



CLARKSON SEVERE SERVICE KNIFE GATE VALVE MODEL KS1

Installation and maintenance instructions

GENERAL INFORMATION

The KS1 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
- Coal preparation plants
- Pulp and paper plants
- Oil sands processing
- Power plants
- Steel processing plants

IMPORTANT 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 and transverse seal prevent 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
- Dual replaceable and rotatable integral 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



LABEL CONTENTS

Item	Description	Example
Service Limit	MAWP at Temperature per B31.3	290 psi / 120°F
Comply	Standard	B31.3 & SP135
Product Code	Manufacturer's Reference	Unique identifier
CRN	Canadian Registration Number	0C23424.5ADD1
Patent	Patent	11,499,644
Size	Valve nominal size	DN 250
Flange	Valve mounting flange standard	ASME 150
Body	Body material	ASTM A439-D2
Gate	Gate material	2205 S/S
Seat	Seat material	NR
PKG/Seal	Packing seal material	NR
Ring(s)	Wear ring material	ASTM A439-D2
Class	Pressure class rating per ASME codes	150

COMPLIANCE LABEL

 EMERSON CLARKSON	PRODUCT CODE				
	BODY	CONFORMANCE	CRN	CLASS	
SERIAL No.	FLANGE	GATE	SEAT	PKG/SEAL	RING(S)
	PART NUMBER	PATENT	SERVICE LIMIT	SIZE	

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

INITIAL INSPECTION

1. Examine entire valve and report any damage or discrepancies to supplier prior to installation.
2. Inspect accessories, if any, including solenoids, limit switches, positioners, etc. for functionality prior to installation.
3. Large manual hand wheels may sometimes be shipped loose in container.
4. Packing screws should be checked and adjusted to torque stated in IOM as these could loosen during transport — overtightening will reduce seal life.

⚠ WARNING

Take safety precautions to avoid risk to personnel from unexpected leakage through packing when valve is first exposed to pressure.

FLANGE BOLTING AND INSTALLATION INSTRUCTIONS

1. KS1 standard pipe connection is “flanged” where port flange mounting holes are tapped.
2. All flange holes in a valve size are same depth.
3. KS1 Series valves are designed to suit flanges compliant to ASME B16.5 and B16.47, and gaskets designed to ASME VIII-1 Appendix 2, and ASME B16.20 and B16.21.
4. Torque on flange bolt should not exceed values shown in Table 1.

⚠ WARNING

Incorrect bolt or stud length may damage thin wall at bottom of flange hole and risk integrity of pressure boundary.

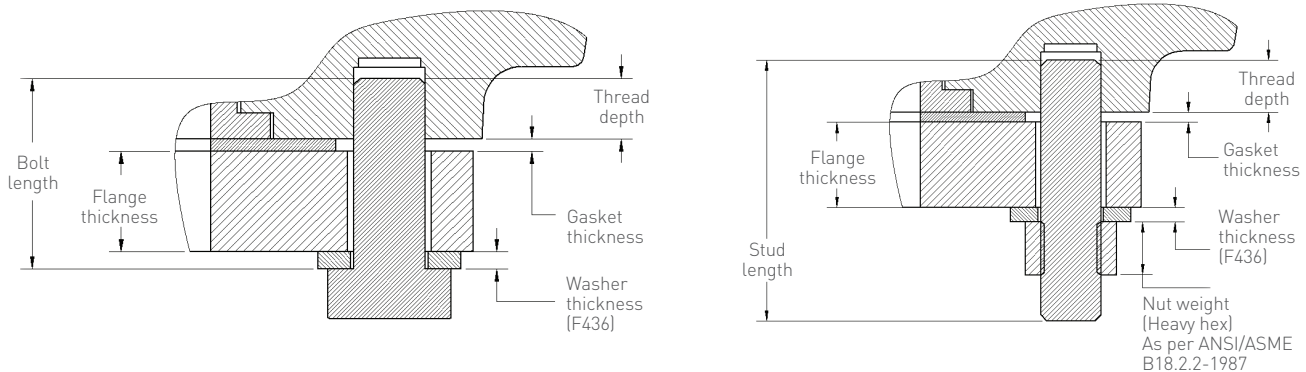
TABLE 1 - MAXIMUM TORQUE ON FLANGE BOLTS OR STUDS

