



KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES THREE-PIECE, FULL AND REDUCED BORE

Three-piece, full and reduced bore, bi-directional sealing Trunnion Mounted Ball Valve with forged steels and soft and metal seats, assembled and tested in Oklahoma City, USA



FEATURES

- Designed to ASME B16.34 and API 6D.
- ISO 15848-1 fugitive emissions tested and certified.
- 3 piece design, full and reduced bore
- Anti-static design: provides continuity throughout the entire valve.
- Bi-directional sealing with zero leakage.
- Blowout proof back seated stem.
- Devlon® soft seats with PEEK option
- API 607 and API 6FA fire test certification
- ISO 5211 mounting pad which simplifies actuator or gear operator mounting.
- NACE MR0175 / ISO 15156 (all parts).
- Self-relieving seat design, for cavity relief in the closed position, with inter-changeable double piston effect seat option
- Sealant Injection Fittings with buried check valve.
- CRN
- CE/PED
- ASME Sec VIII Div 1

GENERAL APPLICATION

Ideally suited for upstream and midstream applications such as transmission and distribution pipelines and other applications from wellhead to storage and anywhere API 6D approval is required.

TECHNICAL DATA

Size range: NPS 2-36
End connections: Flanged ASME and weld ends
Pressure rating: ASME Class 150 to 2500
Temperature rating: Up to 450 °F (230 °C)

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

KEY FEATURES

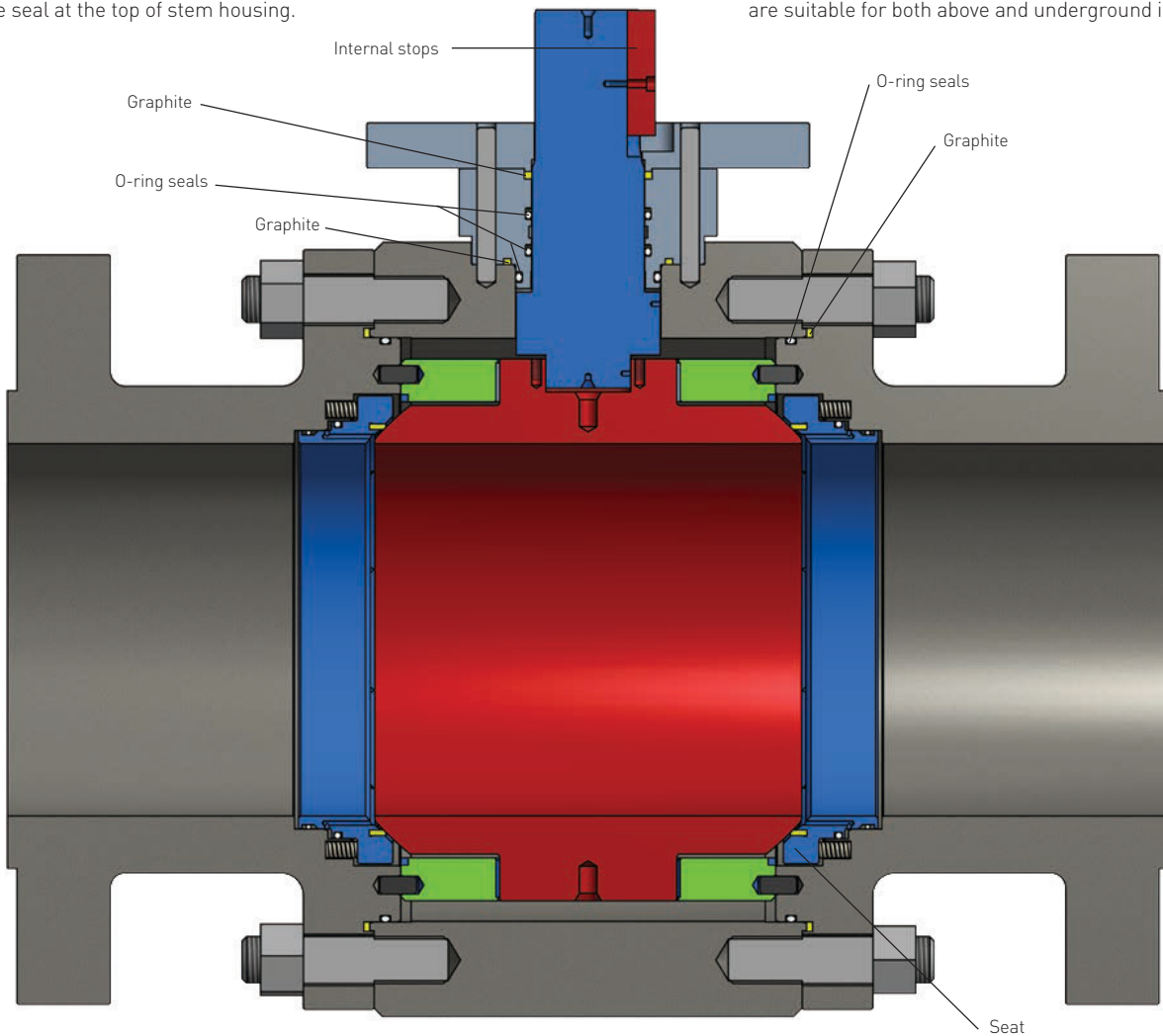
The Series NF are three-piece forged material flanged and weld end Trunnion Mounted Ball Valves with bubble tight sealing at high and low pressures and are intrinsically firesafe due to metal-to-metal sealing with loss of seats. The Series NF features a blowout proof, multiple sealing stem, double body sealing, double block and bleed designs, and a fire safe design. Options are available to add Double Piston Effect Seats. In addition, Series NF Ball Valve are ISO 15848-1 fugitive emissions tested and certified.

Stem features

Stems are blowout proof and multiple sealing. The blowout proof stem enables positive stem retention. A triple sealing arrangement in stem area prevents leakage to atmosphere. It includes double sealing with O-rings and graphite seal at the top of stem housing.

Double body sealing

Double seal combination of O-ring and graphite ensure perfect body joint sealing. KTM Virgo valves therefore meet or exceed the fugitive emission requirements across wide range of pressure and temperature applications. Valves are suitable for both above and underground installations.



Double block and bleed design

Spring loaded seats maintain contact with the ball and provide tight shut off even at low pressure differential. Independent sealing of upstream and downstream sides facilitates draining of fluid from the body cavity, and thus the double block and bleed operation.

Fire safe design

Secondary Metal-Metal sealing accomplishes Fire Safe requirements

ALT: With the ball in the full closed or full open position to verify seat integrity, both seats hold their respective pressures independent of the body cavity pressure. The double block and bleed feature makes it possible to flush the valve under pressure, verifying that the seats are sealing properly.

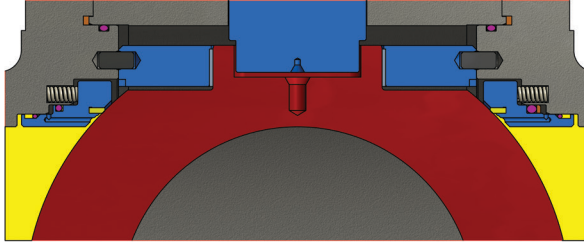
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Seat design option 1 - single piston effect x DPE (SPE X DPE) combined

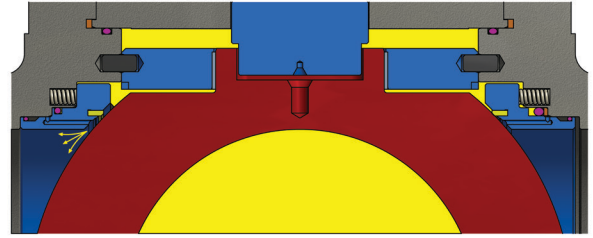
Pressure upstream/downstream
Upstream seat: SPE

Downstream seat: DPE



Pressure in body cavity
Upstream seat: SPE

Downstream seat: DPE



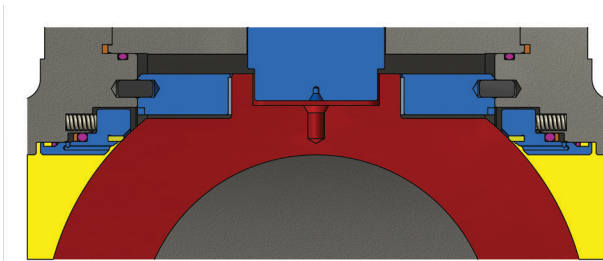
Upstream SPE seat ensures thermal self-relieving capability, while downstream DPE seat provides the double barrier in case of upstream seat damage. This configuration involves a preferred direction of installation with SPE seat facing upstream. SPE x DPE configurations, cavity relief always takes place through SPE seat. DPE seat gives double isolation to the Pig Launchers/Receivers, allowing automatic relief of body cavity at the same time in case of pressure buildup as a safety feature to keep the open end of the trap safe from pressure releasing from the valve and into the loading and receiving area.

Typical application: Blind Flange Futures, Emergency Shut Down, Pig Launchers/Receivers.

Seat design option 2 - double piston effect (DPE x DPE)

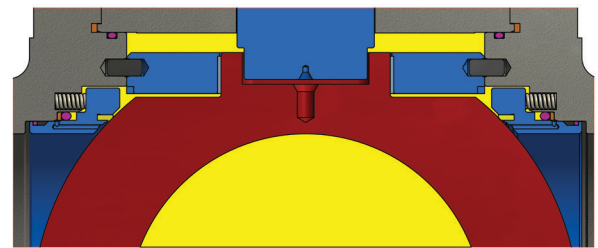
Pressure upstream/downstream
Upstream seat: DPE

Downstream seat: DPE



Pressure in body cavity
Upstream seat: DPE

Downstream seat: DPE



DPE seats are designed to be pushed against the ball in both directions, whether pressure comes from body cavity or from upstream/downstream side. Because the DPE seats cannot perform cavity relief, the use of a pressure relief valve (PRV) or upstream thermal bypass connections is recommended.

