



CLARKSON SEVERE SERVICE KNIFE GATE VALVES

MODEL KS3

The KS3 is a true bi-directional, zero-leakage ASME Class 300 Knife Gate Valve designed for the rigors of severe service applications



FEATURES

- True bi-directional flow and zero leakage shut-off; can be installed in either direction
- Heavy cross section precision-molded elastomer seat provides more surface area for superior isolation
- Field-adjustable, patented gate edge seal system prevents leakage through top of valve
- Enclosed body design prevents any leakage to the outside environment
- Full round port and seat design offers low pressure drop across valve and longer service life in abrasive applications
- Standard inlet and outlet replaceable, rotatable Ni-Resist wear rings extend service life
- Modular frame design allows for installation of any standard accessory without modification
- Fully piggable
- Available in raised or flat face flange

NOTE

All valves hydrotested per MSS SP-151 and will meet zero leakage isolation from zero to 1.1x Maximum Allowable Working Pressure (MAWP).

GENERAL APPLICATION

The KS3 has many features designed to improve service life and lower cost of ownership. It is suitable for a wide range of severe service slurry applications in:

- Mining and mineral processing
- Oil Sands processing
- Pulp and paper plants
- Coal preparation plants
- Power plants
- Steel processing plants

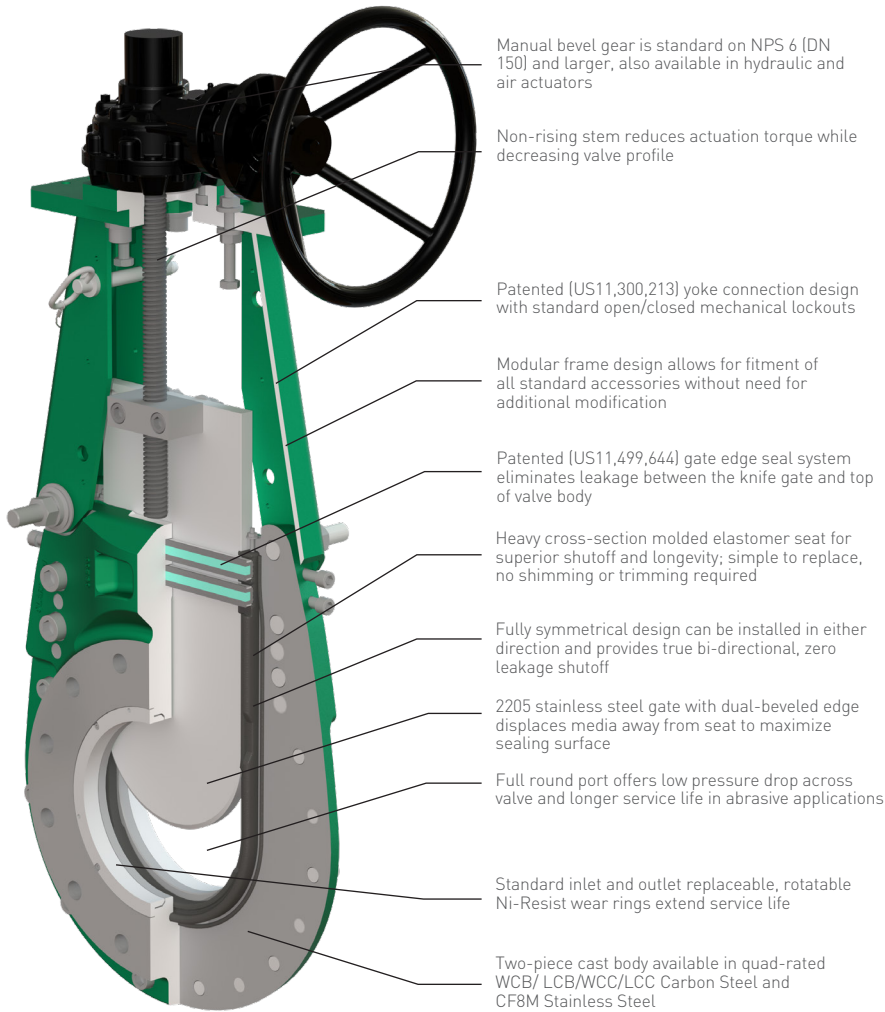
TECHNICAL DATA

| | |
|---------------------|--|
| Size range: | NPS 3 - 30 (DN 80 - 750) |
| Temperature rating: | NR: -58°F to 175°F (-50°C to 80°C) EPDM: -40°F to 300°F (-40°C to 150°C) HNBR: -40°F to 300°F (-40°C to 150°C) FKM: -40°C to 400°F (-40°C to 205°C) |
| Pressure rating: | ASME Class 300 |
| Compliance to: | MSS SP-135 ASME B31.3 |
| Face to face: | MSS SP-135 Short |
| Flange drillings: | ASME 300 AS 2129 Table H PN 50 |

