

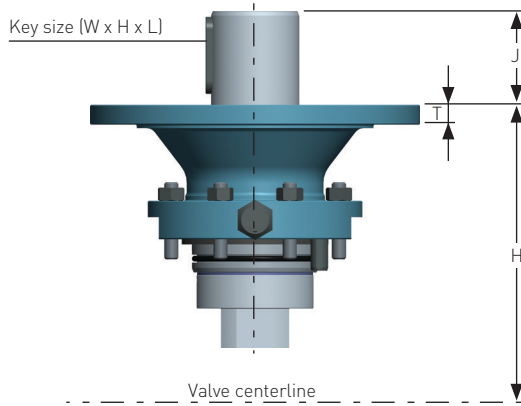


FIGURE 4
Series N with gland top view

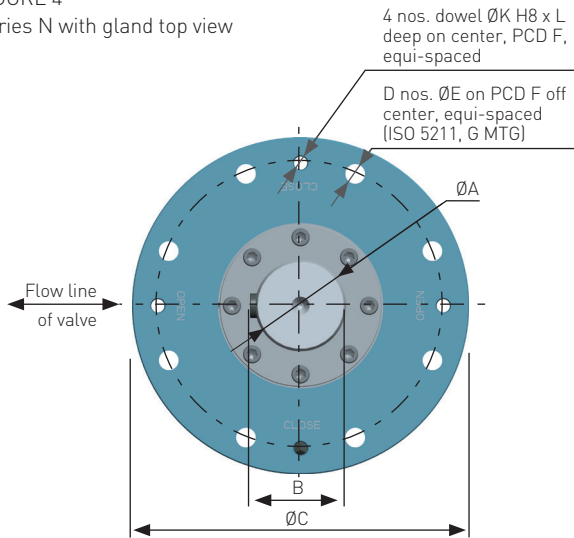


FIGURE 5
Series N without gland side view

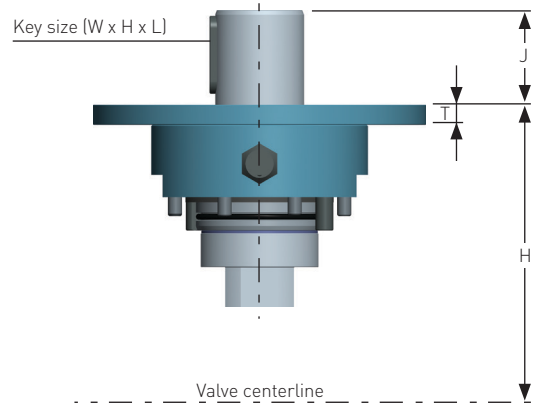
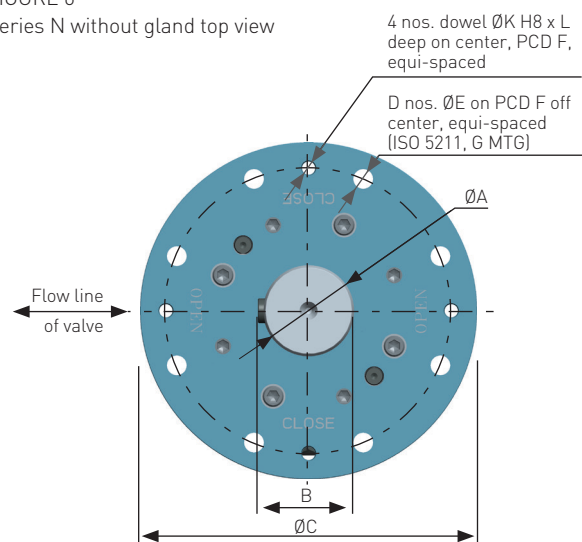


FIGURE 6
Series N without gland top view



TOP MOUNTING DIMENSIONS (inch)

Valve size NPS	Class	Flange type (DIN EN ISO-5211)	Flange OD (øC)	Hole PCD (F)	Diameter of hole (øE)	Fastener size for øE hole	No. of holes	Flange thickness (T)	Stem diameter (øA)	Key size WxHxL	Stem + key dimension (B)	Dowel diameter (øK)	Dowel depth (L)	Stem protrusion (J)	Center to top height (H)	
															With gland	Without gland
2x1½	150•	F10	4.92	4.02	M10	M10	4	0.47	0.71	0.24x0.24x0.79	0.81	0.31	0.39	1.08	6.18	4.23
	300•	F10	4.92	4.02	M10	M10	4	0.47	0.79	0.24x0.24x0.79	0.89	0.31	0.39	1.14	6.42	4.23
	600•	F10	4.92	4.02	M10	M10	4	0.47	0.87	0.24x0.24x0.79	0.96	0.31	0.39	1.06	6.42	4.21
	900/1500•	F10	4.92	4.02	M10	M10	4	0.59	0.98	0.31x0.28x0.98	1.10	0.31	0.39	1.38	7.42	5.00
2	150•	F10	4.92	4.02	M10	M10	4	0.55	0.71	0.24x0.24x0.79	0.81	0.31	0.39	1.08	8.11	4.53
	300•	F10	4.92	4.02	M10	M10	4	0.55	0.87	0.24x0.24x0.79	0.96	0.31	0.39	1.06	8.50	4.53
	600•	F12	5.91	4.92	M12	M12	4	0.59	0.98	0.31x0.28x0.79	1.10	0.39	0.39	1.08	8.50	5.31
	900/1500•	F14	6.89	5.51	M16	M16	4	0.71	1.38	0.39x0.31x0.98	1.50	0.39	0.55	1.40	9.61	6.10
3	150•	F10	4.92	4.02	M10	M10	4	0.55	0.98	0.31x0.28x0.98	1.10	0.31	0.39	1.36	8.90	5.57
	300•	F12	5.91	4.92	M12	M12	4	0.55	1.10	0.31x0.28x0.98	1.22	0.39	0.39	1.28	9.41	5.47
	600	F14	6.89	5.51	0.69	M16	4	0.71	1.38	0.39x0.31x1.18	1.50	0.39	0.55	1.57	10.08	6.59
	900	F14	6.89	5.51	0.69	M17	4	0.71	1.38	0.39x0.31x1.22	1.50	0.39	0.55	1.57	10.08	6.59
	1500	F25	11.81	10.00	0.69	M16	8	0.98	1.77	0.55x0.35x1.38	1.91	0.47	0.59	1.81	10.47	7.87

KTM VIRGO SERIES N TRUNNION BALL VALVES

TOP MOUNTING DIMENSIONS – IMPERIAL

TOP MOUNTING DIMENSIONS (inch) (Continued)