Standards

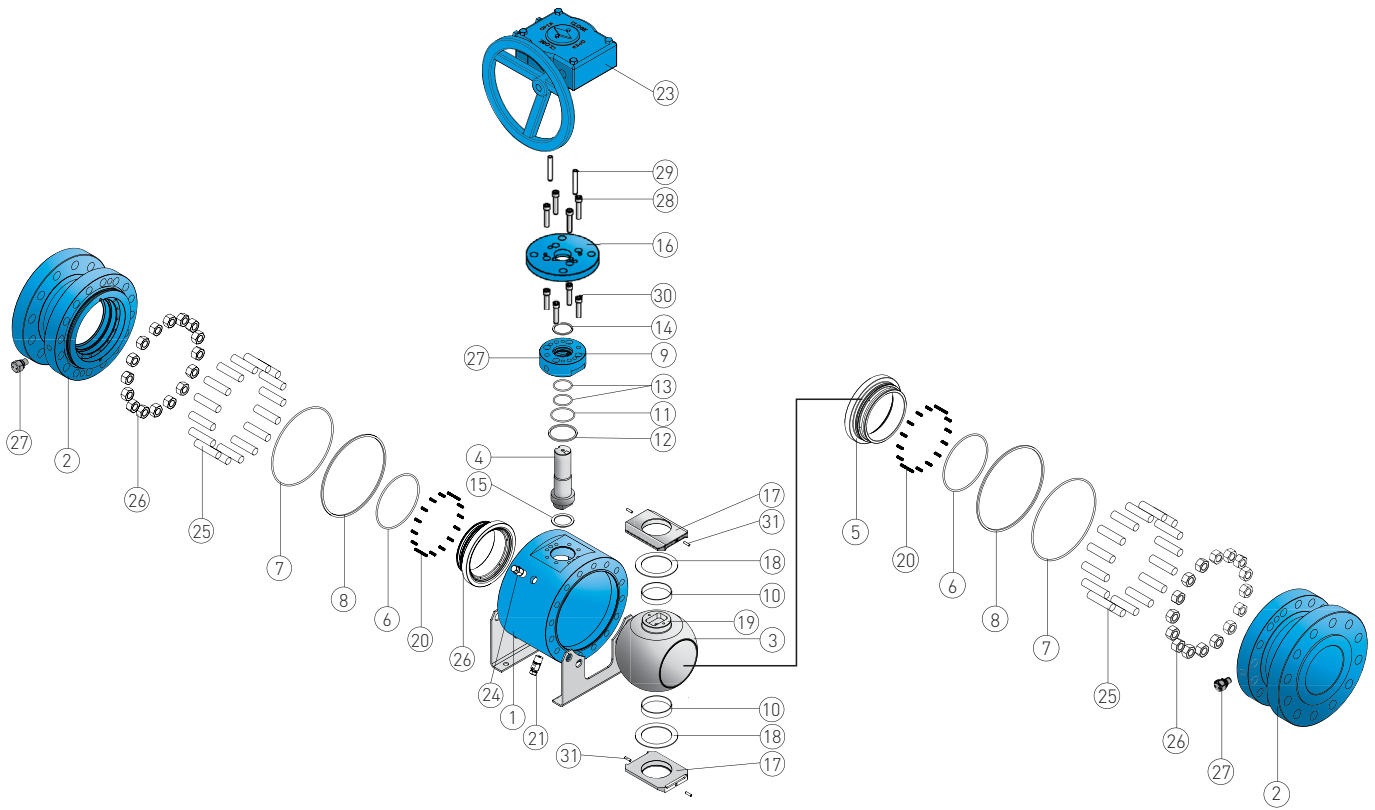
API 598
API 607 Fire Safe
API 6D
API 6FA
API Q1
API QR

ASME B16.10
ASME B16.25
ASME B16.34
EN12266-1
ISO 15848-1 / ISA S93.00.01
ISO 5211 Top Works

ISO 9001:2015
MSS-SP 45, 53, 54, 55, 59, 93, 94
NACE MR0175-2002 / ISO 15156 (All parts)

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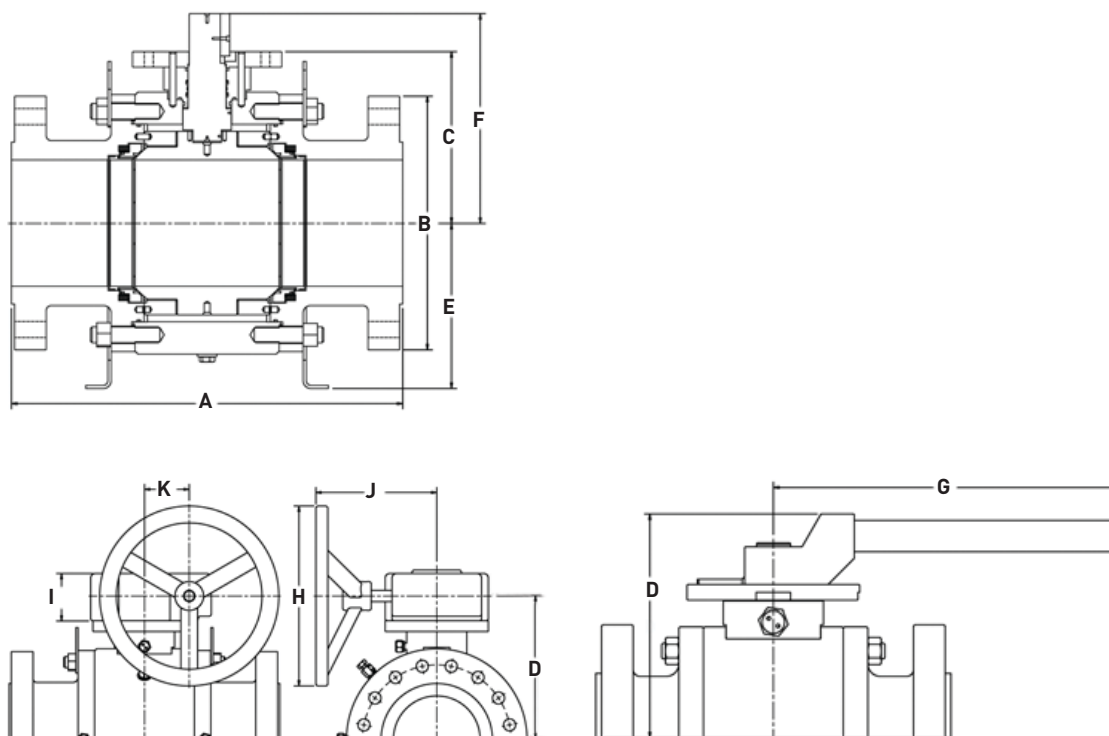


PARTS LIST

| Pos. nr. | Part description | Standard materials | Optional materials | Pos. nr. | Part description | Standard materials | Optional materials |
|----------|-----------------------|----------------------|---|----------|------------------------|--------------------|---|
| 1 | Body | A350 LF2 | F316 SS | 12 | Gasket (stem housing) | Graphite | |
| 2 | Adapter | A350 LF2 | F316 SS | 13 | O-ring (stem) | HNBR AED (-40°F) | FKM, FKM (Low temp.), FKM (AED), FEPM (Alfas®), FFKM (Kalrez®), EPDM, HNBR Duro 85 (JW EOL 985) |
| 3 | Ball | A350 LF2 | A350 LF2 + 3 mil ENP, A276 316 SS, Tungsten Carbide Coating | 14 | Gasket (stem) | Graphite | |
| 4 | Stem | A350 LF2 + 1 mil ENP | A350 LF2 + 3 mil ENP, A276 316 SS, A564 17-4 PH SS | 15 | Stem thrust washer | RTFE | SS+RTFE, 4130 + Nitride |
| 5a | Seat insert | Devlon® | PEEK | 16 | ISO mounting flange | A350 LF2 | F316 SS |
| 5b | Seat Retainer | A350 LF2 | A350 LF2 + 3 mil ENP, A276 316 SS, A276 316 SS + TC coating | 17 | Trunnion plate | A350 LF2 | F316 SS |
| 6 | O-ring (seat) | HNBR AED (-40°F) | FKM, FKM (Low temp.), FKM (AED), FEPM (Alfas®), FFKM (Kalrez®), EPDM, HNBR Duro 85 (JW EOL 985) | 18 | Trunnion thrust washer | RTFE | 4130 + nitride |
| 7 | O-ring (body) | HNBR AED (-40°F) | FKM, FKM (Low temp.), FKM (AED), FEPM (Alfas®), FFKM (Kalrez®), EPDM, HNBR Duro 85 (JW EOL 985) | 19 | Anti-static springs | Spring steel | |
| 8 | Gasket (body) | Graphite | | 20 | Seat springs | Inc X-750 | |
| 9 | Stem housing | A350 LF2 | F316 SS | 21 | Drain plug | A105 CS | 316 SS |
| 10 | Bush bearing | DU CS + PTFE | | 22 | Handle (not shown) | A106/A108 CS | |
| 11 | O-ring (stem housing) | HNBR AED (-40°F) | FKM, FKM (Low temp.), FKM (AED), FEPM (Alfas®), FFKM (Kalrez®), EPDM, HNBR Duro 85 (JW EOL 985) | 23 | Gearbox | | |
| | | | | 24 | Bleed valve | 316 SS | 4140 CS |
| | | | | 25 | Stud | A320 L7M | Xylan coated A320 L7M |
| | | | | 26 | Nut, body adapter | A194 7M | Xylan coated A194 7M |
| | | | | 27 | Injection fitting | 4140 CS | 316 SS |
| | | | | 28 | Bolt, is Mtg. flange | A320 L7M | 316 SS |
| | | | | 29 | Dowel pin | | |
| | | | | 30 | Bolt (stem housing) | A320 L7M | Xylan coated A320 L7M |
| | | | | 31 | Alignment pin | 316 SS | |
| | | | | 32 | Stem key (not shown) | AISI 1045 | |

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE



DIMENSIONS - ANSI 150 (dimensions in inches)