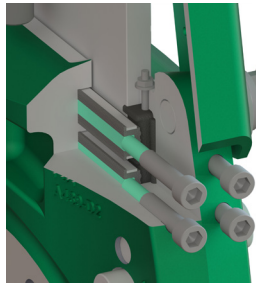
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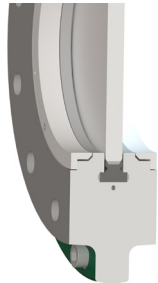
VALVE BENEFITS



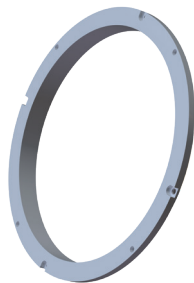
- Manual bevel gear is standard on NPS 6 (DN 150) and larger, also available in hydraulic and air actuators
- Non-rising stem reduces actuation torque while decreasing valve profile
- Patented [US11,300,213] yoke connection design with standard open/closed mechanical lockouts
- Modular frame design allows for fitment of all standard accessories without need for additional modification
- Patented [US11,499,644] gate edge seal system eliminates leakage between the knife gate and top of valve body
- Heavy cross-section molded elastomer seat for superior shutoff and longevity; simple to replace, no shimming or trimming required
- Fully symmetrical design can be installed in either direction and provides true bi-directional, zero leakage shutoff
- 2205 stainless steel gate with dual-beveled edge displaces media away from seat to maximize sealing surface
- Full round port offers low pressure drop across valve and longer service life in abrasive applications
- Standard inlet and outlet replaceable, rotatable Ni-Resist wear rings extend service life
- Two-piece cast body available in quad-rated WCB/ LCB/WCC/LCC Carbon Steel and CF8M Stainless Steel



Patented gate edge seal interlocks with transverse seal and scrapers to provide a continuous seal around gate, incorporating benefits of adjustments to packing pressure while valve is in service

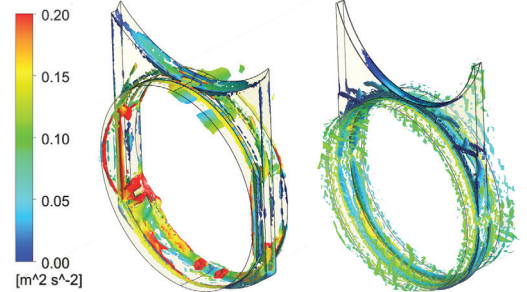


Robust, heavy cross-section elastomer seat provides superior isolation performance over the life of the valve



Replaceable and rotatable wear rings reduce wear to the valve body and prolong service life. Rings can be rotated three times through four positions before requiring replacement