Valve size NPS	Class	Flange type (DIN EN ISO-5211)	Flange OD (øC)	Hole PCD (F)	Diameter of hole (øE)	Fastener size for øE hole	No. of holes	Flange thickness (T)	Stem diameter (øA)	Key size WxHxL	Stem + key dimension (B)	Dowel diameter (øK)	Dowel depth (L)	Stem protrusion (J)	Center to top height (H)	
		ISO-5211	OD (øC)	PCD (F)	of hole (øE)	size for øE hole	No. of holes	thickness (T)	diameter (øA)	Key size WxHxL	Stem + key dimension (B)	Dowel diameter (øK)	Dowel depth (L)	Stem protrusion (J)	With gland	Without gland
4	150•	F12	5.91	4.92	M12	M12	4	0.55	1.18	0.31x0.28x0.98	1.30	0.39	0.39	1.32	9.88	6.69
	300•	F12	5.91	4.92	M12	M12	4	0.55	1.38	0.39x0.31x0.98	1.50	0.39	0.39	1.32	10.67	6.81
	600	F16	8.27	6.50	0.87	M20	4	0.91	1.57	0.47x0.31x1.38	1.69	0.47	0.59	1.77	11.38	8.39
	900	F16	8.27	6.50	0.87	M20	4	0.91	1.77	0.55x0.35x1.57	1.91	0.47	0.59	2.01	11.85	8.98
	1500	F25	11.81	10.00	0.69	M16	8	0.98	1.77	0.55x0.35x1.57	1.91	0.47	0.59	2.01	12.17	10.12
6	150	F16	8.27	6.50	0.87	M20	4	0.91	1.77	0.55x0.35x1.57	1.91	0.47	0.59	2.01	11.85	9.76
	300	F16	8.27	6.50	0.87	M20	4	0.91	1.77	0.55x0.35x1.57	1.91	0.47	0.59	2.01	11.85	9.76
	600	F16	8.27	6.50	0.87	M20	4	0.91	1.77	0.55x0.35x1.57	1.91	0.47	0.59	2.01	12.64	10.06
	900	F25	11.81	10.00	0.69	M16	8	0.79	1.97	0.55x0.35x1.97	2.11	0.47	0.59	2.46	13.62	10.53
	1500	F25	11.81	10.00	0.69	M16	8	1.10	2.36	0.71x0.43x2.17	2.52	0.47	0.59	2.80	13.94	11.65
8	150	F16	8.27	6.50	0.87	M20	4	0.91	1.97	0.55x0.35x1.77	2.11	0.47	0.59	2.24	13.03	11.34
	300	F16	8.27	6.50	0.87	M20	4	0.91	2.17	0.63x0.39x1.97	2.32	0.47	0.59	2.48	13.35	11.42
	600	F25	11.81	10.00	0.69	M16	8	0.79	2.17	0.63x0.39x1.97	2.32	0.47	0.59	2.48	14.41	11.81
	900	F25	11.81	10.00	0.69	M16	8	0.98	2.76	0.79x0.47x2.36	2.93	0.47	0.59	3.05	15.12	12.68
	1500	F30	13.78	11.73	0.87	M20	8	1.26	2.95	0.79x0.47x2.76	3.13	0.79	0.87	3.25	16.34	15.04
10	150	F16	8.27	6.50	0.87	M20	4	0.98	2.36	0.71x0.43x1.97	2.52	0.47	0.59	2.44	14.92	12.91
	300	F16	8.27	6.50	0.87	M20	4	0.98	2.36	0.71x0.43x2.17	2.52	0.47	0.59	2.64	15.91	12.95
	600	F25	11.81	10.00	0.69	M16	8	0.79	2.36	0.71x0.43x2.36	2.52	0.47	0.59	2.80	16.30	13.35
	900	F25	11.81	10.00	0.69	M16	8	1.18	2.76	0.79x0.47x2.36	2.93	0.47	0.59	2.99	17.01	14.49
	1500	F35	16.34	14.02	1.30	M30	8	1.38	3.54	0.98x0.55x2.95	3.74	0.79	0.94	3.60	19.17	16.34
12	150	F25	11.81	10.00	0.69	M16	8	0.79	2.36	0.71x0.43x1.77	2.52	0.47	0.59	2.36	16.34	14.57
	300	F25	11.81	10.00	0.69	M16	8	0.71	2.76	0.79x0.47x2.17	2.93	0.47	0.59	2.72	17.17	14.61
	600	F25	11.81	10.00	0.69	M16	8	0.71	0.00	0.79x0.47x2.36	2.93	0.47	0.59	2.95	17.87	14.84
	900	F25	11.81	10.00	0.69	M16	8	1.10	3.15	0.87x0.55x3.15	3.35	0.47	0.59	3.68	18.98	16.54
	1500	F40	18.70	15.98	1.54	M36	8	1.57	3.94	1.10x0.63x3.35	4.17	1.18	1.34	3.86	20.87	18.90
14	150	F25	11.81	10.00	0.69	M16	8	0.71	2.76	0.79x0.47x2.36	2.93	0.47	0.59	2.99	17.28	15.35
	300	F25	11.81	10.00	0.69	M16	8	0.71	3.15	0.87x0.55x2.56	3.35	0.47	0.59	3.15	18.74	15.51
	600	F25	11.81	10.00	0.69	M16	8	0.98	3.35	0.87x0.55x2.95	3.54	0.47	0.59	3.54	19.45	16.61
	900	F35	16.34	14.02	1.30	M30	8	1.38	3.94	1.10x0.63x3.35	4.17	0.79	0.94	3.98	21.02	18.58
16	150	F25	11.81	10.00	0.69	M16	8	0.71	3.15	0.87x0.55x2.76	3.35	0.47	0.59	3.35	18.54	16.77
	300	F25	11.81	10.00	0.69	M16	8	0.71	3.54	0.98x0.55x2.95	3.74	0.47	0.59	3.54	20.04	17.20
	600	F25	11.81	10.00	0.69	M16	8	0.98	3.35	0.87x0.55x2.95	3.54	0.47	0.59	3.54	20.83	18.27
	900	F30	13.78	11.73	0.87	M20	8	1.18	4.13	1.10x0.63x3.74	4.37	0.79	0.87	4.45	22.17	19.84
18	150	F25	11.81	10.00	0.69	M16	8	0.71	3.54	0.98x0.55x3.15	3.74	0.47	0.59	3.74	20.31	18.50
	300*	F25	11.81	10.00	0.69	M16	8	0.71	3.94	1.10x0.63x3.35	4.17	0.47	0.59	3.94	20.63	18.78
	300**	F30	13.78	11.73	0.87	M20	8	0.98	3.94	1.10x0.63x3.35	4.17	0.79	0.87	3.94	20.63	19.06
	600	F30	13.78	11.73	0.87	M20	8	1.10	4.33	1.10x0.63x3.94	4.57	0.79	0.87	4.59	21.93	20.67
	900	F35	16.34	14.02	1.30	M30	8	1.38	4.92	1.26x0.71x4.72	5.20	0.79	0.94	5.30	25.31	21.85
20	150	F25	11.81	10.00	0.69	M16	8	0.79	3.74	0.98x0.55x3.35	3.94	0.47	0.59	3.94	22.01	20.12
	300*	F30	13.78	11.73	0.87	M20	8	0.98	4.33	1.10x0.63x4.33	4.57	0.79	0.87	4.94	22.91	21.42
	600*	F30	13.78	11.73	0.87	M20	8	1.18	4.72	1.26x0.71x4.53	5.00	0.79	0.87	5.14	23.86	22.20
	300**	F35	16.34	14.02	1.30	M30	8	1.18	4.33	1.10x0.63x4.33	4.57	0.79	0.94	4.94	22.91	21.61
	600**	F35	16.34	14.02	1.30	M30	8	1.18	4.72	1.26x0.71x4.53	5.00	0.79	0.94	5.14	23.86	22.20
24	150	F30	13.78	11.73	0.87	M20	8	0.98	4.33	1.10x0.63x4.33	4.57	0.79	0.87	5.04	25.55	24.69
	300	F35	16.34	14.02	1.30	M30	8	1.18	5.12	1.26x0.71x5.12	5.39	0.79	0.94	5.71	26.26	25.08
	600	F35	16.34	14.02	1.30	M30	8	1.30	5.12	1.26x0.71x5.12	5.39	0.79	0.94	5.71	28.39	26.14

NOTES

Top mounting details of full opening sizes are also applicable to respective reduced opening sizes.