| Size | A-RF | A-RTJ | B | C | D | E | F | G | H | I | J | K | Approx weights (lb) | | |
|---------|------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|------|---------------------|----------------|------|
| | | | | | | | | | | | | | Bare stem | Lever operator | Gear |
| 2 | 7.0 | 7.5 | 6.00 | 5.93 | 8.93 | 4.06 | 7.36 | 11.00 | - | - | - | - | 51 | 4.0 | - |
| 3 x 2 | 8.0 | 8.5 | 7.50 | 5.93 | 8.93 | 4.06 | 7.36 | 11.00 | - | - | - | - | 60 | 4.0 | - |
| 3 | 8.0 | 8.5 | 7.50 | 6.66 | 9.66 | 4.83 | 8.09 | 23.00 | - | - | - | - | 81 | 5.5 | - |
| 4 x 3 | 9.0 | 9.5 | 9.00 | 6.66 | 9.66 | 4.83 | 8.09 | 23.00 | - | - | - | - | 92 | 5.5 | - |
| 4 | 9.0 | 9.5 | 9.00 | 7.02 | 11.52 | 5.07 | 9.28 | 34.63 | - | - | - | - | 118 | 14.1 | - |
| 6 x 4 | 15.5 | 16.0 | 11.00 | 7.02 | 11.52 | 5.07 | 9.28 | 34.63 | - | - | - | - | 153 | 14.1 | - |
| 6 | 15.5 | 16.0 | 11.00 | 8.56 | 10.25 | 6.93 | 10.55 | - | 16 | 3.94 | 11.40 | 2.75 | 306 | - | 33 |
| 8 x 6 | 18.0 | 18.5 | 13.58 | 8.56 | 10.25 | 6.93 | 10.55 | - | 16 | 3.94 | 11.40 | 2.75 | 375 | - | 33 |
| 8 | 18.0 | 18.5 | 13.58 | 10.58 | 12.60 | 10.30 | 13.33 | - | 18 | 4.31 | 10.20 | 3.54 | 633 | - | 47 |
| 10 x 8 | 21.0 | 21.5 | 16.00 | 10.58 | 12.60 | 10.30 | 13.33 | - | 18 | 4.31 | 10.20 | 3.54 | 675 | - | 47 |
| 10 | 21.0 | 21.5 | 16.00 | 12.34 | 14.62 | 12.64 | 14.98 | - | 20 | 4.57 | 17.25 | 5.50 | 897 | - | 64 |
| 12 x 10 | 24.0 | 24.5 | 19.00 | 12.34 | 14.62 | 12.64 | 14.98 | - | 20 | 4.57 | 17.25 | 5.50 | 960 | - | 64 |
| 12 | 24.0 | 24.5 | 19.00 | 14.05 | 16.36 | 14.40 | 16.69 | - | 20 | 4.57 | 17.25 | 5.50 | 1393 | - | 64 |
| 14 x 12 | 27.0 | 27.5 | 21.00 | 14.05 | 16.36 | 14.40 | 16.69 | - | 20 | 4.57 | 17.25 | 5.50 | 1454 | - | 64 |
| 14 | 27.0 | 27.5 | 21.00 | 14.88 | 17.74 | 16.73 | 19.44 | - | 26 | 5.71 | 18.70 | 5.00 | 2034 | - | 106 |
| 16 x 12 | 30.0 | 30.5 | 23.50 | 14.05 | 16.36 | 14.40 | 16.69 | - | 20 | 4.57 | 17.25 | 5.50 | 1534 | - | 64 |
| 16 x 14 | 30.0 | 30.5 | 23.50 | 14.88 | 17.74 | 16.73 | 19.44 | - | 26 | 5.71 | 18.70 | 5.00 | 2116 | - | 106 |
| 16 | 30.0 | 30.5 | 23.50 | 16.43 | 19.30 | 19.75 | 20.73 | - | 26 | 5.71 | 18.70 | 5.00 | 2773 | - | 106 |
| 18 | 34.0 | 34.5 | 25.00 | 18.54 | 21.08 | 19.80 | 23.51 | - | 24 | 5.08 | 18.90 | 4.96 | * | - | * |
| 20 x 16 | 36.0 | 36.5 | 27.56 | 16.43 | 19.30 | 19.75 | 20.73 | - | 26 | 5.71 | 18.70 | 5.00 | 2962 | - | 106 |
| 20 | 36.0 | 36.5 | 27.56 | 20.83 | 27.50 | 21.73 | 25.22 | - | 24 | 7.10 | 20.10 | 9.00 | 4956 | - | 166 |
| 24 x 20 | 42.0 | 42.5 | 32.09 | 20.83 | 27.50 | 21.73 | 25.22 | - | 24 | 7.10 | 20.10 | 9.00 | 5170 | - | 166 |
| 24 | 42.0 | 42.5 | 32.09 | 24.45 | 28.45 | 27.08 | 29.41 | - | 30 | 8.03 | 26.30 | 8.07 | 7489 | - | 397 |
| 30 x 24 | 51.0 | - | 38.75 | 24.45 | 28.45 | 27.08 | 29.41 | - | 30 | 8.03 | 26.30 | 8.07 | 8115 | - | 397 |
| 30 | 51.0 | - | 38.75 | 31.24 | 35.75 | 29.79 | 37.30 | - | 32 | 9.02 | 27.50 | 9.09 | 14532 | - | 540 |
| 36 x 30 | 60.0 | - | 46.00 | 31.24 | 35.75 | 29.79 | 37.30 | - | 32 | 9.02 | 27.50 | 9.09 | 15448 | - | 540 |
| 36 | 60.0 | - | 46.00 | 35.57 | * | 32.71 | 41.63 | - | * | * | * | * | 23667 | - | * |

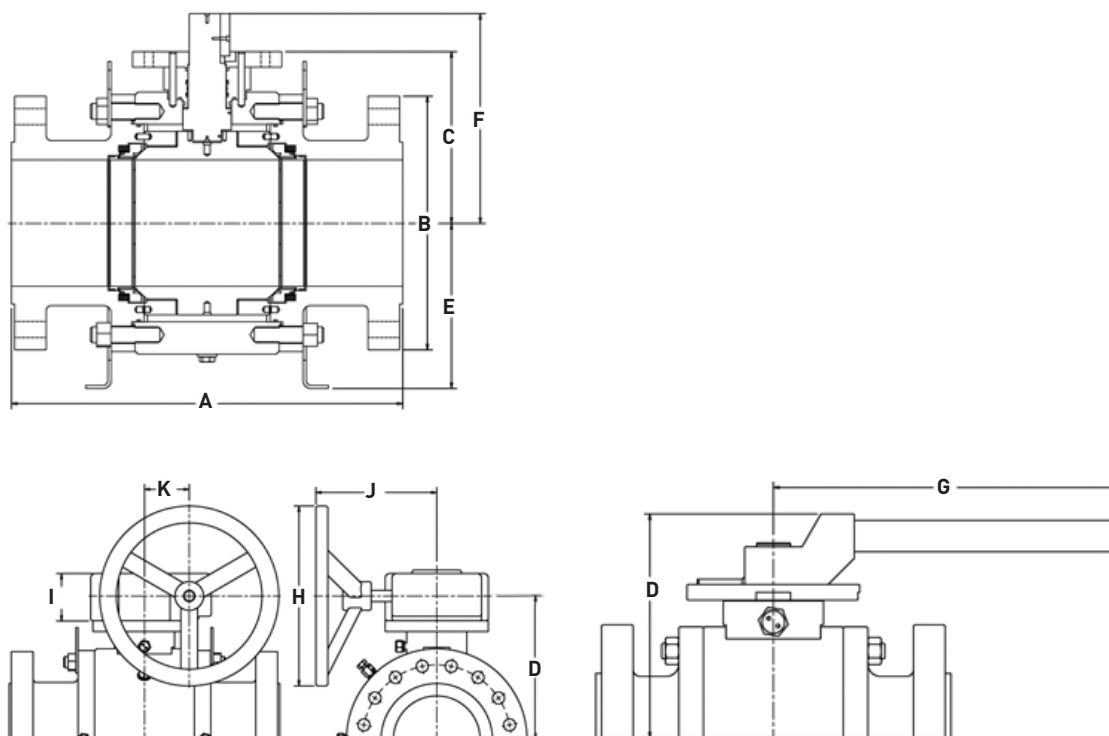
NOTES

Consult factory for sizes not shown

* Consult factory for dimensions

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE



DIMENSIONS - ANSI 300 (dimensions in inches)

| Size | A-RF | A-RTJ | B | C | D | E | F | G | H | I | J | K | Approx weights (lb) | | |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|-------|---------------------|----------------|------|
| | | | | | | | | | | | | | Bare stem | Lever operator | Gear |
| 2 | 8.50 | 9.13 | 6.50 | 6.02 | 9.82 | 4.05 | 7.45 | 11.00 | - | - | - | - | 65 | 4.0 | - |
| 3 x 2 | 11.13 | 11.75 | 8.25 | 6.02 | 9.82 | 4.05 | 7.45 | 11.00 | - | - | - | - | 76 | 4.0 | - |
| 3 | 11.13 | 11.75 | 8.25 | 6.67 | 9.67 | 4.51 | 8.93 | 34.63 | - | - | - | - | 116 | 14.1 | - |
| 4 x 3 | 12.00 | 12.63 | 10.00 | 6.67 | 9.67 | 4.51 | 8.93 | 34.63 | - | - | - | - | 135 | 14.1 | - |
| 4 | 12.00 | 12.63 | 10.00 | 7.42 | 11.92 | 5.39 | 9.68 | 46.63 | - | - | - | - | 168 | 16.7 | - |
| 6 x 4 | 15.88 | 16.50 | 12.60 | 7.42 | 11.92 | 5.39 | 9.68 | 46.63 | - | - | - | - | 201 | 16.7 | - |
| 6 | 15.88 | 16.50 | 12.60 | 8.93 | 11.00 | - | 11.64 | - | 18 | 4.31 | 10.20 | 3.54 | 398 | - | 40 |
| 8 x 6 | 19.75 | 20.38 | 15.00 | 8.93 | 11.00 | - | 11.64 | - | 18 | 4.31 | 10.20 | 3.54 | 463 | - | 40 |
| 8 | 19.75 | 20.38 | 15.00 | 10.63 | 12.78 | 10.50 | 13.39 | - | 18 | 4.31 | 10.20 | 3.54 | 736 | - | 47 |
| 10 x 8 | 22.38 | 23.00 | 17.50 | 10.63 | 12.78 | 10.50 | 13.39 | - | 18 | 4.31 | 10.20 | 3.54 | 806 | - | 47 |
| 10 | 22.38 | 23.00 | 17.50 | 12.58 | 14.47 | 12.64 | 15.22 | - | 20 | 4.57 | 17.25 | 5.50 | 1039 | - | 64 |
| 12 x 10 | 25.50 | 26.13 | 20.50 | 12.58 | 14.47 | 12.64 | 15.22 | - | 20 | 4.57 | 17.25 | 5.50 | 1136 | - | 64 |
| 12 | 25.50 | 26.13 | 20.50 | 14.33 | 16.62 | 14.60 | 16.97 | - | 20 | 4.57 | 17.25 | 5.50 | 1668 | - | 64 |
| 14 x 12 | 30.00 | 30.63 | 23.00 | 14.33 | 16.62 | 14.60 | 16.97 | - | 20 | 4.57 | 17.25 | 5.50 | 1807 | - | 64 |
| 14 | 30.00 | 30.63 | 23.00 | 15.11 | 17.96 | 16.73 | 19.42 | - | 26 | 5.71 | 18.70 | 5.00 | 2262 | - | 106 |
| 16 x 12 | 33.00 | 33.63 | 25.60 | 14.33 | 16.62 | 14.60 | 16.97 | - | 20 | 4.57 | 17.25 | 5.50 | 1956 | - | 64 |
| 16 x 14 | 33.00 | 33.63 | 25.60 | 15.11 | 17.96 | 16.73 | 19.42 | - | 26 | 5.71 | 18.70 | 5.00 | 2414 | - | 106 |
| 16 | 33.00 | 33.63 | 25.60 | 17.15 | 19.69 | 17.25 | 22.00 | - | 24 | 5.08 | 18.70 | 5.00 | 3142 | - | 102 |
| 18 | 36.00 | 36.63 | 28.00 | 19.85 | 23.15 | 19.13 | 24.63 | - | 30 | 6.61 | 21.70 | 6.38 | * | - | * |
| 20 x 16 | 39.00 | 39.75 | 30.50 | 17.15 | 19.69 | 17.25 | 22.00 | - | 24 | 5.08 | 18.70 | 5.00 | 3506 | - | 102 |
| 20 | 39.00 | 39.75 | 30.50 | 21.38 | 24.70 | 22.84 | 25.70 | - | 30 | 6.61 | 21.70 | 10.70 | 5730 | - | 227 |
| 24 x 20 | 45.00 | 45.88 | 36.00 | 21.38 | 24.70 | 22.84 | 25.70 | - | 30 | 6.61 | 21.70 | 10.70 | 6204 | - | 227 |
| 24 | 45.00 | 45.88 | 36.00 | 25.04 | 29.06 | 27.45 | 30.02 | - | 30 | 8.03 | 26.30 | 8.07 | 9496 | - | 397 |
| 30 x 24 | 55.00 | 56.00 | 43.00 | 25.04 | 29.06 | 27.45 | 30.02 | - | 30 | 8.03 | 26.30 | 8.07 | 10491 | - | 397 |
| 30 | 55.00 | 56.00 | 43.00 | 31.99 | 36.50 | 29.87 | 38.05 | - | 32 | 9.02 | 27.50 | 9.09 | 17683 | - | 540 |
| 36 x 30 | 68.00 | 69.13 | 50.00 | 31.99 | 36.50 | 29.87 | 38.05 | - | 32 | 9.02 | 27.50 | 9.09 | 19318 | - | 540 |
| 36 | 68.00 | 69.13 | 50.00 | 36.36 | * | 33.77 | 42.42 | - | * | * | * | * | 29188 | - | * |