Valve size		Bolt size in	Torque		Recommended no. of washer for bolt	Recommended bolt length		Recommended no. of washer for stud	Recommended stud length	
NPS	DN		ft-lb	Nm		in	mm		in	mm
2	50	5/8-11	120	160	1	1.50	40	1	2.50	65
3	80	5/8-11	120	160	3	2.00	50	1	2.75	70
4	100	5/8-11	120	160	3	2.00	50	1	2.75	75
6	150	3/4-10	200	270	2	2.00	50	1	3.00	75
8	200	3/4-10	200	270	2	2.25	60	1	3.25	80
10	250	7/8-9	320	430	2	2.25	60	1	3.50	90
12	300	7/8-9	320	430	1	2.25	60	1	3.50	90
14	350	1-8	470	640	2	2.50	60	1	3.75	95
16	400	1-8	470	640	1	2.50	60	1	4.00	100
18	450	1-1/8-8	690	940	2	2.50	60	1	4.25	110
20	500	1-1/8-8	690	940	1	3.00	75	1	4.50	115
24	600	1-1/4-8	950	1290	2	3.25	80	1	5.00	125
26	650	1-1/4-8	950	1290	1	4.00	100	1	6.00	150
28	700	1-1/4-8	950	1290	1	4.25	110	1	6.00	150
30	750	1-1/4-8	950	1290	1	4.25	110	1	6.25	160

NOTES

1. Maximum torque (assuming lubricated bolts) should not be exceeded to ensure threaded flange holes in valve body are not damaged.
2. Recommended bolt length assumes; Gasket thickness = 0.125 in.; F436 Flat washer thickness;
3. Below diagrams provide details on calculation of flange bolt/stud length.
4. Incorrect bolt or stud length may damage thin wall at bottom of flange hole and risk integrity of pressure boundary.
5. Consult sales for recommended torques for hole sizes other than ASME.

BASIS OF BOLT LENGTH AND STUD LENGTH CALCULATION



Bolt length = Washer thickness + Flange thickness + Flange raised face + Gasket thickness + Valve body recess + 1 x Bolt diameter

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

OPERATIONAL CONSIDERATIONS

⚠ WARNING

Valves must be operated within published design pressure and temperature limits stated on Emerson Label.

1. An operator should have an understanding of the effects of opening/closing a valve within overall piping system and should ensure a valve is in good operating condition prior to operating it under pressure.
2. An operator should be aware if media contains hazardous material and specific health and safety risks associated with that medium, as a damaged liner can result in leakage between body halves.
3. Stand clear of any moving parts such as stem and/or gate assembly when operating and use gloves when operating manual valves to minimize risk of injury.
4. All manual-handwheel-operated valves are designed for hand input of less than 88 lbs (40 kg); do not apply excessive input torque via pipe wrenches, 'cheater bars', or other devices.
5. If a manual-handwheel-actuated valve is difficult to operate due to torque requirements, valve should be serviced.
6. Electric motor actuated valves should be left in their factory-set condition unless system operating parameters dictate a change. In these cases, perform cycling in small increments using the lightest/slowest settings possible in order to achieve desired performance, as excessive torque may result in unexpectedly high thrust and damage the valve.
7. KS1 valves are position-seated and should never be torque-seated; do not use motor torque settings to seat a valve.
8. Care should be taken to ensure that electrical motors are wired correctly; incorrect phasing of 3-phase wiring may cause valve/motor damage.
9. ACME thread on stem in manual handwheel and bevel gearbox actuations should always be well lubricated with a suitable lubricant (Shell Gadus S2 OG 85 or equivalent), as failure to do so may result in damage to valve or excessive thrust to actuate.