Data is common for both soft seated and metal seated valves, unless specified.

- Sizes are primarily lever operated valves. A bracket or coupling is required if gear or actuator mounting is required.

* Soft seated.

** Metal seated.

KTM VIRGO SERIES N TRUNNION BALL VALVES

PERFORMANCE

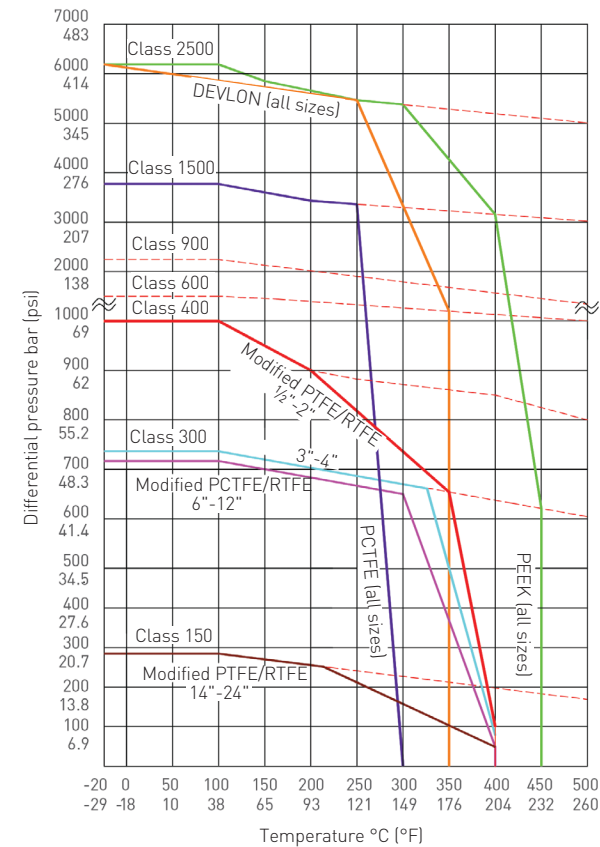
TEMPERATURE LIMITS

Typical values for commonly used materials.

Material		Lower limit °F (°C)	Upper limit °F (°C)
Body material	WCB	-20 (-29)	797 (425)
	A105	-20 (-29)	797 (425)
	LCC	-50 (-46)	653 (345)
	LF2	-50 (-46)	797 (425)
	CF8M	-425 (-254)	1000 (538)
	F316	-325 (-198)	1000 (538)
Seat/inserts material	Modified PTFE/RTFE	-321 (-196)	As per graph
	PEEK	-166 (-110)	As per graph
	Devlon® V-API	-40 (-40)	As per graph
	PCTFE	-321 (-196)	As per graph

These ratings are a general guide. It is important that you analyze all aspects of your application. Due to the variety of operating conditions and applications for these products, the user, through his / her own analysis and testing, is solely responsible for making the final selection of the products and assuming that all performance, safety and warning requirements of the application are met.

PRESSURE TEMPERATURE RATINGS



KTM VIRGO SERIES N TRUNNION BALL VALVES

FLOW COEFFICIENT

C_v (in USGPM*) FOR FULL BORE BALL VALVES

Valve size		Pressure class					
DN	NPS	150	300	600	900	1500	2500
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.

C_v (in USGPM*) FOR REDUCED BORE BALL VALVES

Size/class		Pressure class					
mm	inch	150	300	600	900	1500	2500
50x40	2"x1½"	126	119	122	113	113	-
80x50	3"x2"	126	145	143	138	136	86
100x80	4"x3"	333	366	405	405	404	218
150x100	6"x4"	604	601	593	568	613	379
200x150	8"x6"	1641	1587	1691	1554	1503	1007
250x200	10"x8"	3643	3484	3447	3439	2974	2246
300x250	12"x10"	6288	6255	6171	5959	5279	4277
350x250	14"x10"	4643	4600	4717	4844	4104	-
350x300	14"x12"	12263	12155	11799	13369	10282	-
400x300	16"x12"	7501	7447	7019	8021	6661	-
400x350	16"x14"	12733	12685	12605	11550	10446	-
450x350	18"x14"	8438	8305	8444	7629	7403	-
450x400	18"x16"	18129	17811	17358	15640	14682	-
500x400	20"x16"	12481	12203	11821	11225	10463	-
500x450	20"x18"	24962	24422	24289	22015	19445	-
600x500	24"x20"	23139	22980	21872	21133	19580	-
650x600	26"x24"	58897	58371	55941	-	-	-
700x600	28"x24"	47661	47345	45043	-	-	-
750x600	30"x24"	40265	38251	41903	-	-	-
750x650	30"x26"	55004	54335	51884	-	-	-

* USGPM stands for US gallons per minute.

NOTES

Scope

The values given below are applicable to floating ball valve / trunnion 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.

$$K_v = C_v / 1.156$$

NOTES

1. Technical data provided for customer convenience and is subject to change without notice. Please consult factory for specific application and additional product information.
2. Pressure/temperature ratings are based on ANSI B16.34 and the trim materials selected for the valve.
3. Torque values are based on clean lubricating fluids. A service factor should be applied for all other conditions.