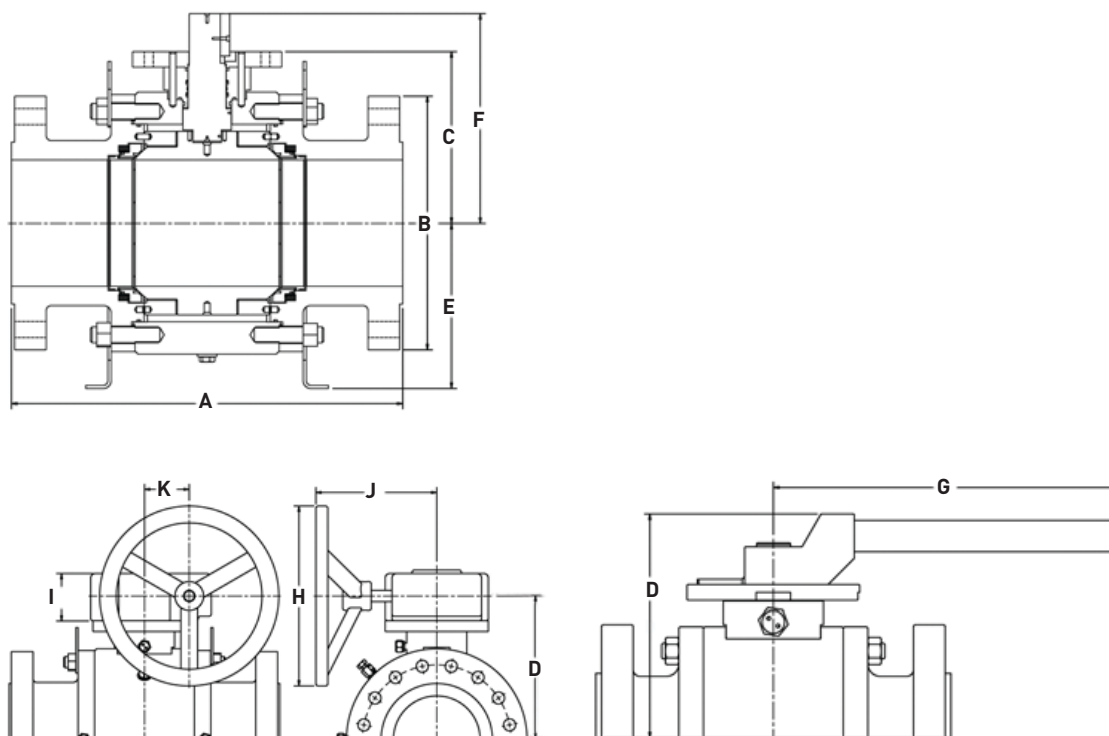
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KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE



DIMENSIONS - ANSI 600 (dimensions in inches)

| Size | A-RF | A-RTJ | B | C | D | E | F | G | H | I | J | K | Approx weights (lb) | | |
|---------|------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|------|---------------------|----------------|------|
| | | | | | | | | | | | | | Bare stem | Lever operator | Gear |
| 2 | 11.5 | 11.61 | 6.50 | 5.30 | 8.30 | 3.80 | 6.67 | 17.00 | - | - | - | - | 82 | 4.7 | - |
| 3 x 2 | 14.0 | 14.13 | 8.25 | 5.30 | 8.30 | 3.80 | 6.67 | 17.00 | - | - | - | - | 101 | 4.7 | - |
| 3 | 14.0 | 14.13 | 8.25 | 6.44 | 10.94 | 4.52 | 8.68 | 34.63 | - | - | - | - | 154 | 14.1 | - |
| 4 x 3 | 17.0 | 17.13 | 10.83 | 6.44 | 10.94 | 4.52 | 8.68 | 34.63 | - | - | - | - | 197 | 14.1 | - |
| 4 | 17.0 | 17.13 | 10.83 | 7.30 | 9.30 | 5.85 | 9.30 | 46.63 | 16 | 3.94 | 11.40 | 2.75 | 294 | 16.4 | 33 |
| 6 x 4 | 22.0 | 22.13 | 14.00 | 7.30 | 9.30 | 5.85 | 9.30 | 46.63 | 16 | 3.94 | 11.40 | 2.75 | 378 | 16.4 | 33 |
| 6 | 22.0 | 22.13 | 14.00 | 9.07 | 11.00 | 9.85 | 11.76 | - | 18 | 4.31 | 10.20 | 3.54 | 579 | - | 47 |
| 8 x 6 | 26.0 | 26.14 | 16.50 | 9.07 | 11.00 | 9.85 | 11.76 | - | 18 | 4.31 | 10.20 | 3.54 | 674 | - | 47 |
| 8 | 26.0 | 26.14 | 16.50 | 11.51 | 13.80 | 11.81 | 14.15 | - | 20 | 4.57 | 17.25 | 5.50 | 1016 | - | 64 |
| 10 x 8 | 31.0 | 31.14 | 20.00 | 11.51 | 13.80 | 11.81 | 14.15 | - | 20 | 4.57 | 17.25 | 5.50 | 1186 | - | 64 |
| 10 | 31.0 | 31.14 | 20.00 | 13.53 | 16.39 | 13.06 | 16.53 | - | 26 | 5.71 | 18.70 | 5.00 | 1582 | - | 106 |
| 12 x 10 | 33.0 | 33.11 | 22.00 | 13.53 | 16.39 | 13.06 | 16.53 | - | 26 | 5.71 | 18.70 | 5.00 | 1678 | - | 106 |
| 12 | 33.0 | 33.11 | 22.00 | 15.45 | 18.31 | 14.82 | 19.03 | - | 26 | 5.71 | 18.70 | 5.00 | 2303 | - | 106 |
| 14 x 12 | 35.0 | 35.12 | 23.82 | 15.45 | 18.31 | 14.82 | 19.03 | - | 26 | 5.71 | 18.70 | 5.00 | 2418 | - | 106 |
| 14 | 35.0 | 35.12 | 23.82 | 17.01 | 20.30 | 17.63 | 19.42 | - | 30 | 6.61 | 21.70 | 5.00 | 3006 | - | 227 |
| 16 x 12 | 39.0 | 39.13 | 27.00 | 15.45 | 18.31 | 14.82 | 19.03 | - | 26 | 5.71 | 18.70 | 5.00 | 2676 | - | 106 |
| 16 x 14 | 39.0 | 39.13 | 27.00 | 17.01 | 20.30 | 17.63 | 19.42 | - | 30 | 6.61 | 21.70 | 5.00 | 3313 | - | 227 |
| 16 | 39.0 | 39.13 | 27.00 | 18.92 | 22.25 | 18.06 | 23.46 | - | 30 | 6.61 | 21.70 | 5.00 | 4264 | - | 227 |
| 18 | 43.0 | 43.11 | 29.25 | 21.22 | 25.22 | 22.27 | 26.20 | - | 30 | 8.03 | 26.30 | 8.07 | * | - | * |
| 20 x 16 | 47.0 | 47.24 | 32.00 | 18.92 | 22.25 | 18.06 | 23.46 | - | 30 | 6.61 | 21.70 | 5.00 | 4880 | - | 227 |
| 20 | 47.0 | 47.24 | 32.00 | 22.70 | 26.70 | 22.59 | 27.70 | - | 30 | 8.03 | 26.30 | 8.07 | 7672 | - | 397 |
| 24 x 20 | 55.0 | 55.39 | 37.00 | 22.70 | 26.70 | 22.59 | 27.70 | - | 30 | 8.03 | 26.30 | 8.07 | 8255 | - | 397 |
| 24 | 55.0 | 55.39 | 37.00 | 28.25 | 33.07 | 29.86 | 34.31 | - | 32 | 9.02 | 27.50 | 9.09 | 12771 | - | 540 |
| 30 x 24 | 65.0 | 65.51 | 44.50 | 28.25 | 33.07 | 29.86 | 34.31 | - | 32 | 9.02 | 27.50 | 9.09 | 14276 | - | 540 |
| 30 | 65.0 | 65.51 | 44.50 | 33.60 | * | 34.43 | 39.66 | - | * | * | * | * | 24232 | - | * |
| 36 x 30 | 82.0 | 82.64 | 51.75 | 33.60 | * | 34.43 | 39.66 | - | * | * | * | * | 26315 | - | * |
| 36 | 82.0 | 82.64 | 51.75 | 38.33 | * | 38.48 | 44.39 | - | * | * | * | * | 40552 | - | * |

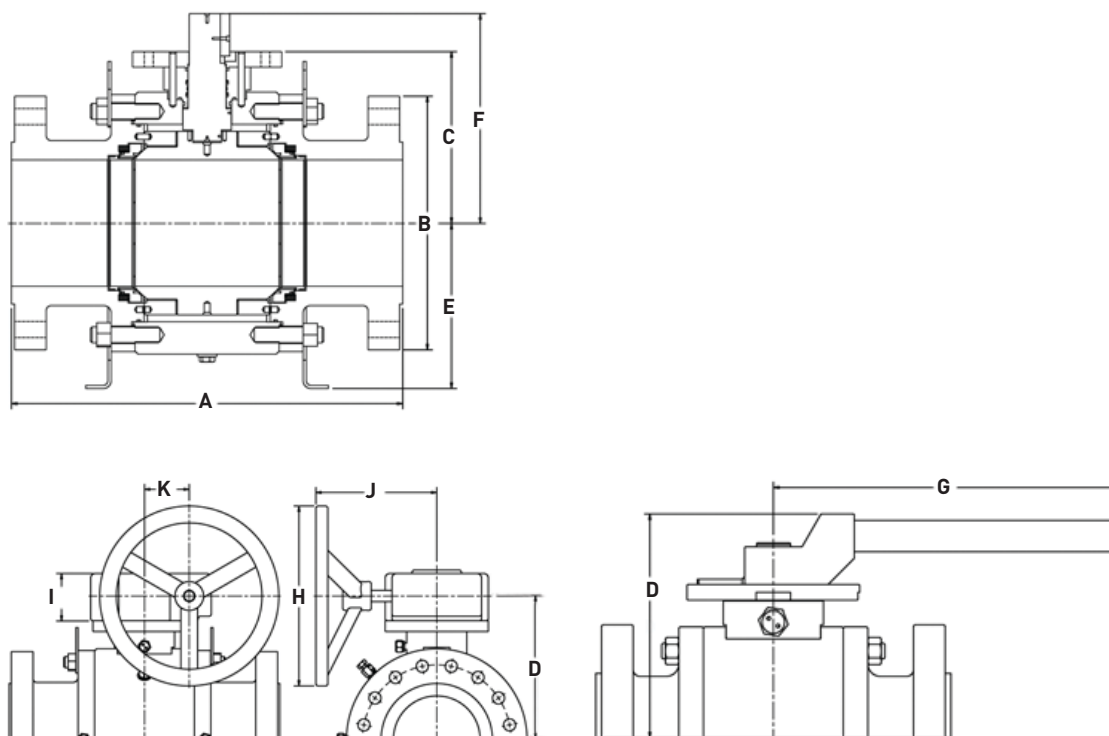
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* Consult factory for dimensions

