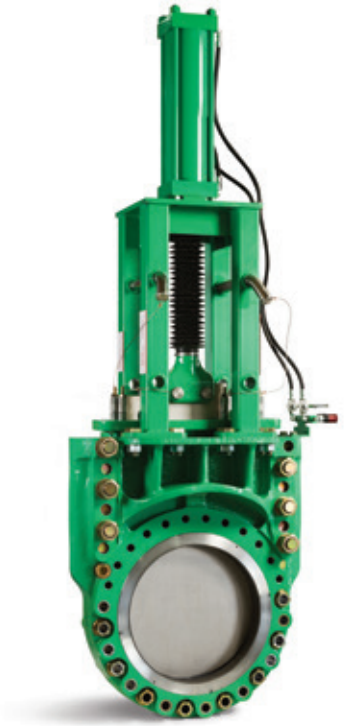
CLARKSON ZERO POCKET KNIFE GATE VALVES

MODEL ZP300

Designed for the extremes of oil sands applications, the zero pocket provides an uninterrupted flow across the valve, increasing service life and minimizing wear on downstream components



GENERAL APPLICATIONS

The Zero Pocket (ZP300) has been specifically designed to meet the high pressure and highly abrasive applications such as oil sands processing and tailings.
Designed to the requirements of MSS-SP135 in Class 300, the ZP300 has many features proven to provide longer service life, lower maintenance and lower cost of ownership compared to other styles of knife gate valves.

TECHNICAL DATA

Size range:	NPS 3 - 48 DN 80 - 1200
Temperature rating:	Up to 390°F (200°C) with proper elastomer selection.
Pressure rating:	ASME Class 300
Compliance to:	MSS-SP135 ASME B16.34
Face to face:	Matches MSS-SP135 Class 300 long pattern.

FEATURES

- Full round port, adaptable to match specific pipe I.D.s offers lowest possible pressure drop across valve and longer service life in abrasive applications.
- Shut-off conforms to the requirements of ASME Class V.
- True bi-directional flow and shut-off, can be installed in either direction.
- Designed as a field repairable asset for a lower overall cost of ownership.
- Heavy cross section precision molded elastomer seat, simple to replace, no shimming or trimming.
- Seat is held in place by the bolted body to prevent pullout or shifting in the body.
- Available with urethane, EPDM, HNBR, FKM or other elastomers with a maximum temperature rating up to 390°F (200°C) with proper elastomer selection.
- Cast bolted body available in CF8M, 2507, WCB/LCB or other materials.
- Polymer chest liners to support gate through the full length of the stroke.
- Two styles of replaceable and rotatable integral flow rings available:
  - Internal rings are suitable for dead-end service.
  - External ring are not for dead-end service.
- Superior packing assembly is standard with live-loaded gland studs, providing continuous load.
- No special tools or unique packing materials to maintain or replace packing, can be repacked with valve in-line (line pressure must be relieved).
- Gate is standard with SSEC, formulated to improve abrasion resistance and extend seat and packing life.
- 17-4 ph stainless steel hardened gate provides improved abrasion resistance against the rigors of abrasive applications. Other gate materials available.
- Compliance to ASME B16.34, CRN on full size range.

CLARKSON ZERO POCKET KNIFE GATE VALVES

MODEL ZP300

Shown with optional heavy duty hydraulic actuator, also available with manual and air actuators

Heavy-duty yoke and clevis, standard with pin-style lockouts on all air or hydraulic actuated valves