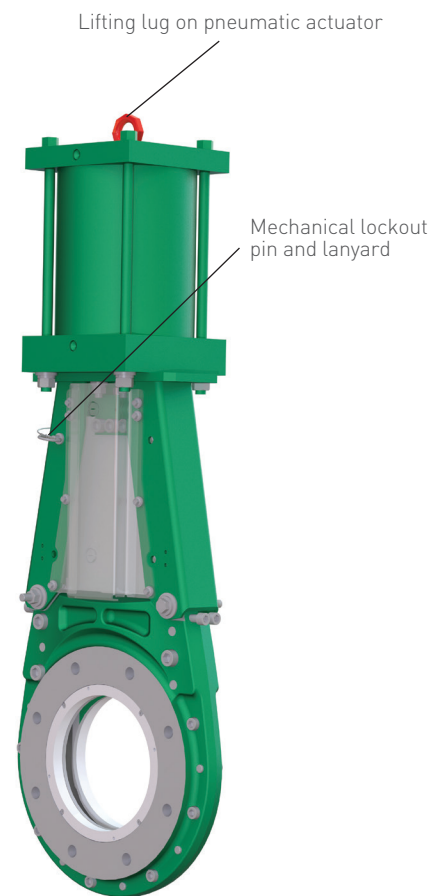
LIFTING LOCATION AND LOCKOUTS

⚠ WARNING

Product limitation

Mechanical lockouts on a linear-actuated valve are designed to prevent gate movement caused from line pressure or gravity and to provide a visual indication of gate position.

1. KS1 valves may be supplied with optional lifting lugs either at yoke connection bolts or on top of pneumatic cylinder.
2. Mechanical lockout for open/closed is provided as standard on all valves.
3. Handwheel-style lockouts are also provided on bevel gearbox valves.
4. Energy lockouts are required for electric, pneumatic and hydraulic cylinder actuators to remove energy and avoid damage to mechanical lockout and valve itself.



CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

ADJUSTMENTS TO PACKING

1. KS1 valves have incorporated a “transverse” type packing gland which can be adjusted with valve in-line under pressure.
2. Each valve has four packing screws: a pair on each side of the valve and one on each side of the port centerline near the yoke connection.
3. Packing material to be used is Balmar LLC 636G in a stick form of a diameter less than packing screw size per Table 2, which also includes recommended torque settings for each valve size.
4. To adjust, remove one packing screw on upstream side of valve, insert 636G into hole, and torque screw to value in Table 2.
5. If torque in Table 2 is not reached before screw reaches full engagement, remove packing screw on opposite side of upstream side, insert 636G into hole, and torque screw to value in Table 2.
6. Repeat Steps 4 and 5 on upstream side until both packing screws are set to torque in Table 2.
7. Repeat Steps 4, 5 and 6 for downstream side of valve.

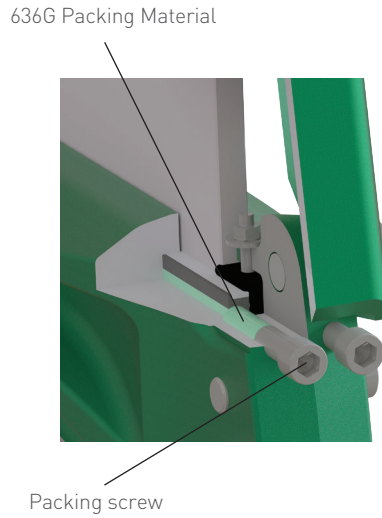


TABLE 2 - PACKING SCREW DETAILS AND RECOMMENDED TORQUE

Valve size		Packing screw size	Packing screw length (mm)	Hex drive (mm)	Initial packing torque setting	
NPS	DN				Nm	ft-lb
2	50	M8 x 1.25	35	6	8	6
3	80	M8 x 1.25	30	6	8	6
4	100	M12 x 1.75	30	10	8	6
6	150	M12 x 1.75	35	10	11	8
8	200	M12 x 1.75	35	10	11	8
10	250	M12 x 1.75	35	10	11	8
12	300	M12 x 1.75	35	10	11	8
14	350	M12 x 1.75	35	10	11	8
16	400	M16 x 2.0	40	14	11	8
18	450	M16 x 2.0	50	14	14	10
20	500	M16 x 2.0	50	14	14	10
24	600	M16 x 2.0	50	14	14	10
26	650	M16 x 2.0	50	14	14	10
28	700	M16 x 2.0	50	14	14	10
30	750	M16 x 2.0	50	14	14	10

NOTES

1. If leaking through packing, increase packing torque one screw at a time (1 Nm or 1 ft-lb) as required.
2. If leaking does not stop when torque reaches 2x value in Table 2, valve should be scheduled for disassembly and a major service.