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE



DIMENSIONS - ANSI 900 (dimensions in inches)

| Size | A-RF | A-RTJ | B | C | D | E | F | G | H | I | J | K | Approx weights (lb) | | |
|---------|------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|------|---------------------|----------------|------|
| | | | | | | | | | | | | | Bare stem | Lever operator | Gear |
| 2 | 14.5 | 14.63 | 8.50 | 7.29 | 10.29 | 5.50 | 8.08 | 34.63 | - | - | - | - | 139 | 14.1 | - |
| 3 x 2 | 15.0 | 15.13 | 9.50 | 7.29 | 10.29 | 5.50 | 8.08 | 34.63 | - | - | - | - | 154 | 14.1 | - |
| 3 | 15.0 | 15.13 | 9.50 | 7.50 | 12.02 | 5.90 | 9.63 | 46.63 | - | - | - | - | 220 | 16.4 | - |
| 4 x 3 | 18.0 | 18.13 | 11.50 | 7.50 | 12.02 | 5.90 | 9.63 | 46.63 | - | - | - | - | 299 | 16.4 | - |
| 4 | 18.0 | 18.13 | 11.50 | 8.79 | 10.76 | 7.20 | 10.78 | - | 16 | 3.94 | 11.40 | 2.75 | 360 | 16.4 | 33 |
| 6 x 4 | 24.0 | 24.13 | 15.00 | 8.79 | 10.76 | 7.20 | 10.78 | - | 16 | 3.94 | 11.40 | 2.75 | 477 | 16.4 | 33 |
| 6 | 24.0 | 24.13 | 15.00 | 10.34 | 12.63 | 10.00 | 12.98 | - | 20 | 4.57 | 17.25 | 5.50 | 661 | - | 64 |
| 8 x 6 | 29.0 | 29.13 | 18.50 | 10.34 | 12.63 | 10.00 | 12.98 | - | 20 | 4.57 | 17.25 | 5.50 | 813 | - | 64 |
| 8 | 29.0 | 29.13 | 18.50 | 12.83 | 15.70 | 12.00 | 15.86 | - | 26 | 5.71 | 18.70 | 5.00 | 1180 | - | 106 |
| 10 x 8 | 33.0 | 33.13 | 21.50 | 12.83 | 15.70 | 12.00 | 15.86 | - | 26 | 5.71 | 18.70 | 5.00 | 1366 | - | 106 |
| 10 | 33.0 | 33.13 | 21.50 | 14.18 | 16.72 | 14.00 | 19.15 | - | 24 | 5.08 | 18.70 | 5.00 | 2075 | - | 102 |
| 12 x 10 | 38.0 | 38.13 | 24.00 | 14.18 | 16.72 | 14.00 | 19.15 | - | 24 | 5.08 | 18.70 | 5.00 | 2316 | - | 102 |
| 12 | 38.0 | 38.13 | 24.00 | 16.97 | 20.06 | 17.41 | 21.46 | - | 24 | 6.18 | 20.91 | 5.79 | 3648 | - | 227 |
| 14 x 12 | 40.5 | 40.88 | 25.20 | 16.97 | 20.06 | 17.41 | 21.46 | - | 24 | 6.18 | 20.91 | 5.79 | 3773 | - | 227 |
| 14 | 40.5 | 40.88 | 25.20 | 19.57 | 23.00 | 18.50 | 24.10 | - | 28 | 6.85 | 24.00 | 6.38 | 4773 | - | 397 |
| 16 x 12 | 44.5 | 44.88 | 27.75 | 16.97 | 20.30 | 17.41 | 21.46 | - | 26 | 6.18 | 20.91 | 5.79 | 4034 | - | 227 |
| 16 x 14 | 44.5 | 44.88 | 27.75 | 19.57 | 23.00 | 18.50 | 24.10 | - | 28 | 6.85 | 22.50 | 6.38 | 5035 | - | 397 |
| 16 | 44.5 | 44.88 | 27.75 | 20.83 | 25.00 | 22.88 | 25.81 | - | 30 | 8.00 | 26.27 | 8.07 | 6862 | - | 397 |
| 18 | 48.0 | 48.50 | 31.00 | * | * | * | * | - | * | * | * | * | * | - | * |
| 20 x 16 | 52.0 | 52.50 | 33.75 | 20.83 | 25.00 | 22.88 | 25.81 | - | 30 | 8.00 | 26.27 | 8.07 | 7758 | - | 397 |
| 20 | 52.0 | 52.50 | 33.75 | 26.12 | 30.62 | 25.86 | 32.18 | - | 32 | 9.02 | 27.40 | 9.09 | 12145 | - | 540 |
| 24 x 20 | 61.0 | 61.75 | 41.00 | 26.12 | 30.62 | 25.86 | 32.18 | - | 32 | 9.02 | 27.40 | 9.09 | 13815 | - | 540 |
| 24 | 61.0 | 61.75 | 41.00 | 30.22 | 34.50 | 30.28 | 36.26 | - | 32 | 9.02 | 27.40 | 9.09 | 19622 | - | * |
| 30 x 24 | 74.0 | 74.88 | 48.50 | 30.22 | 34.50 | 30.28 | 36.26 | - | 32 | 9.02 | 27.40 | 9.09 | 21907 | - | * |
| 30 | 74.0 | 74.88 | 48.50 | * | * | * | * | - | * | * | * | * | * | - | * |
| 36 x 30 | 90.0 | 91.13 | 57.50 | * | * | * | * | - | * | * | * | * | * | - | * |
| 36 | 82.0 | 82.64 | 51.75 | * | * | * | * | - | * | * | * | * | * | - | * |

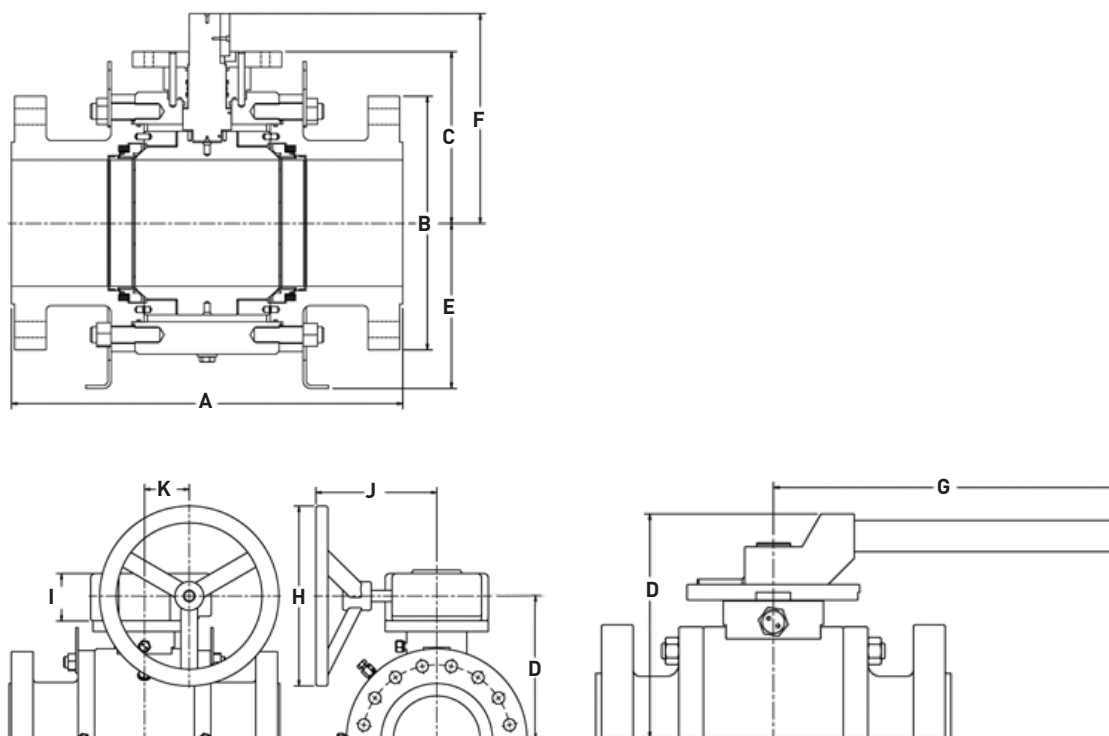
NOTES

Consult factory for sizes not shown

* Consult factory for dimensions

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE



DIMENSIONS - ANSI 1500 (dimensions in inches)