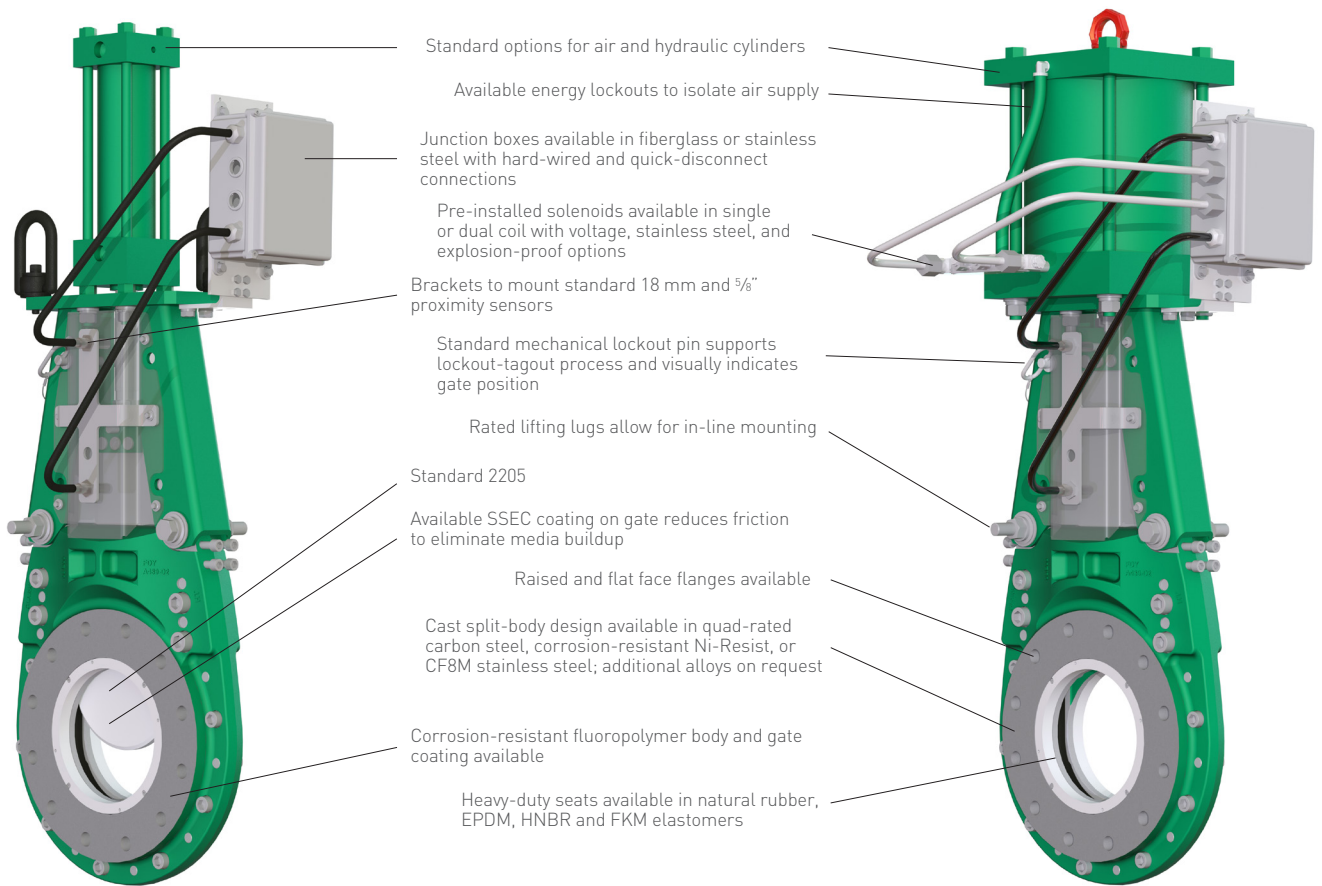
Turbulence kinetic energy



Full round port minimizes any disruption to flow compared to non-round ports, resulting in reduced wear on the valve and downstream components