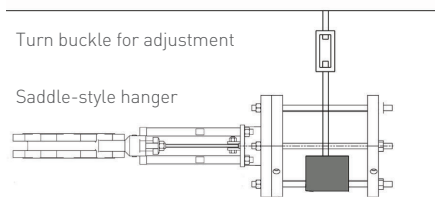
CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

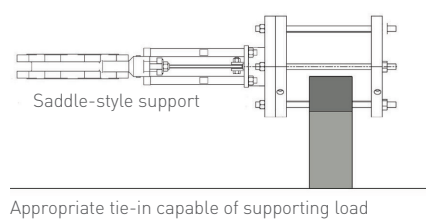
CYLINDER SUPPORT METHODS FOR HORIZONTALLY OR OFF-VERTICAL MOUNTING

1. Pneumatic and hydraulic cylinders require additional support when mounted in an orientation other than vertical, and failure to do so could lead to failure of cylinder and/or valve.
2. Suggested methods included in this document are conceptual in nature, and design of supporting structures is responsibility of user.
3. It is important that linear actuator and gate are aligned axially.
4. Supports shall be designed to maintain alignment and carry bulk weight of actuator and own weight considering all loads.

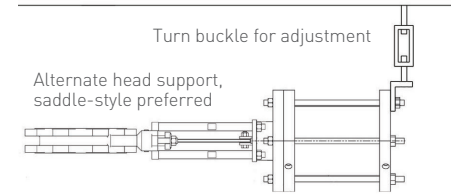
INSTALLATION A



INSTALLATION B



INSTALLATION C



RECOMMENDED LONG-TERM STORAGE

Storage procedures maximize product integrity during extended storage up to 5 years.

Storage facility

1. Location to be clean, dry and covered from direct exposure to sunlight - ideally in a container or building protected from the environment.
2. OEM shipping containing is not suitable for storage exposed to the environment.

Periodic inspection

Visual inspections shall be performed at 6-month intervals of the following and a record maintained:

1. Environment is clean, dry and goods are covered from direct exposure to sunlight.
2. If goods are unwrapped:
 - Check flange covers are in-place.
 - Apply Loctite® 9660 rust inhibitor (or - equivalent) to flange face and holes.

Maintenance

Maintenance shall consist of correcting deficiencies noted during inspection and recorded in a log.

Cylinder storage

These cylinder storage instructions are not intended to replace the instructions of the specific cylinder manufacturer and are to be used as a guide only. If specific instructions are required, contact Emerson Sales.

For storage of up to 3 years:

1. Apply by injection a high-quality grade of hydraulic oil or synthetic lubricant into cylinder ports.
2. Operate cylinder 6-12 times on a yearly basis.

For storage 3-5 years:

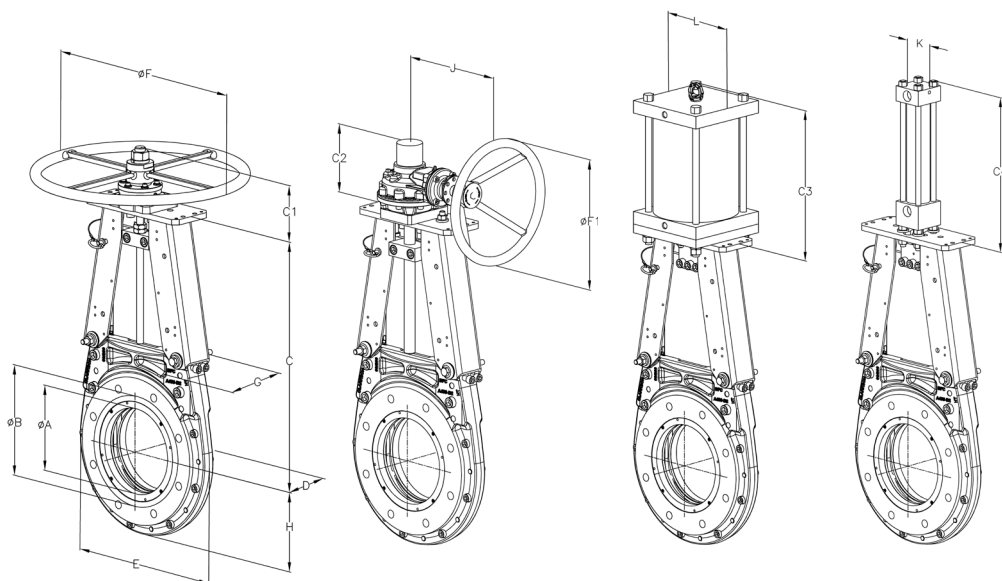
1. Lubricate as above. Additionally, extend cylinder rod until the valve is fully closed, then coat cylinder rod with high-quality heavy grease or synthetic lubricant.
2. Retract cylinder rod until valve is fully open, drawing lubricant into rod end of cylinder.
3. If cylinder is not pre-piped to control accessories, securely plug cylinder ports with pipe plugs.
4. If cylinder is pre-piped to accessories, plug all input and output ports of accessories.