| Size | A-RF | A-RTJ | B | C | D | E | F | G | H | I | J | K | Approx weights (lb) | | |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|------|---------------------|----------------|------|
| | | | | | | | | | | | | | Bare stem | Lever operator | Gear |
| 2 | 14.50 | 14.63 | 8.50 | 7.89 | 10.29 | 5.51 | 9.96 | 46.63 | - | - | - | - | 158.4 | 14.1 | - |
| 3 x 2 | 18.50 | 18.63 | 10.50 | 7.89 | 10.29 | 5.51 | 9.96 | 46.63 | - | - | - | - | 198.0 | 14.1 | - |
| 3 | 18.50 | 18.63 | 10.50 | 7.99 | 9.96 | 4.60 | 10.10 | - | 16 | 3.94 | 11.40 | 2.75 | 242.0 | - | 33 |
| 4 x 3 | 21.50 | 21.63 | 12.20 | 7.99 | 9.96 | 4.60 | 10.10 | - | 16 | 3.94 | 11.40 | 2.75 | 338.8 | - | 33 |
| 4 | 21.50 | 21.63 | 12.20 | 8.91 | 11.07 | 7.34 | 11.50 | - | 18 | 4.31 | 10.20 | 3.54 | 539.0 | - | 47 |
| 6 x 4 | 27.75 | 28.00 | 15.50 | 8.91 | 11.07 | 7.34 | 11.50 | - | 18 | 4.31 | 10.20 | 3.54 | 722.0 | - | 47 |
| 6 | 27.75 | 28.00 | 15.50 | 13.06 | 15.92 | 12.50 | 16.65 | - | 26 | 5.71 | 18.70 | 5.00 | 1150.0 | - | 64 |
| 8 x 6 | 32.75 | 33.13 | 19.00 | 13.06 | 15.92 | 12.50 | 16.65 | - | 26 | 5.71 | 18.70 | 5.00 | 1393.0 | - | 64 |
| 8 | 32.75 | 33.13 | 19.00 | 14.80 | 17.66 | 14.82 | 18.61 | - | 26 | 5.71 | 18.70 | 5.00 | 2275.0 | - | 106 |
| 10 x 8 | 39.00 | 39.38 | 23.00 | 14.80 | 17.66 | 14.82 | 18.61 | - | 26 | 5.71 | 18.70 | 5.00 | 2684.0 | - | 106 |
| 10 | 39.00 | 39.38 | 23.00 | * | * | * | * | - | * | * | * | * | * | - | 102 |
| 12 x 10 | 44.50 | 45.13 | 26.50 | * | * | * | * | - | * | * | * | * | * | - | 102 |
| 12 | 44.50 | 45.13 | 26.50 | * | * | * | * | - | * | * | * | * | * | - | 227 |
| 14 x 12 | 49.50 | 50.25 | 29.50 | * | * | * | * | - | * | * | * | * | * | - | 227 |
| 14 | 49.50 | 50.25 | 29.50 | * | * | * | * | - | * | * | * | * | * | - | * |
| 16 x 12 | 54.50 | 55.38 | 32.50 | * | * | * | * | - | * | * | * | * | * | - | 227 |
| 16 x 14 | 54.50 | 55.38 | 32.50 | * | * | * | * | - | * | * | * | * | * | - | * |
| 16 | 54.50 | 55.38 | 32.50 | * | * | * | * | - | * | * | * | * | * | - | * |
| 18 | 60.50 | 61.38 | 36.00 | * | * | * | * | - | * | * | * | * | * | - | * |
| 20 x 16 | 65.50 | 66.38 | 38.75 | * | * | * | * | - | * | * | * | * | * | - | * |
| 20 | 65.50 | 66.38 | 38.75 | * | * | * | * | - | * | * | * | * | * | - | * |
| 24 x 20 | 80.43 | 81.54 | 46.00 | * | * | * | * | - | * | * | * | * | * | - | * |
| 24 | 80.43 | 81.54 | 46.00 | * | * | * | * | - | * | * | * | * | * | - | * |

NOTES

Consult factory for sizes not shown

* Consult factory for dimensions

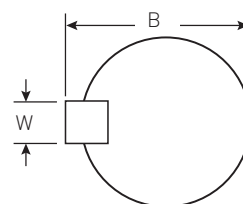
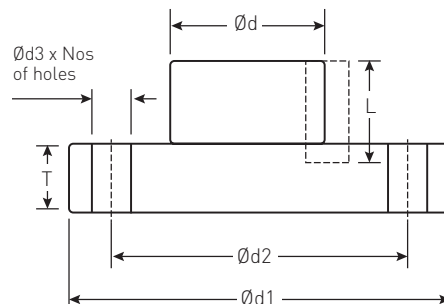
Dimensions - ANSI 2500 Consult factory

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

TOP WORKS (dimensions in inches)

| FP | RP | Class | D | ISO 5211 | D1 | D2 | D3 | T | Holes | W | b | L |
|----|---------|----------|------|----------|-------|-------|------|------|-------|------|------|------|
| 2 | 3 x 2 | 150-300 | 0.87 | F10 | 4.92 | 4.02 | 0.47 | 0.79 | 4 | 0.25 | 0.99 | 1.77 |
| | 3 x 2 | 600 | 0.87 | F12 | 5.90 | 4.92 | 0.55 | 0.79 | 4 | 0.25 | 0.99 | 1.77 |
| | 3 x 2 | 900-1500 | 1.42 | F14 | 6.89 | 5.51 | 0.71 | 0.79 | 4 | 0.38 | 1.61 | 2.36 |
| 3 | 4 x 3 | 150 | 0.87 | F10 | 4.92 | 4.02 | 0.47 | 0.79 | 4 | 0.25 | 0.99 | 1.77 |
| | 4 x 3 | 300-600 | 1.42 | F14 | 6.89 | 5.51 | 0.71 | 0.79 | 4 | 0.38 | 1.60 | 2.36 |
| | 4 x 3 | 900 | 1.65 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.38 | 1.84 | 2.36 |
| | 4 x 3 | 1500 | 1.65 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.38 | 1.84 | 2.36 |
| 4 | 6 x 4 | 150 | 1.42 | F14 | 6.89 | 5.51 | 0.71 | 0.79 | 4 | 0.38 | 1.60 | 2.36 |
| | 6 x 4 | 300 | 1.42 | F14 | 6.89 | 5.51 | 0.71 | 0.79 | 4 | 0.38 | 1.60 | 2.36 |
| | 6 x 4 | 600 | 1.65 | F16 | 8.27 | 6.50 | 0.87 | 0.75 | 4 | 0.38 | 1.84 | 2.36 |
| | 6 x 4 | 900 | 1.65 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.38 | 1.84 | 2.36 |
| | 6 x 4 | 1500 | 1.89 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.50 | 2.14 | 3.03 |
| 6 | 8 x 6 | 150 | 1.65 | F16 | 8.27 | 6.50 | 0.87 | 0.75 | 4 | 0.38 | 1.84 | 2.36 |
| | 8 x 6 | 300-600 | 1.89 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.50 | 2.14 | 3.03 |
| | 8 x 6 | 900 | 2.36 | F25 | 11.81 | 10.00 | 0.71 | 1.16 | 8 | 0.63 | 2.67 | 3.15 |
| | 8 x 6 | 1500 | 2.36 | F25 | 11.81 | 10.00 | 0.71 | 1.16 | 8 | 0.63 | 2.67 | 3.15 |
| 8 | 10 x 8 | 150 | 1.89 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.50 | 2.14 | 3.15 |
| | 10 x 8 | 300 | 1.89 | F16 | 8.27 | 6.50 | 0.87 | 0.91 | 4 | 0.50 | 2.14 | 3.03 |
| | 10 x 8 | 600 | 2.36 | F25 | 11.81 | 10.00 | 0.71 | 1.16 | 8 | 0.63 | 2.67 | 3.15 |
| | 10 x 8 | 900 | 2.83 | F25 | 11.81 | 10.00 | 0.71 | 1.22 | 8 | 0.75 | 3.21 | 3.35 |
| | 10 x 8 | 1500 | 3.15 | F25 | 11.81 | 10.00 | 0.71 | 1.50 | 8 | 0.75 | 3.52 | 4.72 |
| 10 | 12 x 10 | 150-300 | 2.36 | F25 | 11.81 | 10.00 | 0.71 | 1.16 | 8 | 0.63 | 2.67 | 3.15 |
| | 12 x 10 | 600 | 2.83 | F25 | 11.81 | 10.00 | 0.71 | 1.22 | 8 | 0.75 | 3.21 | 3.35 |
| | 12 x 10 | 900 | 3.15 | F25 | 11.81 | 10.00 | 0.71 | 1.37 | 8 | 0.75 | 3.52 | 5.71 |
| 12 | 16 x 12 | 150-300 | 2.36 | F25 | 11.81 | 10.00 | 0.71 | 1.16 | 8 | 0.63 | 2.67 | 3.15 |
| | 16 x 12 | 600 | 2.83 | F25 | 11.81 | 10.00 | 0.71 | 1.43 | 8 | 0.75 | 3.21 | 3.35 |
| | 16 x 12 | 900 | 3.86 | F30 | 13.78 | 11.73 | 0.87 | 1.18 | 8 | 1.00 | 4.36 | 4.92 |
| 14 | 16 x 14 | 150-300 | 2.83 | F25 | 11.81 | 10.00 | 0.71 | 1.10 | 8 | 0.75 | 3.21 | 5.02 |
| | 16 x 14 | 600 | 3.86 | F30 | 13.78 | 11.73 | 0.87 | 1.50 | 8 | 1.00 | 4.36 | 4.92 |
| | 16 x 14 | 900 | 3.94 | F35 | 16.34 | 14.00 | 1.30 | 1.50 | 8 | 1.00 | 4.44 | 6.50 |
| 16 | 20 x 16 | 150 | 2.83 | F25 | 11.81 | 10.00 | 0.71 | 1.10 | 8 | 0.75 | 3.21 | 4.72 |
| | 20 x 16 | 300 | 3.15 | F25 | 11.81 | 10.00 | 0.71 | 1.37 | 8 | 0.75 | 3.52 | 5.71 |
| | 20 x 16 | 600 | 3.86 | F30 | 13.78 | 11.73 | 0.87 | 1.62 | 8 | 1.00 | 4.36 | 5.31 |
| | 20 x 16 | 900 | 4.72 | F35 | 16.34 | 14.02 | 1.26 | 1.77 | 8 | 1.25 | 5.35 | 5.83 |
| 20 | 24 x 20 | 150 | 3.86 | F30 | 13.78 | 11.73 | 0.87 | 1.50 | 8 | 1.00 | 4.36 | 4.92 |
| | 24 x 20 | 300 | 3.86 | F30 | 13.78 | 11.73 | 0.87 | 1.50 | 8 | 1.00 | 4.36 | 4.92 |
| | 24 x 20 | 600 | 4.72 | F35 | 16.34 | 14.02 | 1.26 | 1.77 | 8 | 1.25 | 5.35 | 5.83 |
| | 24 x 20 | 900 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.25 | 7.55 | 7.20 |
| 24 | 30 x 24 | 150-300 | 4.72 | F35 | 16.34 | 14.02 | 1.26 | 1.77 | 8 | 1.25 | 5.35 | 5.83 |
| | 30 x 24 | 600 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.25 | 7.55 | 7.20 |
| | 30 x 24 | 900 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.50 | 7.80 | 7.00 |
| 30 | 36 x 30 | 150 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.50 | 7.80 | 7.00 |
| | 36 x 30 | 300 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.50 | 7.80 | 7.00 |
| | 36 x 30 | 600 | 6.30 | F48 | 22.05 | 19.02 | 1.50 | 2.11 | 12 | 1.50 | 7.80 | 7.00 |
| 36 | - | 150 | 6.30 | F40 | 18.70 | 15.98 | 1.50 | 2.11 | 8 | 1.50 | 7.80 | 7.00 |
| | - | 300 | 6.30 | F48 | 22.05 | 19.02 | 1.50 | 2.11 | 12 | 1.50 | 7.80 | 7.00 |
| | - | 600 | 6.30 | F48 | 22.05 | 19.02 | 1.50 | 2.11 | 12 | 1.50 | 7.80 | 7.00 |