KTM VIRGO SERIES N TRUNNION BALL VALVES

TORQUE VALUES

TABLE A1 - TORQUE VALUES FOR DEVLON/PCTFE/PTFE/RPTFE

Size DN (NPS)	Class	Nm (lbf-in)				
		BTO	RTO/RTC	ETO	BTC	ETC
40 [1½]	150	35 [310]	16 [142]	23 [201]	30 [263]	28 [248]
	300	51 [451]	24 [212]	33 [292]	43 [381]	41 [363]
	600	70 [620]	34 [301]	46 [407]	60 [531]	56 [496]
	900	79 [699]	36 [319]	47 [420]	67 [594]	63 [559]
	1500	104 [920]	53 [469]	62 [549]	88 [779]	83 [735]
50 [2]	150	36 [319]	16 [143]	23 [207]	31 [271]	29 [255]
	300	70 [620]	32 [279]	46 [403]	60 [527]	56 [496]
	600	102 [903]	46 [406]	66 [587]	87 [767]	82 [722]
	900	135 [1195]	61 [538]	81 [717]	115 [1016]	108 [956]
	1500	216 [1912]	97 [860]	130 [1147]	184 [1625]	173 [1529]
80 [3]	150	104 [920]	47 [414]	68 [598]	88 [782]	83 [736]
	300	138 [1221]	62 [550]	90 [794]	117 [1038]	110 [977]
	600	276 [2443]	124 [1099]	179 [1588]	235 [2076]	221 [1954]
	900	295 [2611]	133 [1175]	177 [1567]	251 [2219]	236 [2089]
	1500	532 [4709]	239 [2119]	319 [2825]	452 [4002]	426 [3767]
100 [4]	150	188 [1664]	85 [749]	122 [1082]	160 [1414]	150 [1331]
	300	252 [2230]	113 [1004]	164 [1450]	214 [1896]	202 [1784]
	600	391 [3461]	176 [1557]	254 [2249]	332 [2942]	313 [2769]
	900	511 [4523]	230 [2035]	307 [2714]	434 [3844]	409 [3618]
	1500	660 [5841]	297 [2629]	396 [3505]	561 [4965]	528 [4673]
150 [6]	150	470 [4160]	212 [1872]	306 [2704]	400 [3536]	376 [3328]
	300	600 [5310]	270 [2390]	390 [3452]	510 [4514]	480 [4248]
	600	650 [5753]	293 [2589]	423 [3739]	553 [4890]	520 [4602]
	900	920 [8143]	414 [3664]	552 [4886]	782 [6921]	736 [6514]
	1500	1566 [13860]	705 [6237]	940 [8316]	1331 [11781]	1253 [11088]
200 [8]	150	900 [7966]	405 [3585]	585 [5178]	765 [6771]	720 [6373]
	300	1193 [10559]	537 [4752]	775 [6863]	1014 [8975]	954 [8447]
	600	1214 [10745]	546 [4835]	789 [6984]	1032 [9133]	971 [8596]
	900	2455 [21729]	1105 [9778]	1473 [13037]	2087 [18469]	1964 [17383]
	1500	2921 [25853]	1314 [11634]	1753 [15512]	2483 [21975]	2337 [20682]
250 [10]	150	1280 [11329]	576 [5098]	832 [7364]	1088 [9630]	1024 [9063]
	300	1400 [12391]	630 [5576]	910 [8054]	1190 [10532]	1120 [9913]
	600	1950 [17259]	878 [7771]	1267 [11214]	1657 [14666]	1560 [13807]
	900	2513 [22242]	1131 [10009]	1508 [13345]	2136 [18906]	2010 [17794]
	1500	4904 [43404]	2207 [19532]	2942 [26042]	4168 [36893]	3923 [34723]
300 [12]	150	1540 [13630]	693 [6134]	1001 [8860]	1309 [11586]	1232 [10904]
	300	2460 [21773]	1107 [9798]	1599 [14152]	2091 [18507]	1968 [17418]
	600	2540 [22481]	1143 [10116]	1651 [14613]	2159 [19109]	2032 [17985]
	900	4414 [39067]	1553 [13745]	2648 [23437]	3752 [33208]	3531 [31252]
	1500	7074 [62610]	3183 [28175]	4244 [37566]	6013 [53219]	5659 [50088]
350 [14]	150	2484 [21985]	1118 [9893]	1615 [14290]	2111 [18687]	1987 [17588]
	300	3479 [30792]	1566 [13856]	2261 [20015]	2957 [26173]	2783 [24633]
	600	4285 [37925]	1928 [17066]	2785 [24652]	3642 [32237]	3428 [30340]
	900	6678 [59105]	3005 [26597]	4007 [35463]	5676 [50239]	5342 [47284]
	1500	12932 [114458]	5819 [51506]	7759 [68675]	10992 [97289]	10346 [91566]
400 [16]	150	3380 [29916]	1521 [13462]	2197 [19445]	2873 [25428]	2704 [23932]
	300	4302 [38076]	1936 [17134]	2796 [24749]	3657 [32365]	3442 [30461]
	600	4498 [39811]	2024 [17915]	2924 [25877]	3823 [33839]	3598 [31849]
	900	8298 [73443]	3734 [33050]	4979 [44066]	7053 [62427]	6638 [58755]
	1500	13100 [115945]	5895 [52175]	7860 [69567]	11135 [98553]	10480 [92756]
450 [18]	150	4522 [40023]	2035 [18010]	2939 [26015]	3844 [34020]	3618 [32018]
	300	7118 [63000]	3203 [28350]	4627 [40950]	6050 [53550]	5694 [50400]
	600	9110 [80630]	4100 [36284]	5922 [52410]	7744 [68536]	7288 [64504]
	900	13665 [120945]	6149 [54425]	8199 [72567]	11615 [102804]	10932 [96756]
	1500	28382 [251202]	12772 [113041]	17029 [150721]	24125 [213522]	22706 [200961]
500 [20]	150	5731 [50724]	2579 [22826]	3725 [32970]	4871 [43115]	4585 [40579]
	300	9863 [87295]	4438 [39283]	6411 [56742]	8384 [74201]	7890 [69836]
	600	12624 [111732]	5681 [50279]	8206 [72626]	10730 [94972]	10099 [89385]
	900	18463 [163411]	8308 [73535]	11078 [98047]	15694 [138900]	14770 [130729]
600 [24]	150	9927 [87861]	4467 [39538]	6453 [57110]	8438 [74682]	7942 [70289]
	300	14821 [131177]	6669 [59030]	9634 [85265]	12598 [111500]	11857 [104942]
	600	15745 [139355]	7085 [62710]	10234 [90581]	13383 [118452]	12596 [111484]

NOTES

- BTO Break to open torque (under rated pressure)
- RTO/RTC Run-to-open torque / Run-to-close (reseal) torque
- ETO End to open torque
- BTC Break to close torque
- ETC End to close torque (reseating torque)

Other materials available.
See page 18 for detailed notes.
Consult factory for more information.