WARNING

Contact your local Emerson representative prior to performing any maintenance if valve is still covered under warranty.

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1



- ØA Valve ID
- ØB Raised face OD
- C Valve center to yoke top plate distance
- D Face to face dimension
- E The maximum valve or upstand clearance dimension for installation
- F Handwheel outer diameter
- G The maximum valve width clearance dimension for installation
- H Valve center to valve bottom distance

DIMENSIONS (inch)

NPS	ØA	ØB	C	C1	C2	C3	C4	D	E	ØF	ØF1	G	H	J	K	L
2	2.0	3.6	9.9	5.5	-	7.3	7.8	2.0	8.5	12.0	-	6.6	4.2	-	2.5	4.5
3	3.0	5.0	12.0	5.5	-	8.3	8.8	2.0	10.0	12.0	-	6.6	5.0	-	2.5	4.5
4	4.0	6.2	14.0	5.5	-	10.1	10.2	2.0	11.2	12.0	-	6.6	5.6	-	2.5	5.5
6	6.0	8.5	18.4	5.5	-	12.8	12.3	2.3	13.4	20.0	-	7.2	6.7	-	2.5	7.5
8	8.0	10.6	22.9	5.5	7.1	15.0	14.9	2.8	16.0	20.0	11.8	8.7	8.0	11.8	3.0	8.5
10	10.0	12.8	27.0	-	7.1	18.7	17.0	2.8	18.2	-	11.8	8.6	9.1	11.8	3.5	10.6
12	12.0	15.0	31.3	-	7.1	20.2	19.0	3.0	21.5	-	11.8	9.8	10.8	11.8	3.5	12.8
14	13.25	16.3	34.4	-	7.4	21.1	21.2	3.0	23.5	-	15.8	9.9	11.8	14.4	4.5	14.8
16	15.25	18.5	38.5	-	7.4	23.9	23.3	3.5	26.3	-	15.8	10.7	13.5	14.4	4.5	17.0
18	17.25	21.0	43.6	-	7.4	26.6	25.8	3.5	28.5	-	15.8	11.9	14.2	14.4	5.0	19.0
20	19.25	23.0	47.8	-	7.5	31.0	28.1	4.5	31.5	-	23.6	12.1	15.7	16.6	5.0	21.0
24	23.25	27.3	57.0	-	8.7	37.4	32.9	4.5	37.1	-	23.6	14.5	18.6	18.1	6.5	25.0
26	25.25	29.5	62.0	-	8.7	39.7	36.4	6.8	38.4	-	23.6	15.8	19.2	18.1	7.5	27.5
28	27.25	31.5	66.9	-	9.9	41.8	38.4	7.1	40.7	-	23.6	17.0	20.3	19.9	7.5	27.5
30	29.25	33.8	70.9	-	9.9	44.7	40.5	7.4	43.2	-	23.6	18.2	21.6	19.9	7.5	29.8