NOTES

Consult factory for sizes not shown

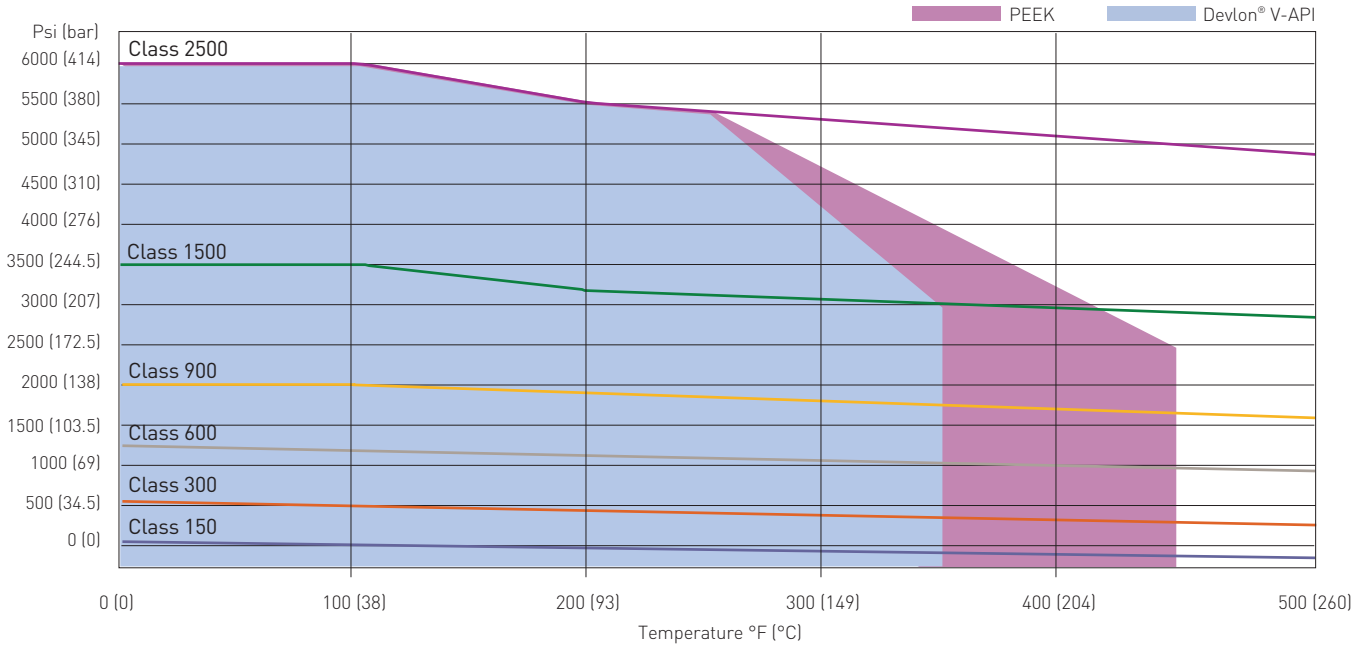
* Consult factory for dimensions

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

PERFORMANCE

PRESSURE/TEMPERATURE CHART



C_v FLOW COEFFICIENTS (USGPM)

| Size | CL 150 | CL 300 | CL 600 | CL 900 | CL 1500 | CL 2500 |
|---------|--------|--------|--------|--------|---------|---------|
| 2 | 420 | 420 | 400 | 330 | 330 | 250 |
| 3 x 2 | 200 | 200 | 200 | 190 | 180 | 200 |
| 3 | 1200 | 1050 | 1000 | 910 | 810 | 465 |
| 4 x 3 | 600 | 600 | 600 | 590 | 550 | 560 |
| 4 | 2200 | 2100 | 1850 | 1800 | 1700 | 1100 |
| 6 x 4 | 800 | 800 | 790 | 790 | 780 | 745 |
| 6 | 5150 | 5100 | 4600 | 4380 | 3800 | 2500 |
| 8 x 6 | 2150 | 2150 | 2150 | 2150 | 2150 | 2150 |
| 8 | 9500 | 9400 | 9000 | 8500 | 7400 | 5300 |
| 10 x 8 | 4300 | 4300 | 4300 | 4300 | 3800 | 2500 |
| 10 | 15000 | 15000 | 14700 | 14500 | 11500 | 8300 |
| 12 x 10 | 7550 | 7550 | 7550 | 8000 | 9000 | 7550 |
| 12 | 23000 | 23000 | 22500 | 21100 | 18000 | 13000 |
| 14 x 12 | 14000 | 14000 | 14000 | 12800 | 12800 | - |
| 16 x 12 | 9100 | 9100 | 9100 | 8900 | 8900 | - |
| 14 | 28000 | 28000 | 28000 | 25000 | 21000 | - |
| 16 | 37200 | 37200 | 37200 | 34500 | 27500 | - |
| 18 x 16 | 21000 | 21000 | 21000 | 19200 | 19000 | - |
| 20 x 16 | 15300 | 15300 | 15300 | 13800 | 12000 | - |
| 18 | 49000 | 49000 | 49000 | 45000 | 37000 | - |
| 20 | 59000 | 59000 | 59000 | 55200 | 47800 | - |
| 24 x 20 | 28200 | 28200 | 28000 | 25100 | 20600 | - |
| 24 | 92000 | 92000 | 92000 | 83800 | 70000 | - |
| 30 x 24 | 36000 | 36000 | 36000 | 32900 | - | - |
| 30 | 145000 | 145000 | 144000 | 130000 | - | - |
| 36 x 30 | 164000 | 164000 | 164000 | 161500 | - | - |
| 36 | 210000 | 210000 | 210000 | 198200 | - | - |

NOTES

Consult factory for sizes not shown

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

TORQUE VALUES

| Pressure class | Size NPS (DN) | Torque type (lbf-in) | | | | |
|----------------|---------------|----------------------|--------|--------|--------|--------|
| | | BTO | RUN | ETO | BTC | ETC |
| 150 | 2 (50) | 468 | 211 | 304 | 398 | 375 |
| | 3 (80) | 794 | 357 | 516 | 674 | 635 |
| | 4 (100) | 1412 | 635 | 918 | 1200 | 1129 |
| | 6 (150) | 4513 | 2031 | 2934 | 3836 | 3610 |
| | 8 (200) | 5268 | 2370 | 3424 | 4477 | 4214 |
| | 10 (250) | 10001 | 4500 | 6501 | 8501 | 8001 |
| | 12 (300) | 12001 | 5400 | 7800 | 10201 | 9600 |
| | 14 (350) | 21791 | 9806 | 14164 | 18522 | 17432 |
| | 16 (400) | 23511 | 10580 | 15282 | 19984 | 18809 |
| | 18 (450) | 39406 | 17733 | 25614 | 33495 | 31525 |
| | 20 (500) | 50008 | 22503 | 32505 | 42506 | 40006 |
| | 24 (600) | 62150 | 27968 | 40398 | 52828 | 49720 |
| 30 (750) | 86400 | 38880 | 56160 | 73440 | 69120 | |
| 300 | 2 (50) | 576 | 259 | 374 | 490 | 461 |
| | 3 (80) | 1037 | 467 | 674 | 881 | 829 |
| | 4 (100) | 1921 | 865 | 1249 | 1633 | 1537 |
| | 6 (150) | 4670 | 2101 | 3035 | 3969 | 3736 |
| | 8 (200) | 5520 | 2484 | 3588 | 4692 | 4416 |
| | 10 (250) | 16001 | 7200 | 10401 | 13601 | 12801 |
| | 12 (300) | 16668 | 7501 | 10834 | 14168 | 13334 |
| | 14 (350) | 28786 | 12954 | 18711 | 24468 | 23029 |
| | 16 (400) | 31406 | 14133 | 20414 | 26695 | 25125 |
| | 18 (450) | 53998 | 24299 | 35098 | 45898 | 43198 |
| | 20 (500) | 58415 | 26287 | 37970 | 49653 | 46732 |
| | 24 (600) | 79541 | 35793 | 51701 | 67609 | 63632 |
| 30 (750) | 158096 | 71143 | 102762 | 134381 | 126476 | |
| 600 | 2 (50) | 1172 | 528 | 762 | 997 | 938 |
| | 3 (80) | 1980 | 891 | 1287 | 1683 | 1584 |
| | 4 (100) | 3737 | 1682 | 2429 | 3176 | 2989 |
| | 6 (150) | 6445 | 2900 | 4190 | 5479 | 5156 |
| | 8 (200) | 13674 | 6153 | 8888 | 11623 | 10939 |
| | 10 (250) | 16652 | 7494 | 10824 | 14155 | 13322 |
| | 12 (300) | 23288 | 10479 | 15137 | 19795 | 18630 |
| | 14 (350) | 44999 | 20249 | 29249 | 38249 | 35999 |
| | 16 (400) | 47176 | 21229 | 30664 | 40099 | 37741 |
| | 18 (450) | 92208 | 41494 | 59935 | 78377 | 73766 |
| | 20 (500) | 94631 | 42584 | 61510 | 80436 | 75705 |
| | 24 (600) | 137579 | 61911 | 89426 | 116942 | 110063 |
| 30 (750) | 213433 | 96045 | 138731 | 181418 | 170746 | |
| 900 | 2 (50) | 2045 | 920 | 1329 | 1738 | 1636 |
| | 3 (80) | 2987 | 1344 | 1941 | 2539 | 2389 |
| | 4 (100) | 5193 | 2337 | 3375 | 4414 | 4154 |
| | 6 (150) | 8765 | 3944 | 5697 | 7450 | 7012 |
| | 8 (200) | 16192 | 7286 | 10525 | 13763 | 12953 |
| | 10 (250) | 36080 | 16236 | 23452 | 30668 | 28864 |
| | 12 (300) | 53962 | 24283 | 35075 | 45867 | 43169 |
| | 14 (350) | 76968 | 34636 | 50029 | 65423 | 61575 |
| | 16 (400) | 127831 | 57524 | 83090 | 108657 | 102265 |
| | 20 (500) | 204700 | 92115 | 133055 | 173995 | 163760 |
| | 24 (600) | 270165 | 121574 | 175607 | 229640 | 216132 |
| | 1500 | 2 (50) | 3100 | 1395 | 2015 | 2635 |
| 3 (80) | | 5249 | 2362 | 3412 | 4461 | 4199 |
| 4 (100) | | 8340 | 3753 | 5421 | 7089 | 6672 |
| 6 (150) | | 25763 | 11593 | 16746 | 21899 | 20611 |
| 8 (200) | | 26957 | 12131 | 17522 | 22913 | 21565 |
| 10 (250) | | 60490 | 27221 | 39319 | 51417 | 48392 |
| 12 (300) | | 78261 | 35217 | 50869 | 66521 | 62608 |

NOTES

Consult factory for sizes not shown

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

FINAL VALVE TORQUE (FBTO) BASED ON TEMPERATURE AND SEAT MATERIAL

| Seat material at various temperature | Final valve torque (FBTO) |
|---|--|
| Devlon from -45 °C to high temperature as per PT rating chart | = BTO (Refer to torque values above) |
| Peek from -45 °C to high temperature as per PT rating chart | = 1.5 x BTO (Refer to torque values above) |
| Metal from -45 C to high temperature as per PT Rating chart | = 1.5 x BTO (Refer to torque values above) |

For valves with extended stem (length up to 2.5 meters), increase Final valve torque by 10%.
Example: Underground / buried applications

GEARBOX SELECTION

Maximum allowable rim pull (handwheel or lever) is 80 lb. Add a factor of 1.5.