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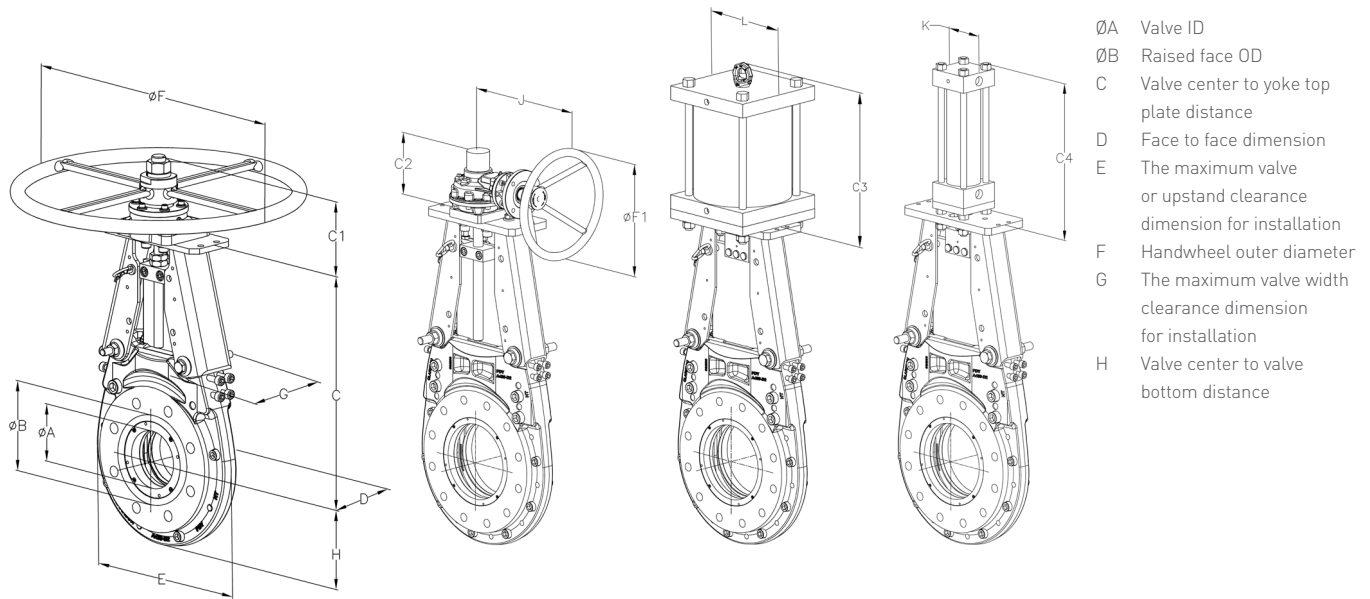


MATERIAL LIST

| Component | Material | Properties |
|--------------------------|---|--|
| Base valve configuration | Body material: WCB/LCB/WCC/LCC Body coating: Clarkson™ Paint Gate material: 2205 Stainless steel Wear ring: A439 D2 Ni-Resist Seat material: Natural rubber | Quad-rated carbon steel for wide temperature range ISO 12944-2 with C3 corrosive rating High corrosion resistance Improved corrosion resistance and hardness -58°F to 175°F (-50°C to 80°C) High tensile strength, superior tear and abrasion resistance |
| Optional body materials | Stainless steel CF8M Duplex CD3MN (4A) Super Duplex CD3MWCuN (6A) Hastelloy (CW12MW) Type C276 | High corrosion resistance and chemical compatibility materials |
| Optional body coatings | Fluoropolymer | Typically used with Ni-Resist as a chemical treatment in lieu of paint finish |
| Optional gate materials | 17-4 PH Stainless steel 2507 Super Duplex C276 Hastelloy | High abrasion resistance High corrosion resistance and chemical compatibility materials |
| Optional gate coatings | SSEC | Low coefficient of friction prevents sticky, viscous, corrosive, and/or abrasive media from sticking to the gate, thus reducing drag, improving seat life, and leading to more reliable isolation |
| Optional seat materials | EPDM HNBR FKM | -40°F to 300°F (-40°C to 150°C) Good resistance to fresh and sea water, steam, alkalis, organic and inorganic acids, silicone oils, bleach solution, ammonia, aqueous abrasive slurries, salt solutions and oxygenated solvents Poor resistance to oil, gasoline and hydrocarbons -40°F to 300°F (-40°C to 150°C) Excellent resistance to oil, solvents, sour gas, dilute acids, dilute alkalis, steam and hydraulic fluids. HNBR has good ozone, oxidation and chemical resistance Poor resistance to high polar fluids, aromatic oils, or chlorinated hydrocarbons -40°F to 400°F (-40°C to 205°C) Excellent resistance to heat, oil, gasoline, hydraulic fluids, and hydrocarbon solvents. FKM possesses very good resistance to oxygen, ozone, sunlight Poor resistance to oxygenated solvents, amines, alkalis, formic and acetic acids |