MHW/BG INPUT TORQUE

ft-lb
2
4
5
17
45 (MHW) / 16 (BG)
24
35
39
51
66
93
67
79
72
83

NOTES

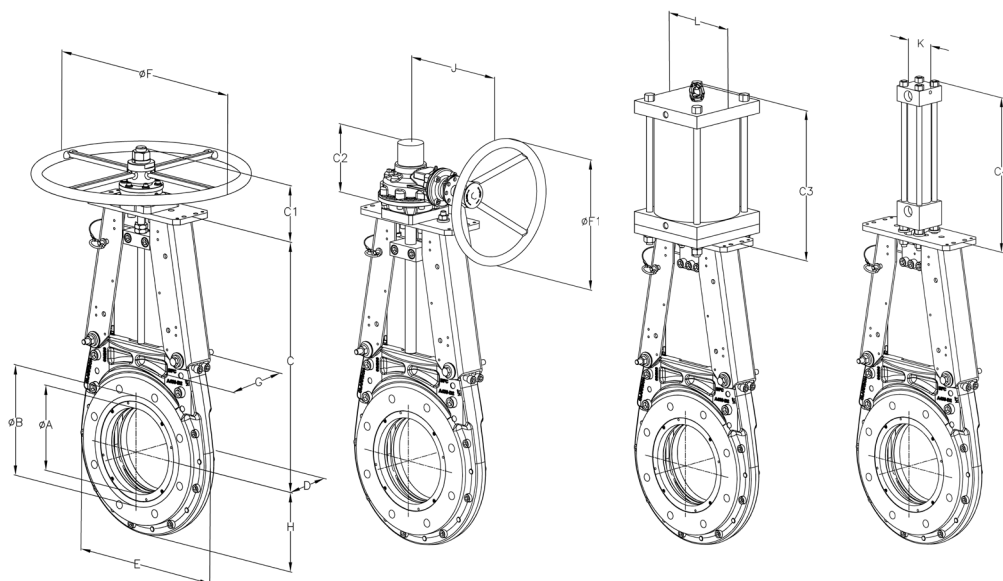
- Torque is value to open valve at rated pressure.
- Actuator bore size based on required thrust to open valve at rated pressure with 80 psi pneumatic or 2,000 psi hydraulic supply pressure.

VALVE WEIGHT (lbs)

Valve size (NPS)	AC Actuation			HC Actuation			BG Actuation			MHW Total MHW valve assembly
	Bare valve assembly	AC actuator	Total AC valve assembly	Bare valve assembly	HC actuator	Total HC valve assembly	Bare valve assembly	BG actuator	Total BG valve assembly	
2	20	13	33	31	9	40	-	-	-	46
3	43	14	57	44	9	53	-	-	-	57
4	62	22	84	55	9	64	-	-	-	71
6	94	49	143	83	10	93	-	-	-	104
8	160	63	223	142	19	161	149	27	176	163
10	225	145	370	197	28	225	205	27	231	-
12	324	205	529	285	30	315	291	27	317	-
14	432	315	747	370	53	423	380	37	417	-
16	595	443	1038	515	56	571	523	37	560	-
18	857	574	1431	754	88	842	763	37	800	-
20	1146	728	1874	1023	93	1116	1035	41	1076	-
24	1757	1444	3201	1547	175	1722	1587	82	1669	-
26	2405	1735	4140	2089	259	2348	2136	82	2218	-
28	2815	1749	4564	2499	270	2769	2573	84	2657	-
30	3296	2491	5787	2927	281	3235	2996	84	3080	-

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1



- ØA Valve ID
- ØB Raised face OD
- C Valve center to yoke top plate distance
- D Face to face dimension
- E The maximum valve or upstand clearance dimension for installation
- F Handwheel outer diameter
- G The maximum valve width clearance dimension for installation
- H Valve center to valve bottom distance

DIMENSIONS (mm)

DN	ØA	ØB	C	C1	C2	C3	C4	D	E	ØF	ØF1	G	H	J	K	L
50	51	92	250	141	-	186	186	51	215	305	-	168	107	-	64	114
80	76	127	304	141	-	210	224	51	254	305	-	168	127	-	64	114
100	102	157	355	141	-	257	259	51	284	305	-	168	142	-	64	140
150	152	216	468	141	-	325	311	57	341	508	-	183	170	-	64	191
200	203	270	582	141	179	380	379	70	406	508	300	220	203	299	76	216
250	254	324	685	-	179	474	431	70	462	-	300	219	231	299	89	270
300	305	381	794	-	179	514	483	76	546	-	300	250	273	299	89	324
350	337	413	872	-	189	537	539	76	597	-	400	251	299	366	114	375
400	387	470	977	-	189	608	591	89	668	-	400	272	343	366	114	432
450	438	533	1108	-	189	676	656	89	723	-	400	302	362	366	127	483
500	489	584	1213	-	191	788	714	114	800	-	600	306	400	422	127	533
600	591	692	1448	-	221	950	836	114	943	-	600	368	472	460	165	635
650	641	749	1576	-	221	1009	924	171	976	-	600	400	488	460	191	699
700	692	800	1699	-	251	1061	976	181	1033	-	600	431	516	505	191	699
750	743	857	1800	-	251	1136	1028	187	1097	-	600	461	548	505	191	756

MHW/BG INPUT TORQUE

Nm
2
5
7
23
61(MHW) / 21(BG)
33
47
53
70
89
126
91
107
97
112

NOTES

1. Torque is value to open valve at rated pressure.
2. Actuator bore size based on required thrust to open valve at rated pressure with 552 kPa pneumatic or 13,790 kPa hydraulic supply pressure.