Superior packing assembly with live-loaded gland studs

Molded elastomer seat with integral packing support bar

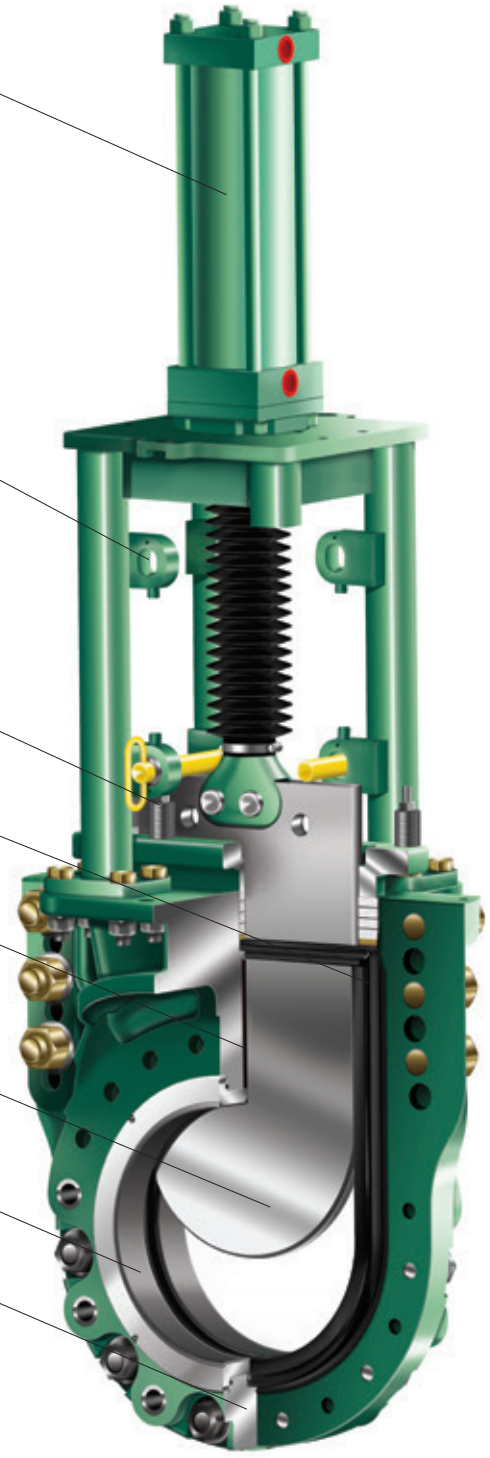
Full-stroke polymer gate supports

17-4 hardened gate, standard with SSEC to extend seat and packing life.

Integral flow rings (External style shown)

Two-piece body, designed in compliance to MSS-SP135 and ASME B16.34

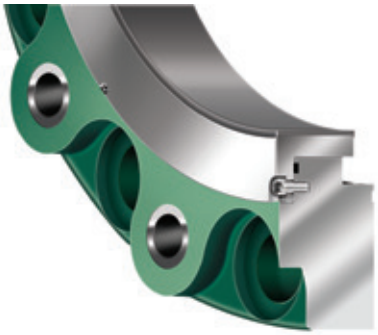
Full round port, adaptable to match specific pipe I.D.s offers lowest possible pressure drop across valve and longer service life in abrasive applications.

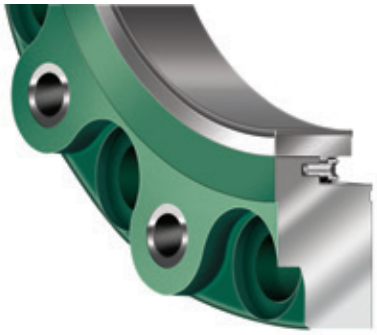


SPECIFICATIONS

Bi-directional high pressure knife gate valve, ASME Class 300 to MSS-SP135 with molded urethane seat (or other elastomer as required for the application), [external replaceable flow rings] [internal replaceable flow rings suitable for dead end service] made to suit various pipe line I.D.s, 17-4 ph stainless steel hardened gate with SSEC gate coating and with full polymer chest liners to support and guide the gate through the full length of the stroke. To prevent atmospheric leakage, valves shall be equipped with a multistage gate packing assembly consisting of a packing support bar, brass gate scraper, layers of PTFE-Graphite packing combined with self-mold packing, compressed by a live-loaded gland follower. Valve shall be seat leak tested with an allowable leak rate to ASME Class V with gate in the fully closed position. Valve shall be repairable with seat, packing, gate, gate supports, flow rings and body replaceable.

TWO STYLES OF INTEGRAL FLOW RINGS





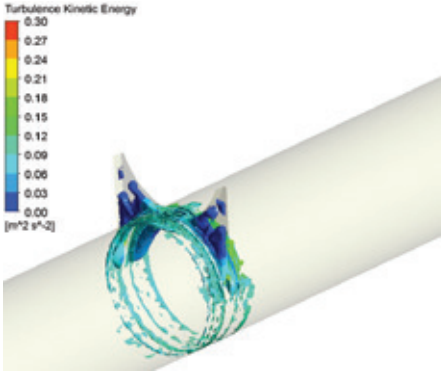
EXTERNAL RING
- 17-4 ph S/S
- Replaceable and rotatable.
- Not for dead-end service.