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DIMENSIONS (inch)

| NPS | ØA | ØB | C | C1 | C2 | C3 | C4 | D | E | ØF | ØF1 | G | H | J | K | L |
|-----|-------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| 3 | 3.00 | 5.0 | 13.4 | 5.5 | - | 8.2 | 9.1 | 2.8 | 10.2 | 12.0 | - | 6.4 | 5.1 | - | 2.5 | 4.5 |
| 4 | 4.00 | 6.2 | 15.6 | 5.5 | - | 9.3 | 10.2 | 2.8 | 12.3 | 20.0 | - | 6.4 | 6.2 | - | 2.5 | 5.5 |
| 6 | 6.00 | 8.5 | 20.3 | - | 7.1 | 13.1 | 12.8 | 3.2 | 14.8 | - | 11.8 | 7.7 | 7.4 | 12.6 | 3.5 | 8.5 |
| 8 | 8.00 | 10.6 | 26.2 | - | 7.1 | 16.8 | 16.0 | 3.5 | 18.1 | - | 11.8 | 8.3 | 9.0 | 12.6 | 4.5 | 10.6 |
| 10 | 10.00 | 12.8 | 29.4 | - | 7.5 | 18.9 | 18.5 | 4.7 | 20.6 | - | 23.6 | 9.6 | 10.3 | 16.6 | 5.0 | 12.8 |
| 12 | 12.00 | 15.0 | 34.1 | - | 8.8 | 22.8 | 21.6 | 5.0 | 23.6 | - | 23.6 | 10.6 | 11.8 | 18.1 | 6.5 | 17.0 |
| 14 | 13.25 | 16.3 | 36.6 | - | 8.8 | 24.1 | 22.9 | 5.5 | 26.1 | - | 23.6 | 10.9 | 13.1 | 18.1 | 6.5 | 17.0 |
| 16 | 15.25 | 18.5 | 42.0 | - | 9.6 | 27.4 | 26.4 | 5.5 | 28.9 | - | 23.6 | 11.9 | 14.4 | 19.9 | 7.5 | 19.0 |
| 18 | 17.00 | 21.0 | 46.3 | - | 10.1 | 30.5 | 28.5 | 6.3 | 31.8 | - | 23.6 | 14.0 | 15.9 | 19.8 | 7.5 | 23.0 |
| 20 | 19.00 | 23.0 | 52.1 | - | 13.3 | 35.6 | 30.8 | 7.4 | 34.4 | - | 29.5 | 14.2 | 17.2 | 24.5 | 8.5 | 25.0 |
| 24 | 23.00 | 27.3 | 61.3 | - | 13.3 | 40.5 | 36.3 | 8.5 | 40.8 | - | 29.5 | - | 20.4 | 24.5 | 9.5 | 29.8 |
| 26 | 25.00 | 29.5 | 67.1 | - | 13.3 | - | 40.9 | 8.5 | 44.1 | - | 29.5 | - | 22.0 | 24.5 | 12.6 | - |
| 28 | 27.00 | 31.5 | 71.1 | - | 14.3 | - | 42.9 | 10.0 | 46.6 | - | 29.5 | - | 23.3 | 25.4 | 12.6 | - |
| 30 | 29.00 | 33.8 | 75.1 | - | 14.3 | - | 45.0 | 10.5 | 48.9 | - | 29.5 | - | 24.5 | 25.4 | 12.6 | - |

MHW/BG INPUT TORQUE

| ft-lb |
|-------|
| 7 |
| 20 |
| 24 |
| 41 |
| 67 |
| 48 |
| 59 |
| 60 |
| 77 |
| 96 |
| 69 |
| 82 |
| 101 |
| 116 |

DIMENSIONS (mm)