KTM VIRGO SERIES N TRUNNION BALL VALVES

TORQUE VALUES

TABLE A2 - TORQUE VALUES FOR PEEK

Size	Class	Nm (lbf-in)				
		BTO	RUN	ETO	BTC	ETC
1½"	150	46 [407]	21 [186]	30 [266]	39 [345]	36 [319]
	300	66 [584]	31 [274]	43 [381]	56 [496]	53 [469]
	600	91 [805]	44 [389]	59 [522]	77 [682]	73 [646]
	900	103 [912]	47 [416]	62 [549]	87 [770]	82 [726]
	1500	135 [1195]	69 [611]	81 [717]	115 [1018]	108 [956]
2"	150	47 [416]	21 [186]	30 [266]	40 [354]	37 [327]
	300	91 [805]	41 [363]	59 [522]	77 [682]	73 [646]
	600	133 [1177]	60 [531]	86 [761]	113 [1000]	106 [938]
	900	176 [1558]	79 [699]	105 [929]	149 [1319]	140 [1239]
	1500	281 [2487]	126 [1115]	168 [1487]	239 [2115]	225 [1991]
3"	150	135 [1195]	61 [540]	88 [779]	115 [1018]	108 [956]
	300	179 [1584]	81 [717]	117 [1036]	152 [1345]	144 [1275]
	600	359 [3177]	161 [1425]	233 [2062]	305 [2699]	287 [2540]
	900	384 [3399]	173 [1531]	230 [2036]	326 [2885]	307 [2717]
	1500	692 [6125]	311 [2753]	415 [3673]	588 [5204]	553 [4894]
4"	150	244 [2160]	110 [974]	159 [1407]	208 [1841]	196 [1735]
	300	328 [2903]	147 [1301]	213 [1885]	278 [2461]	262 [2319]
	600	508 [4496]	229 [2027]	330 [2921]	432 [3824]	407 [3602]
	900	664 [5877]	299 [2646]	399 [3531]	565 [5001]	531 [4700]
	1500	858 [7594]	386 [3416]	515 [4558]	729 [6452]	686 [6072]
6"	150	611 [5408]	275 [2434]	397 [3514]	519 [4594]	489 [4328]
	300	780 [6904]	351 [3107]	507 [4487]	663 [5868]	624 [5523]
	600	845 [7479]	380 [3363]	549 [4859]	718 [6355]	676 [5983]
	900	1196 [10585]	538 [4762]	718 [6355]	1017 [9001]	957 [8470]
	1500	2036 [18020]	916 [8107]	1221 [10807]	1730 [15312]	1629 [14418]
8"	150	1170 [10355]	527 [4664]	761 [6735]	995 [8806]	936 [8284]
	300	1551 [13728]	698 [6178]	1008 [8922]	1318 [11665]	1241 [10984]
	600	1578 [13966]	710 [6284]	1026 [9081]	1341 [11869]	1263 [11178]
	900	3192 [28252]	1436 [12710]	1915 [16949]	2713 [24012]	2553 [22596]
	1500	3797 [33606]	1709 [15126]	2278 [20162]	3228 [28570]	3038 [26889]
10"	150	1664 [14728]	749 [6629]	1082 [9577]	1414 [12515]	1331 [11780]
	300	1820 [16108]	819 [7249]	1183 [10470]	1547 [13692]	1456 [12887]
	600	2535 [22437]	1141 [10099]	1647 [14577]	2154 [19065]	2028 [17949]
	900	3267 [28915]	1470 [13011]	1960 [17347]	2777 [24579]	2614 [23136]
	1500	6375 [56424]	2869 [25393]	3825 [33854]	5419 [47962]	5100 [45139]
12"	150	2002 [17719]	901 [7975]	1301 [11515]	1702 [15064]	1602 [14179]
	300	3198 [28305]	1439 [12736]	2079 [18401]	2718 [24056]	2558 [22640]
	600	3302 [29225]	1486 [13152]	2146 [18994]	2807 [24844]	2642 [23384]
	900	5738 [50786]	2018 [17861]	3443 [30473]	4877 [43165]	4591 [40634]
	1500	9196 [81391]	4138 [36624]	5518 [48838]	7817 [69186]	7357 [65115]
14"	150	2732 [24180]	1230 [10886]	1776 [15719]	2323 [20560]	2186 [19348]
	300	3479 [30792]	1566 [13860]	2261 [20012]	2957 [26172]	2783 [24632]
	600	4285 [37925]	1928 [17064]	2785 [24649]	3642 [32234]	3428 [30340]
	900	7346 [65018]	3306 [29261]	4407 [39005]	6244 [55264]	5877 [52016]
	1500	14225 [125901]	6401 [56654]	8535 [75541]	12091 [107014]	11380 [100721]
16"	150	3380 [29916]	1521 [13462]	2197 [19445]	2873 [25428]	2704 [23932]
	300	4302 [38076]	1936 [17135]	2796 [24747]	3657 [32367]	3442 [30464]
	600	4948 [43793]	2227 [19711]	3216 [28464]	4206 [37226]	3958 [35031]
	900	9128 [80790]	4108 [36359]	5477 [48476]	7759 [68673]	7302 [64628]
	1500	14410 [127539]	6485 [57397]	8646 [76524]	12249 [108413]	11528 [102031]
18"	150	4522 [40023]	2035 [18011]	2939 [26012]	3844 [34022]	3618 [32022]
	300	7118 [63000]	3203 [28349]	4627 [40952]	6050 [53547]	5694 [50396]
	600	9110 [80630]	4100 [36288]	5922 [52414]	7744 [68540]	7288 [64504]
	900	15032 [133044]	6764 [59866]	9019 [79825]	12777 [113086]	12025 [106430]
	1500	31220 [276320]	14049 [124344]	18732 [165792]	26537 [234872]	24976 [221056]
20"	150	5731 [50724]	2579 [22826]	3725 [32969]	4871 [43112]	4585 [40581]
	300	9863 [87295]	4438 [39280]	6411 [56742]	8384 [74205]	7890 [69832]
	600	13886 [122901]	6249 [55308]	9026 [79887]	11803 [104465]	11109 [98323]
	900	20309 [179750]	9139 [80887]	12186 [107855]	17263 [152790]	16247 [143798]
24"	150	9927 [87861]	4467 [39536]	6453 [57114]	8438 [74683]	7942 [70293]
	300	16303 [144294]	7336 [64929]	10597 [93791]	13858 [122654]	13042 [115431]
	600	15588 [137965]	7794 [68983]	10132 [89676]	13249 [117264]	12470 [110369]
	600	17320 [153295]	7794 [68983]	11258 [99642]	14722 [130301]	13856 [122636]

KTM VIRGO SERIES N TRUNNION BALL VALVES

TORQUE VALUES

TORQUES BASED ON TEMPERATURE AND SEAT MATERIAL

Sr.No	Operating temperatures	Seat insert materials	Feature	Operating condition	Evaluated valve torque (E-BTO)
1	(-) 29°C to 0°C temperature as per PT rating chart	Devlon / PCTFE / PTFE / RPTFE	Valves with gland / Valves without gland	Operable	= 1.1 x BTO (refer table A1)
2	+1°C to 200°C temperature as per PT rating chart	Devlon / PCTFE / PTFE / RPTFE	Valves with gland / Valves without gland	Operable	= BTO (refer table A1)
3	(-) 29°C to 200°C temperature as per PT rating chart	Devlon / PCTFE / PTFE / RPTFE	Valves with gland / Valves without gland	Non operable	= BTO (refer table A1)
4	(-) 29°C to 0°C temperature as per PT rating chart	Peek	Valves with gland / Valves without gland	Operable	= 1.1 x BTO (refer table A2)
5	+1°C to 200°C temperature as per PT rating chart	Peek	Valves with gland / Valves without gland	Operable	= BTO (refer table A2)
6	(-) 29°C to 200°C temperature as per PT rating chart	Peek	Valves with gland / Valves without gland	Non operable	= BTO (refer table A2)
7	(-) 50°C to (-) 30°C	Devlon / PCTFE / PTFE / RPTFE	Valves with gland / Valves without gland	Operable	= 1.5 x BTO (refer table A1)
8	(-) 50°C to (-) 30°C	Devlon / PCTFE / PTFE / RPTFE	Valves with gland / Valves without gland	Non operable	= BTO (refer table A1)
9	(-) 50°C to (-) 30°C	Peek	Valves with gland / Valves without gland	Operable	= 1.5 x BTO (refer table A2)
10	(-) 50°C to (-) 30°C	Peek	Valves with gland / Valves without gland	Non operable	= BTO (refer table A2)
11	(-) 50°C to (-) 30°C	Devlon / PCTFE / PTFE / RPTFE	Valves complying BS6364 (non cold box)	Operable with 250 mm extended bonnet	= 1.5 x BTO (refer table A1)
12	(-) 50°C to (-) 30°C	Peek	Valves complying BS6364 (non cold box)	Operable with 250 mm extended bonnet	= 1.5 x BTO (refer table A2)

For valves - with gland: Stem housing meets lagging extension length as per MESC SPE 77/200:2019.