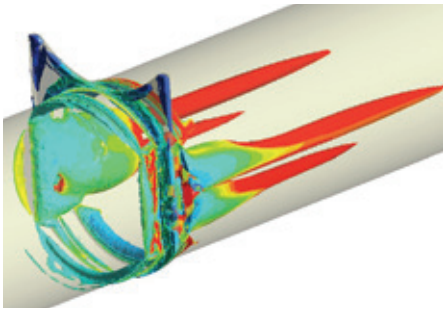
INTERNAL RINGS
- 17-4 ph S/S or white iron per ATSM A532
- Replaceable and rotatable.
- Suitable for dead-end service (with 17-4 ph ring only).

Why "Zero Pocket"?

The ZP300 valve with its Zero Pocket port design generates less disruption to pipeline flow than valves with obstructions in the flow path, offering superior life for the valve with a lower cost-of-ownership. Additionally, the smooth flow minimizes wear on the downstream pipe and equipment. Disruptions in the port geometry (guides, reduced port dimension non-round ports) can result in flow being directed and even accelerated into the pipe wall, generating turbulence that breaks boundary layer flow and results in higher velocities and increased wall shear stresses downstream.

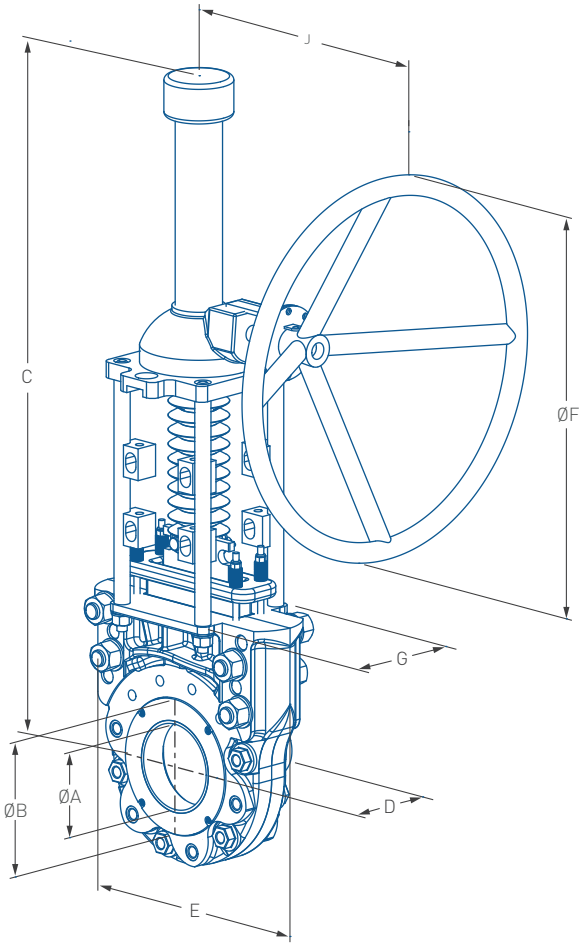
Wall shear stress is dependent upon the magnitude of velocity and distance from wall, any turbulent behavior can lead to disruptive flow conditions increasing flow velocity near the wall. The greater magnitude of wall shear stress is proportional to abrasive wear.