| DN | ØA | ØB | C | C1 | C2 | C3 | C4 | D | E | ØF | ØF1 | G | H | J | K | L |
|-----|-----|-----|------|-----|-----|------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|
| 80 | 76 | 127 | 339 | 141 | - | 209 | 232 | 70 | 260 | 305 | - | 164 | 130 | - | 64 | 114 |
| 100 | 102 | 157 | 395 | 141 | - | 236 | 258 | 70 | 313 | 508 | - | 164 | 156 | - | 64 | 140 |
| 150 | 152 | 216 | 515 | - | 179 | 332 | 326 | 80 | 377 | - | 300 | 195 | 188 | 319 | 89 | 216 |
| 200 | 203 | 270 | 665 | - | 179 | 428 | 406 | 89 | 458 | - | 300 | 211 | 229 | 319 | 114 | 270 |
| 250 | 254 | 324 | 746 | - | 191 | 480 | 470 | 119 | 524 | - | 600 | 243 | 262 | 422 | 127 | 324 |
| 300 | 305 | 381 | 866 | - | 222 | 579 | 549 | 127 | 600 | - | 600 | 270 | 300 | 460 | 165 | 432 |
| 350 | 337 | 413 | 930 | - | 222 | 612 | 582 | 140 | 663 | - | 600 | 276 | 332 | 460 | 165 | 432 |
| 400 | 387 | 470 | 1066 | - | 245 | 696 | 671 | 140 | 734 | - | 600 | 302 | 367 | 505 | 191 | 483 |
| 450 | 432 | 533 | 1176 | - | 257 | 775 | 724 | 159 | 807 | - | 600 | 355 | 404 | 504 | 191 | 584 |
| 500 | 483 | 584 | 1323 | - | 338 | 903 | 782 | 189 | 874 | - | 750 | 361 | 437 | 622 | 216 | 635 |
| 600 | 584 | 692 | 1557 | - | 338 | 1030 | 921 | 216 | 1035 | - | 750 | - | 518 | 622 | 241 | 756 |
| 650 | 635 | 749 | 1704 | - | 338 | - | 1039 | 216 | 1119 | - | 750 | - | 560 | 622 | 321 | - |
| 700 | 686 | 800 | 1807 | - | 364 | - | 1091 | 254 | 1184 | - | 750 | - | 592 | 646 | 321 | - |
| 750 | 737 | 857 | 1908 | - | 364 | - | 1144 | 267 | 1242 | - | 750 | - | 621 | 646 | 321 | - |

MHW/BG INPUT TORQUE

| N-m |
|-----|
| 10 |
| 27 |
| 32 |
| 56 |
| 90 |
| 66 |
| 80 |
| 81 |
| 104 |
| 130 |
| 94 |
| 111 |
| 137 |
| 157 |

NOTES

1. Input torque is value at handwheel to open valve at rated pressure.
2. Hydraulic actuator bore size based on required thrust to open valve at rated pressure with 2,000 psi (138 bar) hydraulic supply pressure. Standard cylinder will close gate at no less than shutoff pressure of 525 psi (36 bar).
3. Pneumatic actuator bore size based on required thrust to open valve at 70% rated pressure with 100 psi pneumatic pressure, consult sales for other options.
4. Bevel gearboxes for NPS 24-30 (DN 600-750) are sized to open with a Rim Pull of 80 lbs at 50% MAWP, as these have been optimized for Electric Actuator operation.

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VALVE FLOW VALUES

| Valve size | | Flow values | |
|------------|-----|----------------|----------------|
| NPS | DN | C _v | K _v |
| 3 | 75 | 660 | 566 |
| 4 | 80 | 1200 | 1028 |
| 6 | 150 | 2900 | 2485 |
| 8 | 200 | 5100 | 4370 |
| 10 | 250 | 8300 | 7112 |
| 12 | 300 | 12100 | 10368 |
| 14 | 350 | 14700 | 12596 |
| 16 | 400 | 19600 | 16795 |
| 18 | 450 | 25100 | 21508 |
| 20 | 500 | 31400 | 26907 |
| 24 | 600 | 46300 | 39674 |
| 26 | 650 | 54800 | 46958 |
| 28 | 700 | 63800 | 54670 |
| 30 | 750 | 73600 | 63068 |

NOTES

1. C_v values have been determined using combination of Ansys CFD analyses, Crane's formulae from technical paper 410M and Darcy Weisbach equation.
2. C_v values represent U.S. gallons per minute of water at 60°F flowing through a 100% open valve that results in a pressure drop of 1 psi.
3. Metric equivalent K_v is cubic meters per hour of water at +16°C flowing through a 100% open valve that results in a pressure drop of 1 bar.
4. To convert C_v to K_v - multiply the C_v value by 0.8569.

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