NOTES

- Torque values for double block and bleed valves (when application calls for), increase torque values by 1.2 times over and above safety factor 1.5 mentioned.
- For valves with extended length up to 2.5 meter stem for underground application or insulation purpose, increase torque values by 1.1 times.
- For primary metal secondary soft (PMSS) seat (Viton seat insert), factor is 1 of E-BTO.
- For clean, particle-free, non viscous Liquids, factor is 1 times of E-BTO.
- For reduced bore valve, take torque values corresponding to the required ball bore size.**
e.g. for 14" x 10" Reduced Bore Valve, consider torque values corresponding to 10".
- Formulas to calculate values of torque in units as follows:

kgf-cm Value in Nm x 10.1972

lb-in Value in Nm x 8.85075

Guideline for gear box selection torque

Gear box selection torque = Evaluated valve torque (E-BTO) x 1.5

Guidelines for safety factors considerations for Actuator selection

- If project specification mentions safety factor less than 1.5, considered minimum safety factor (SF) shall be 1.5 for process on-off cycles, emergency shut down valves (ESDV), clean, particle-free, non-viscous liquids, dry, steam, and low demand mode of operation. If project specification mentions safety factor more than 1.5, consider safety factor (SF) specified in project specification.
- Final actuator Torque requirement has to be calculated as:

Actuator torque requirement = E-BTO X SF

KTM VIRGO SERIES N TRUNNION BALL VALVES

MAXIMUM ALLOWABLE STEM TORQUE (MAST) VALUES

MAXIMUM ALLOWABLE STEM TORQUE (MAST) VALUES (Nm (lbf-in))

Pressure class	Size DN (NPS)	Stem material					
		ASTM A182 Gr F316L	ASTM A182 Gr F316, ASTM A479 Type 316	ASTM A182 Gr F51, ASTM A479, UNS31803	ASTM A322 Gr.AISI 4140	ASTM A564 Gr.17-4PH Type 630	API 6A 718
150	50x40 (2x1.5)	60 (531)	72 (637)	160 (1416)	184 (1629)	258 (2283)	294 (2602)
	50 (2)	60 (531)	72 (637)	160 (1416)	184 (1629)	258 (2283)	294 (2602)
	80 (3)	174 (1540)	208 (1841)	460 (4071)	528 (4673)	742 (6567)	846 (7488)
	100 (4)	312 (2761)	376 (3328)	828 (7328)	952 (8426)	1334 (11807)	1522 (13471)
	150 (6)	1096 (9700)	1320 (11683)	2900 (25667)	3332 (29490)	4674 (41368)	5332 (47192)
	200 (8)	1530 (13542)	1844 (16321)	4050 (35846)	4652 (41174)	6526 (57760)	7444 (65885)
	250 (10)	2620 (23189)	3160 (27968)	6938 (61406)	7970 (70540)	11178 (98934)	12750 (112847)
	300 (12)	2620 (23189)	3160 (27968)	6938 (61406)	7970 (70540)	11178 (98934)	12750 (112847)
	350 (14)	4226 (37403)	5096 (45103)	11190 (99040)	12856 (113785)	18028 (159561)	20564 (182007)
	400 (16)	6226 (55105)	7508 (66451)	16484 (145896)	18938 (167615)	26558 (235058)	30294 (268124)
	450 (18)	9090 (80453)	10962 (97022)	24066 (213002)	27648 (244705)	38772 (343161)	44226 (391433)
	500 (20)	10768 (95305)	12986 (114936)	28508 (325088)	32752 (289880)	45928 (406497)	52390 (463691)
300	600 (24)	16810 (148781)	20270 (179405)	44498 (393840)	51122 (452468)	71690 (634510)	81778 (723796)
	50x40 (2x1.5)	84 (743)	102 (903)	226 (2000)	260 (2301)	366 (3239)	416 (3682)
	50 (2)	116 (1027)	140 (1239)	310 (2744)	356 (3151)	498 (4408)	568 (5027)
	80 (3)	250 (2213)	302 (2673)	664 (5877)	762 (6744)	1070 (9470)	1222 (10816)
	100 (4)	490 (4337)	590 (5222)	1298 (11488)	1492 (13205)	2092 (18516)	2386 (21118)
	150 (6)	1096 (9700)	1320 (11683)	2900 (25667)	3332 (29491)	4674 (41368)	5332 (47192)
	200 (8)	2044 (18091)	2464 (28110)	5412 (47900)	6218 (55034)	8720 (77178)	9946 (88030)
	250 (10)	2620 (23189)	3160 (27968)	6938 (61406)	7970 (70540)	11178 (98934)	12750 (112847)
	300 (12)	4226 (37403)	5096 (45103)	11190 (99040)	12856 (113785)	18028 (159561)	20564 (182007)
	350 (14)	6226 (55105)	7508 (66451)	16484 (145896)	18938 (167615)	26558 (235058)	30294 (268124)
	400 (16)	9090 (80453)	10962 (97022)	24066 (213002)	27648 (244705)	38772 (343161)	44226 (391433)
	450 (18)	12474 (110404)	15042 (133133)	33020 (292252)	37938 (335780)	53202 (470877)	60686 (537116)
600	500 (20)	16810 (148781)	20270 (179405)	44498 (393840)	51122 (452468)	71690 (634510)	81778 (723796)
	600 (24)	28028 (248069)	33798 (299138)	74194 (656672)	85240 (754438)	119534 (1057965)	136352 (1206817)
	50x40 (2x1.5)	116 (1027)	140 (1239)	310 (2744)	356 (3151)	498 (4408)	568 (5027)
	50 (2)	174 (1540)	208 (1841)	460 (4071)	528 (4673)	742 (6567)	846 (7488)
	80 (3)	490 (4337)	590 (5222)	1298 (11488)	1492 (13205)	2092 (18516)	2386 (21118)
	100 (4)	762 (6744)	920 (8143)	2022 (17896)	2322 (20551)	3256 (28818)	3716 (32889)
	150 (6)	1096 (9700)	1320 (11683)	2900 (25667)	3332 (29491)	4674 (41368)	5332 (47192)
	200 (8)	2044 (18091)	2464 (21808)	5412 (47900)	6218 (55034)	8720 (77179)	9946 (88030)
	250 (10)	2620 (23189)	3160 (27968)	6938 (61406)	7970 (70540)	11178 (98934)	12750 (112847)
	300 (12)	4226 (37403)	5096 (45103)	11190 (99040)	12856 (113785)	18028 (159561)	20564 (182007)
	350 (14)	7532 (66664)	9084 (80400)	19940 (176484)	22910 (202771)	32128 (284357)	36648 (324362)
	400 (16)	7532 (66664)	9084 (80400)	19940 (176484)	22910 (202771)	32128 (284357)	36648 (324362)
900	450 (18)	16810 (148781)	20270 (179405)	44498 (393840)	51122 (452468)	71690 (634510)	81778 (723796)
	500 (20)	21834 (193247)	26330 (233040)	57800 (511573)	66406 (587743)	93122 (824199)	106224 (940162)
	600 (24)	28028 (248069)	33798 (299138)	74194 (656672)	85240 (754438)	119534 (1057965)	136352 (1206817)
	50x40 (2x1.5)	174 (1540)	208 (1841)	460 (4071)	528 (4673)	742 (6567)	846 (7487)
	50 (2)	490 (5594)	590 (6744)	1298 (14798)	1492 (17011)	2092 (23862)	2386 (27207)
	80 (3)	490 (5594)	590 (6744)	1298 (14798)	1492 (17011)	2092 (23862)	2386 (27207)
	100 (4)	1096 (12497)	1320 (15064)	2900 (33084)	3332 (38005)	4674 (53299)	5332 (60805)
	150 (6)	1530 (17436)	1844 (21029)	4050 (46183)	4652 (53069)	6526 (74417)	7444 (84879)
	200 (8)	4226 (48201)	5096 (58132)	11190 (127592)	12856 (146604)	18028 (205585)	20564 (234509)
	250 (10)	4226 (48201)	5096 (58132)	11190 (127592)	12856 (146604)	18028 (205585)	20564 (234509)
	300 (12)	6226 (71001)	7508 (85622)	16484 (187972)	18938 (215976)	26558 (302855)	39034 (345480)
	350 (14)	12474 (142249)	15042 (171545)	33020 (376564)	37938 (432642)	53202 (606701)	60686 (692058)
1500	400 (16)	14536 (165774)	17528 (199903)	38478 (438802)	44208 (504138)	61994 (706980)	70716 (806445)
	450 (18)	24804 (282870)	29912 (341108)	65660 (748791)	75436 (860275)	105788 (1206374)	120670 (1376114)
	50x40 (2x1.5)	174 (1540)	208 (1841)	460 (4071)	528 (4673)	742 (6567)	846 (7488)
	50 (2)	490 (4337)	590 (5222)	1298 (11488)	1492 (13205)	2092 (18516)	2386 (21118)
	80 (3)	1096 (9700)	1322 (11701)	2902 (25685)	3334 (29508)	4678 (41404)	5336 (47228)
	100 (4)	1096 (9700)	1320 (11683)	2900 (25667)	3332 (29491)	4674 (41368)	5332 (47192)
	150 (6)	2620 (23189)	3160 (27968)	6938 (61406)	7970 (70540)	11178 (98934)	12750 (112847)
	200 (8)	5250 (46466)	6330 (56025)	13896 (122990)	15966 (141311)	22390 (198168)	25540 (226048)
	250 (10)	9090 (80453)	10962 (97022)	24066 (213002)	27648 (244705)	38772 (343161)	44226 (391433)
	300 (12)	12474 (110404)	15042 (133133)	33020 (292251)	37938 (335780)	53202 (470877)	60686 (537116)