Gear Box Selection Torque = FBTO x 1.5

ACTUATOR SELECTION

The Service Fluid Factor (SFF) has to be determined from table below:

| Fluid | SFF |
|---|-----|
| Clean, particle-free, non viscous liquids | 1.0 |
| Dry gas, Steam | 1.3 |

The Frequency of Operation Factor (FOF) shall be taken from project specification.
If it is not available in project specification, consult factory.

| 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) | 2.0 |

Actuator Selection Torque = FBTO x SFF x FOF

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

MAXIMUM ALLOWABLE STEM TORQUE (MAST)

| Size | Class | Stem material (in - lbs) | | | |
|------|-------|--------------------------|--------|---------|---------|
| | | 316SS | LF2 | 4140 | 17-4 |
| 2 | 150 | 1607 | 2143 | 3214 | 5625 |
| | 300 | 1607 | 2143 | 3214 | 5625 |
| | 600 | - | 2143 | 3214 | 5625 |
| | 900 | 7206 | 9608 | 14412 | 25221 |
| | 1500 | 7206 | 9608 | 14412 | 25221 |
| 3 | 150 | 1607 | 2143 | 3214 | 5625 |
| | 300 | 7206 | 9608 | 14412 | 25221 |
| | 600 | 7205 | 9607 | 14410 | 25218 |
| | 900 | 11847 | 15796 | 23694 | 41465 |
| | 1500 | 11847 | 15796 | 23694 | 41465 |
| 4 | 150 | 7206 | 9608 | 14412 | 25221 |
| | 300 | 7206 | 9608 | 14412 | 25221 |
| | 600 | 11847 | 15796 | 23694 | 41465 |
| | 900 | 11847 | 15796 | 23694 | 41465 |
| | 1500 | 17080 | 22773 | 34160 | 59780 |
| 6 | 150 | 11847 | 15796 | 23694 | 41465 |
| | 300 | 17080 | 22773 | 34160 | 59780 |
| | 600 | 17813 | 23751 | 35626 | 62346 |
| | 900 | 33356 | 44475 | 66712 | 116746 |
| | 1500 | 57638 | 76851 | 115276 | 201733 |
| 8 | 150 | 17080 | 22773 | 34160 | 59780 |
| | 300 | 17080 | 22773 | 34160 | 59780 |
| | 600 | 35246 | 46995 | 70492 | 123361 |
| | 900 | 57638 | 76851 | 115276 | 201733 |
| | 1500 | 79158 | 105544 | 158316 | 277053 |
| 10 | 150 | 33356 | 44475 | 66712 | 116746 |
| | 300 | 33356 | 44475 | 66712 | 116746 |
| | 600 | 60409 | 80545 | 120818 | 211432 |
| | 900 | 81023 | 108031 | 162046 | 283581 |
| 12 | 150 | 33358 | 44477 | 66716 | 116753 |
| | 300 | 33356 | 44475 | 66712 | 116746 |
| | 600 | 60409 | 80545 | 120818 | 211432 |
| | 900 | 146090 | 194787 | 292180 | 511315 |
| 14 | 150 | 57638 | 76851 | 115276 | 201733 |
| | 300 | 57643 | 76857 | 115286 | 201751 |
| | 600 | 146090 | 194787 | 292180 | 511315 |
| | 900 | 155967 | 207956 | 311934 | 545885 |
| 16 | 150 | 57643 | 76857 | 115286 | 201751 |
| | 300 | 81029 | 108039 | 162058 | 283602 |
| | 600 | 146718 | 195624 | 293436 | 513513 |
| | 900 | 266852 | 355803 | 533704 | 933982 |
| 18 | 150 | 81023 | 108031 | 162046 | 283581 |
| | 300 | 146090 | 194787 | 292180 | 511315 |
| | 600 | 266852 | 355803 | 533704 | 933982 |
| 20 | 150 | 146090 | 194787 | 292180 | 511315 |
| | 300 | 146090 | 194787 | 292180 | 511315 |
| | 600 | 266868 | 355824 | 533736 | 934038 |
| | 900 | 585540 | 780720 | 1171080 | 2049390 |
| 24 | 150 | 266852 | 355803 | 533704 | 933982 |
| | 300 | 266852 | 355803 | 533704 | 933982 |
| | 600 | 585594 | 780792 | 1171188 | 2049579 |
| | 900 | 544878 | 726504 | 1089756 | 1907073 |
| 30 | 150 | 544878 | 726504 | 1089756 | 1907073 |
| | 300 | 544878 | 726504 | 1089756 | 1907073 |
| | 600 | - | 726504 | 1089756 | 1907073 |
| 36 | 150 | 544878 | 726504 | 1089756 | 1907073 |
| | 300 | - | 726504 | 1089756 | 1907072 |
| | 600 | - | - | 1089756 | 1907073 |

NOTES

Consult factory for sizes not shown

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

SELECTION GUIDE - PART 1

| Example: | NF3F | - 0050 | R3 | A1 | 00 | A1 | - CG | Continue with the code from PART 2 |
|----------------------------|--|-------------|-----------------|----|----|----|------|------------------------------------|
| Series / model | | | | | | | | |
| NF3F | KTM Virgo Series NF Trunnion Ball Valve Full Bore | | | | | | | |
| NF3R | KTM Virgo Series NF Trunnion Ball Valve Reduced Bore | | | | | | | |
| Size | | | | | | | | |
| 0050 | DN 0050/ NPS 2 | 0400 | DN 0400/ NPS 16 | | | | | |
| 0080 | DN 0080/ NPS 3 | 0450 | DN 0450/ NPS 18 | | | | | |
| 0100 | DN 0100/ NPS 4 | 0500 | DN 0500/ NPS 20 | | | | | |
| 0150 | DN 0150/ NPS 6 | 0600 | DN 0600/ NPS 24 | | | | | |
| 0200 | DN 0200/ NPS 8 | 0750 | DN 0750/ NPS 36 | | | | | |
| 0250 | DN 0250/ NPS 10 | ZZZZ | Special | | | | | |
| 0300 | DN 0300/ NPS 12 | | | | | | | |
| 0350 | DN 0350/ NPS 14 | | | | | | | |
| End connection | | | | | | | | |
| R3 | Flange - RF (Raised Face) - 125 to 250 AARH | | | | | | | |
| RJ | Flange - RTJ (Ring Type Joint) | | | | | | | |
| BZ | Buttweld | | | | | | | |
| MM | Multiple / Mixed End Connection | | | | | | | |
| ZZ | Special | | | | | | | |
| Drilling / schedule | | | | | | | | |
| A1 | ASME B16.5 CL.150 | | | | | | | |
| A2 | ASME B16.5 CL.300 | | | | | | | |
| A3 | ASME B16.5 CL.600 | | | | | | | |
| A4 | ASME B16.5 CL.900 | | | | | | | |
| A5 | ASME B16.5 CL.1500 | | | | | | | |
| Face to face | | | | | | | | |
| 00 | Standard (Refer product literature) | | | | | | | |
| Pressure class | | | | | | | | |
| A1 | ASME 150 | | | | | | | |
| A2 | ASME 300 | | | | | | | |
| A3 | ASME 600 | | | | | | | |
| A4 | ASME 900 | | | | | | | |
| A5 | ASME 1500 | | | | | | | |
| A6 | ASME 2500 | | | | | | | |
| Body material | | | | | | | | |
| CG | Carbon steel A350 LF2 | | | | | | | |
| SE | Stainless steel A182 F316 | | | | | | | |
| ZZZ | Special | | | | | | | |

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

SELECTION GUIDE - PART 2

| Example: | CG1 | C1 | Q2 | H0 | I | A | - DPE |
|--|-----|----|----|----|---|---|-------|
| Ball material | | | | | | | |
| CG1 Carbon steel A350 LF2 + ENP 1 mil | | | | | | | |
| CG3 Carbon steel A350 LF2 + ENP 3 mil | | | | | | | |
| S00 Stainless steel A276 316 | | | | | | | |
| ZZZ Special | | | | | | | |
| Stem material | | | | | | | |
| C1 Carbon steel A350 LF2 + ENP 1 mil | | | | | | | |
| C7 Carbon steel A350 LF2 + ENP 3 mil | | | | | | | |
| S0 Stainless steel A276 316 | | | | | | | |
| SH Stainless steel A564 17-4 PH | | | | | | | |
| ZZ Special | | | | | | | |
| Seat material | | | | | | | |
| Q2 Devlon | | | | | | | |
| A0 PEEK | | | | | | | |
| MT Stainless steel A276 316 tungsten carbide coated | | | | | | | |
| ZZ Special | | | | | | | |
| Stem seals | | | | | | | |
| H0 HNBR AED (-40) | | | | | | | |
| FL FKM (low temp) | | | | | | | |
| F0 FKM | | | | | | | |
| FA FKM (AED) | | | | | | | |
| FE FEPM (Atlas) | | | | | | | |
| F5 FFKM (Kalrez) | | | | | | | |
| E0 EPDM | | | | | | | |
| N8 HNBR Duro 85 (JW EOL 985) | | | | | | | |
| ZZ Special | | | | | | | |
| Mounting | | | | | | | |
| I ISO 5211 | | | | | | | |
| Actuation | | | | | | | |
| A Actuator | | | | | | | |
| B Bare stem | | | | | | | |
| C Gear with chain wheel | | | | | | | |
| G Gear with hand wheel | | | | | | | |
| L Lever / wrench | | | | | | | |
| Z Special | | | | | | | |
| Options | | | | | | | |
| DPE Double Piston Effect (non relieving) | | | | | | | |
| SPE Single Piston Effect x Double Piston Effect (SPE X DPE) | | | | | | | |
| V50 Vent - pressure relief valve | | | | | | | |
| TBR Thermal Bypass Relief | | | | | | | |
| V01 Drain-Ball Valve | | | | | | | |
| EXO Stem Extensions | | | | | | | |

KTM VIRGO SERIES NF TRUNNION MOUNTED BALL VALVES

THREE-PIECE, FULL AND REDUCED BORE

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 storage procedures.
Long term storage shall be avoided.
- For welded-end valves, advise Emerson if there will be a post-weld heat treatment.
(Transition pups may be necessary to avoid damages to seals).
- Flush and clean the line 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 used for on-off service only.
Throttling service (use of the valve with the ball partially open) can damage the seals.
- Make sure to take into consideration the actual service conditions when selecting materials
for O-rings and seal inserts.
- Always specify anti-explosive decompression material for valves to be used
in high pressure gas service.
- Make sure the selected actuator has been property sized
(an oversized actuator can be as dangerous as an undersized one).
- Advise Emerson of cycle frequency to ensure proper sizing of actuator.
- Do not use the actuator to lift the valve.

NOTES

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