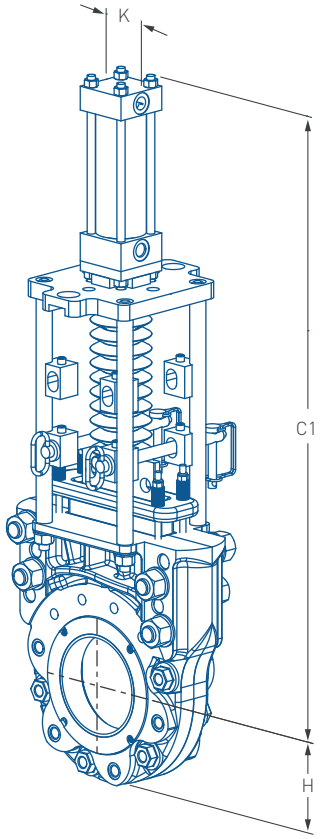


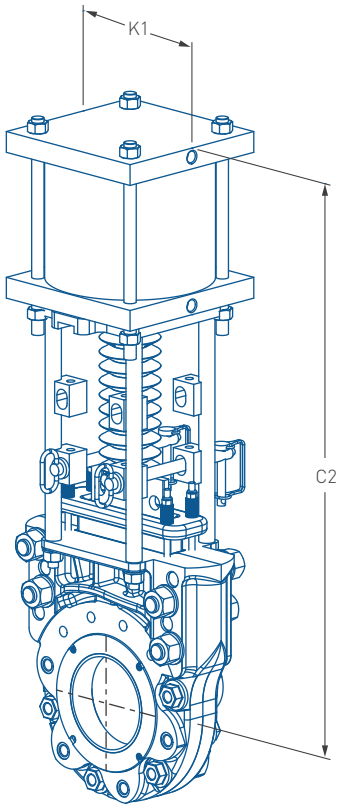


The full-round, Zero Pocket port with pipeline I.D match minimizes any disruption, reducing wear on the valve and protecting the downstream components from wear.

Non-round ports with mismatched I.Ds. generate significant disruption, causing wear on valve and downstream components


J
C
ØF
G
ØB
ØA
D
E


K
C1
H


K1
C2

CLARKSON ZERO POCKET KNIFE GATE VALVES

MODEL ZP300

DIMENSIONS (inches)

Valve size NPS	ØA	ØB	C	C1	C2	D	E	ØF	G	H	J	K	K1	B/Gear mass (lbs)	Hyd act mass (lbs)	Pneu act mass (lbs)	Bevel gear model
3	3.00	5.00	26.25	24.13	21.63	4.01	9.49	18.00	10.25	4.13	14.47	2.50	5.50	173	110	125	BG3
4	4.00	6.19	28.88	27.76	25.51	4.12	11.88	18.00	6.58	5.00	14.47	2.50	6.50	219	157	178	BG3
6	6.00	8.50	43.14	38.07	35.63	4.12	15.66	24.00	7.50	6.25	16.59	3.50	10.63	329	264	411	BG3
8	8.00	10.62	44.90	42.99	41.68	4.64	18.35	24.00	9.63	7.50	19.23	3.50	12.75	549	375	586	BG4
10	10.00	12.75	52.19	53.40	51.66	5.38	21.97	24.00	15.53	8.75	19.38	5.00	14.75	904	805	1080	BG42
12	12.00	15.00	59.90	60.83	58.37	5.63	25.79	24.00	17.45	10.25	29.67	5.00	19.00	1292	1148	1668	BG44
14	13.25	16.25	67.71	64.69	63.76	6.25	28.29	24.00	19.45	11.50	19.38	5.00	21.00	1549	1388	2061	BG44
16	15.25	18.50	71.91	71.88	70.66	6.63	30.79	24.00	19.45	12.75	29.67	6.50	23.00	1908	1810	CS	BG44
18	17.00	21.00	75.65	77.38	-	7.00	33.40	24.00	19.45	14.00	29.68	6.50	-	2089	1982	CS	BG44
20	19.00	23.00	89.36	87.58	-	7.44	36.09	36.00	21.50	15.25	27.31	7.50	-	2831	2662	CS	BG64
24	23.00	27.25	110.41	104.57	-	8.50	42.58	36.00	25.39	18.00	27.32	8.50	-	4532	4473	CS	BG624
26	25.00	29.50	-	111.06	-	8.50	44.83	-	28.39	19.13	-	9.50	-	-	5297	CS	-
28	27.00	31.43	-	119.89	-	10.00	47.72	-	27.50	20.38	-	9.50	-	-	6145	CS	-
30	29.00	33.75	-	130.55	-	10.50	51.69	-	36.35	21.82	-	12.63	-	-	8649	CS	-
32	31.00	36.00	-	138.39	-	11.50	54.63	-	34.93	23.13	-	12.63	-	-	10714	CS	-
36	35.00	40.75	-	153.26	-	12.00	63.99	-	39.13	25.42	-	14.88	-	-	14734	CS	-
42	40.00	44.75	-	176.13	-	14.75	74.65	-	42.00	30.75	-	17.13	-	-	22709	CS	-
48	46.00	51.25	-	198.88	-	16.75	76.66	-	49.00	33.75	-	19.00	-	-	30426	CS	-

DIMENSIONS (mm)