KTM VIRGO SERIES N TRUNNION BALL VALVES

SELECTION GUIDE FOR SERIES N SOFT SEATED STANDARD VALVE

SELECTION GUIDE

Example:	2	N	L	2	RT	2	F	C	7	N	P	6	G	ZZ	C2
Sizes															
2	NPS 2 / DN 50	16	NPS 16 / DN 400												
3	NPS 3 / DN 80	18	NPS 18 / DN 450												
4	NPS 4 / DN 100	20	NPS 20 / DN 500												
6	NPS 6 / DN 150	22	NPS 22 / DN 550												
8	NPS 8 / DN 200	24	NPS 24 / DN 600												
10	NPS 10 / DN 250	26	NPS 26 / DN 650												
12	NPS 12 / DN 300	28	NPS 28 / DN 700												
14	NPS 14 / DN 350	30	NPS 30 / DN 750												
Series															
N	Soft seated trunnion side entry														
Configuration															
L	Standard (Trunnion) - API6D														
Construction															
2	Two piece - Cast														
End connection															
RF	Flanged raised face serrated			BW Butt weld											
RS	Flanged raised face smooth			BP Butt weld with pup piece											
FF	Flanged flat face serrated			HB Hub connection											
FS	Flanged flat face smooth			ZZ Other than above											
RT	Flanged RTJ														
Ratings															
1	150#	3	300#	9	900#										
2	1500#	6	600#												
Bore															
F	Full			R Reduced / regular											
Body															
C	WCB	6	CF8M	D	Duplex 4A	N	Inconel CW6MC								
L	LCB	5	CF3M	E	Super Duplex 5A	Z	Other than above								
7	WCC	4	CF8	F	Super Duplex 6A										
2	LCC	3	CF3	M	Inconel Cu5MCuC										
Ball / seat ring / stem															
1	A105 / A105 / 4140	P	316 / 316 / Inconel	Y	Duplex / 316 / 17-4 PH	M	Inconel (825 or Cu5MCuC)								
8	LF2 / LF2 / 17-4 PH	5	316L / 316L / 316L	9	F60 (Carbon steel)	N	Inconel (625 or CW6MC)								
L	LF2 / LF2 / LF2	3	316 / 316 / XM-19	D	Duplex (4A or F51)	Z	Other than above								
6	316 / 316 / 316	4	304 / 304 / 304	E	Super Duplex (5A or F53)										
2	316 / 316 / 17-4 PH	A	F6A / F6A / 410	F	Super Duplex (6A or F55)										
7	316 / 316 / Duplex	U	Duplex / 316 / 316	G	Duplex F60										
Coating (ball and seat rings)															
1	ENP 1 mil (25 micron)*		3	ENP 3 mil (75 micron)*		Z	Other than above								
2	ENP 2 mil (50 micron)*		N	Not Applicable											
* Also for stem, if in Carbon steel material															
Seat insert (ball seal)															
G	RTFE		P	PEEK		V	Viton								
L	Devlon		E	PCTFE (Kel F)		Z	Other than above								
Seals (O ring*, lip seal, gasket)															
1	HNBR		5	FKM / Viton		K	FFKM		T	PTFE sealing (no graphite)**					
2	HNBR 90 Durometer		6	FKM AED / Viton AED		E	EPDM		Z	Other than above					
3	HNBR AED (90D)		7	FKM Low temp		F	EPDM AED								
4	HNBR Low temp		A	FEPM		L	Lip seals (material as specified)								
* AED O-rings mandatory for ASME Class 600 and above															
** Non fire safe sealing															
Operator (if applicable)															
A	Actuator		C	Gear with chain wheel		L	Lever / wrench								
B	Bare stem		G	Gear with hand wheel		Z	Other than above								
Other (if applicable)															
SI	Sealant injection		DP	Double piston effect (non relieving)		SD	Single Piston Effect (U/S); Double Piston Effect (D/S)				BE	Bonnet extension			
SE	Stem extension		NF	Non fire safe		MF	Multiple Features - e.g. stem extension with DP seats				ZZ	Other than above			
Sub-series															
C2	Standard Series														