Valve size DN	ØA	ØB	C	C1	C2	D	E	ØF	G	H	J	K	K1	B/Gear mass (kg)	Hyd act mass (kg)	Pneu act mass (kg)	Bevel gear model
80	76	127	667	613	549	102	241	460	260	105	367	64	140	78	50	57	BG3
100	102	157	734	705	648	105	302	460	167	127	367	64	165	99	71	81	BG3
150	152	216	1096	967	905	105	398	610	191	159	421	89	270	149	120	186	BG3
200	203	270	1140	1092	1059	118	466	610	245	191	488	89	324	249	170	265	BG4
250	254	324	1326	1356	1312	137	558	610	394	222	492	127	375	410	365	489	BG42
300	305	381	1521	1545	1483	143	655	610	443	260	754	127	483	585	520	756	BG44
350	337	413	1720	1643	1620	159	719	610	494	292	492	127	533	702	629	934	BG44
400	387	470	1827	1826	1795	168	782	610	494	324	754	165	584	864	820	CS	BG44
450	432	533	1922	1965	-	178	848	610	494	356	754	165	-	946	898	CS	BG44
500	483	584	2270	2225	-	189	917	915	546	387	694	191	-	1282	1206	CS	BG64
600	584	692	2804	2656	-	216	1081	915	645	457	694	216	-	2053	2029	CS	BG624
650	635	749	-	2821	-	216	1139	-	721	486	-	241	-	-	2403	CS	-
700	686	798	-	3045	-	254	1212	-	699	518	-	241	-	-	2787	CS	-
750	737	857	-	3316	-	267	1313	-	923	554	-	321	-	-	3923	CS	-
800	787	914	-	3515	-	292	1388	-	887	587	-	321	-	-	4860	CS	-
900	890	1035	-	3893	-	305	1625	-	994	646	-	378	-	-	6683	CS	-
1050	1016	1137	-	4474	-	375	1896	-	1067	781	-	435	-	-	10301	CS	-
1200	1168	1302	-	5052	-	425	1947	-	1245	857	-	483	-	-	13801	CS	-

NOTE

ØA = Dimension is for maximum port diameter

D = Face to Face dimensions per MSS-SP135- long pattern.

G = The maximum valve width clearance dimension for installation.

CS = Contact Sales for further information.

Pneumatic actuator is based on 80 psi (550 kPa) air supply.

Bevel Gear assembly includes bevel gear, lockout, hand wheel, stem, stem cover and cap and fasteners.

Hydraulic actuator mass includes weight of oil.

SSEC: SYNERGISTIC SURFACE ENHANCEMENT COATING

Well suited for use in applications where corrosive media or abrasion is a problem, SSEC is ideal for applications with sticky, viscous media, scaling/plating or where galling is a problem. The low coefficient of friction eliminates "stick-slip" problems, reduces drag and increases sleeve life. Often improves micro finish of a gate or body. SSEC is a synergistic coating that combines the advantages of anodizing, plating or thermal spraying with the controlled infusion of polymers, dry lubricants and other materials to provide an entirely new composite with improved properties to the base metal. This coating will work on most metal surfaces and creates a harder-than- steel surface, excellent release (non-stick) properties, protects against wear, corrosion and chemical attack and provides permanent lubricity and a superior resistance to static buildup of material. SSEC has a hardness/wear and abrasion rating of up to rc 68 equilibrium Wear rate (eWr) using Taber abrasion testing methods (CS-10 wheel): 2.0 - 4.0 mg per 1000 cycles. SSEC is also very corrosion resistant and will survive 500 hours in ASTM B-117 salt spray. (Coating thickness will affect corrosion resistance.) Suitable for use on steel, stainless, copper, brass, bronze, titanium, and aluminum.

	Coefficient of friction	Temperatures (a)	Thickness (mils)	Ph range	Abrasion	Anti-stick (lubricity)	Chemical resistance
SSEC	As low as 0.09	-250°F to 550°F (b) (-157°C to 288°C)	0.2 To 3 excellent	5 To 8.5	Good	Excellent	Fair
SSEC+	Static as low as 0.10 Dynamic as low as 0.09	-250°F to 500°F (-157°C to 260°C)	0.5 To 2.0	5 To 8.5	Good	Excellent	Good

1. Stated temperatures are above normal operating temperature of the valve and are not to be considered as the rated temperature of the valve.
2. SSEC will survive temperatures of 1400°F (760°C), but all lubricant will dissipate above+ 800°F (427°C).
3. Short term exposure up to 350°F (177°C)