KTM VIRGO SERIES N TRUNNION BALL VALVES

SELECTION GUIDE FOR SERIES N SOFT SEATED VALVE WITH GLAND PACKING

SELECTION GUIDE

Example:	2	N	G	2	RF	6	R	C	1	1	L	6	G	SI	C2
Sizes															
2	NPS 2 / DN 50	16	NPS 16 / DN 400												
3	NPS 3 / DN 80	18	NPS 18 / DN 450												
4	NPS 4 / DN 100	20	NPS 20 / DN 500												
6	NPS 6 / DN 150	22	NPS 22 / DN 550												
8	NPS 8 / DN 200	24	NPS 24 / DN 600												
10	NPS 10 / DN 250	28	NPS 28 / DN 700												
12	NPS 12 / DN 300	30	NPS 30 / DN 750												
14	NPS 14 / DN 350														
Series															
N	Soft seated trunnion side entry														
Configuration															
G	Standard with gland packing (Trunnion) - API 6D														
Construction															
2	Two piece - Cast														
End connection															
RF	Flanged raised face serrated			BW Buttweld											
RS	Flanged raised face smooth			BP Buttweld with pup piece											
FF	Flanged flat face serrated			HB Hub connection											
FS	Flanged flat face smooth			ZZ Other than above											
RT	Flanged RTJ														
Ratings															
1	150#	3	300#	9	900#										
2	1500#	6	600#												
Bore															
F	Full			R	Reduced / regular										
Body															
C	WCB	6	CF8M	D	Duplex 4A	N	Inconel CW6MC								
L	LCB	5	CF3M	E	Super Duplex 5A	Z	Other than above								
7	WCC	4	CF8	F	Super Duplex 6A										
2	LCC	3	CF3	M	Inconel Cu5MCuC										
Ball / seat ring / stem															
1	A105 / A105 / 4140	P	316 / 316 / Inconel	Y	Duplex / 316 / 17-4 PH	M	Inconel (825 or Cu5MCuC)								
8	LF2 / LF2 / 17-4 PH	5	316L / 316L / 316L	9	F60 (Carbon steel)	N	Inconel (625 or CW6MC)								
L	LF2 / LF2 / LF2	3	316 / 316 / XM-19	D	Duplex (4A or F51)	Z	Other than above								
6	316 / 316 / 316	4	304 / 304 / 304	E	Super Duplex (5A or F53)										
2	316 / 316 / 17-4 PH	A	F6A / F6A / 410	F	Super Duplex (6A or F55)										
7	316 / 316 / Duplex	U	Duplex / 316 / 316	G	Duplex F60										
Coating (ball and seat rings)															
1	ENP 1 mil (25 micron)*		3	ENP 3 mil (75 micron)*		Z	Other than above								
2	ENP 2 mil (50 micron)*		N	Not Applicable											
* Also for stem, if in Carbon steel material															
Seat insert (ball seal)															
G	RTFE		P	PEEK		V	Viton								
L	Devlon		E	PCTFE (Kel F)		Z	Other than above								
Seals (O ring*, lip seal, gasket)															
1	HNBR		5	FKM / Viton		K	FFKM		T	PTFE sealing (No graphite)**					
2	HNBR 90 Durometer		6	FKM AED / Viton AED		E	EPDM		Z	Other than above					
3	HNBR AED (90D)		7	FKM Low temp		F	EPDM AED								
4	HNBR Low temp		A	FEPM		L	Lip seals (material as specified)								
* AED O-rings mandatory for ASME Class 600 and above															
** Non fire safe sealing															
Operator															
A	Actuator		C	Gear with chain wheel		L	Lever / wrench								
B	Bare stem		G	Gear with hand wheel		Z	Other than above								
Other (if applicable)															
SI	Sealant injection		DP	Double piston effect (non relieving)		SD	Single Piston Effect (U/S); Double Piston Effect(D/S)				BE	Bonnet extension			
SE	Stem extension		NF	Non fire safe		MF	Multiple Features - e.g. stem extension with DP seats				ZZ	Other than above			
Sub-series															
C2	Standard Series														

KTM VIRGO SERIES N TRUNNION BALL VALVES

SELECTION GUIDE FOR SERIES M METAL SEATED VALVE WITH GLAND PACKING

SELECTION GUIDE

Example:	2	M	G	2	RF	1	R	D	D	T	N	5	L	SE	C2
Sizes															
2	NPS 2 / DN 50	14	NPS 14 / DN 350												
3	NPS 3 / DN 80	16	NPS 16 / DN 400												
4	NPS 4 / DN 100	18	NPS 18 / DN 450												
6	NPS 6 / DN 150	20	NPS 20 / DN 500												
8	NPS 8 / DN 200	24	NPS 24 / DN 600												
10	NPS 10 / DN 250	28	NPS 28 / DN 700												
12	NPS 12 / DN 300	30	NPS 30 / DN 750												
Series															
M	Metal seated trunnion side entry														
Configuration															
G	Standard with gland packing (Trunnion) - API 6D														
Construction															
2	Two piece - Cast														
End connection															
RF	Flanged raised face serrated			BW Butt weld											
RS	Flanged raised face smooth			BP Butt weld with pup piece											
FF	Flanged flat face serrated			HB Hub connection											
FS	Flanged flat face smooth			ZZ Other than above											
RT	Flanged RTJ														
Ratings															
1	150#	3	300#	9	900#										
2	1500#	6	600#												
Bore															
F	Full	R	Reduced / regular												
Body															
C	WCB	6	CF8M	D	Duplex 4A	N	Inconel CW6MC								
L	LCB	5	CF3M	E	Super Duplex 5A	Z	Other than above								
7	WCC	4	CF8	F	Super Duplex 6A										
2	LCC	3	CF3	M	Inconel Cu5MCuC										
Ball / seat ring / stem															
1	A105 / A105 / 4140	P	316 / 316 / Inconel	Y	Duplex / 316 / 17-4 PH	G	Duplex F60								
8	LF2 / LF2 / 17-4 PH	3	316 / 316 / XM-19	D	Duplex (4A or F51)	N	Inconel (625 or CW6MC)								
2	316 / 316 / 17-4 PH	A	F6A / F6A / 410	E	Super Duplex (5A or F53)	Z	Other than above								
7	316 / 316 / Duplex	9	F60 (Carbon steel)	F	Super Duplex (6A or F55)										
Coating (ball and seat rings)															
C	Chrome carbide	T	Tungsten carbide			Z	Other than above								
Seat insert (ball seal)															
N	Not applicable														
Seals (O ring*, lip seal, gasket)															
1	HNBR	5	FKM / Viton	K	FFKM	T	PTFE sealing (No graphite)**								
2	HNBR 90 Durometer	6	FKM AED / Viton AED	E	EPDM	Z	Other than above								
3	HNBR AED (90D)	7	FKM Low temp	F	EPDM AED										
4	HNBR Low temp	A	FEPM	L	Lip seals (material as specified)										
* AED O-rings mandatory for ASME Class 600 and above															
** Non fire safe sealing															
Operator															
A	Actuator	C	Gear with chain wheel			L	Lever / wrench								
B	Bare stem	G	Gear with hand wheel			Z	Other than above								
Other (if applicable)															
SI	Sealant injection	DP	Double piston effect (non relieving)			SD	Single Piston Effect (U/S); Double Piston Effect(D/S)			BE	Bonnet extension				
SE	Stem extension	NF	Non fire safe			MF	Multiple Features - e.g. stem extension with DP seats			ZZ	Other than above				
Sub-series															
C2	Standard Series														

KTM VIRGO SERIES N TRUNNION BALL VALVES

IN-SERVICE APPLICATIONS

How to avoid problems

- Ball valves shall be transported and stored with the ball in the fully open position.
- Flanged ends and welded ends shall be protected.
- End protection shall be removed only when the valve is installed in the line.
- Valves shall be handled using the proper lifting lugs.
- Valves shall be stored according to Emerson procedures. Long term storage should be avoided.
- For welded-end valves, advise Emerson if there will be a post-weld heat treatment (transition pumps may be necessary to avoid damage to seals).
- Flush and clean before operating the valve.
- Make sure no line-testing fluid is left in the line and/or the valve body.
- Avoid leaving the valve body filled with salt water to prevent corrosion.
- During line-testing, valves shall be left in the partially open position for the minimum possible amount of time.
- Standard ball valves shall be used for on-off service only. Throttling service (use of the valve with the ball partially open) can damage the seats.
- Make sure to take into consideration the actual service conditions when selecting materials for O-rings and seat inserts.
- Always specify anti-explosive decompression material for valves to be used in high pressure gas service.
- Make sure the selected actuator has been sized properly (an oversized actuator can be as dangerous as an undersized one).
- Advise Emerson of cycle frequency to ensure proper sizing of the actuator.
- Do not use the actuator to lift the valve.

NOTES

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