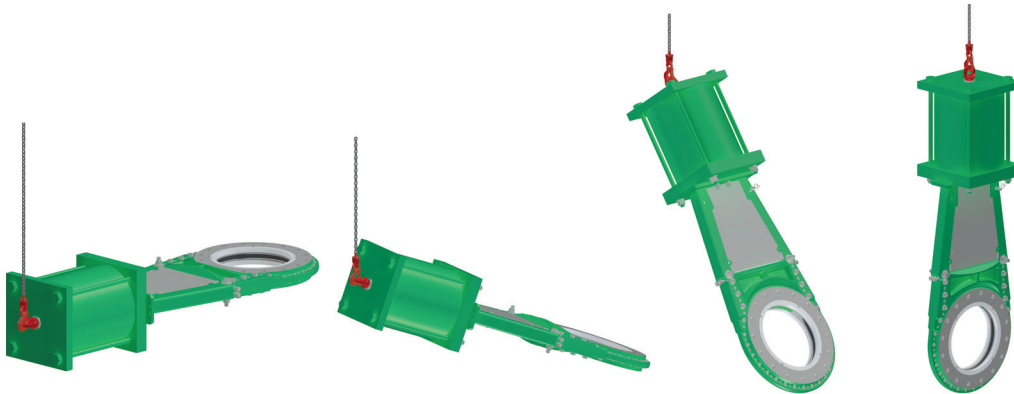
VALVE WEIGHT (kg)

Valve size (DN)	AC Actuation			HC Actuation			BG Actuation			MHW Total MHW valve assembly
	Bare valve assembly	AC actuator	Total AC valve assembly	Bare valve assembly	HC actuator	Total HC valve assembly	Bare valve assembly	BG actuator	Total BG valve assembly	
50	9.1	5.9	15	14	4.1	18	-	-	-	21
80	20	6.4	26	20	4.1	24	-	-	-	26
100	28	10	38	25	4.1	29	-	-	-	32
150	43	22	65	38	4.5	42	-	-	-	47
200	73	29	101	64	8.6	73	68	12	80	74
250	102	66	168	89	13	102	93	12	105	-
300	147	93	240	129	14	143	132	12	144	-
350	196	143	339	168	24	192	172	17	189	-
400	270	201	471	234	25	259	237	17	254	-
450	389	260	649	342	40	382	346	17	363	-
500	520	330	850	464	42	506	469	19	488	-
600	797	655	1452	702	79	781	720	37	757	-
650	1091	787	1878	948	117	1065	969	37	1006	-
700	1277	793	2070	1134	122	1256	1167	38	1205	-
750	1495	1130	2625	1328	127	1467	1359	38	1397	-

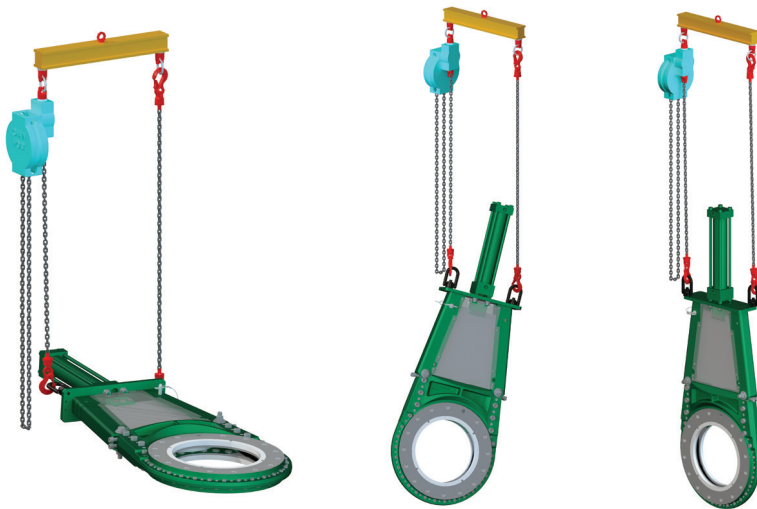
CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

RECOMMENDED METHOD FOR LIFTING VALVES



Pneumatic actuated valves have one lifting lug on top of actuator which can be used to lift complete valve assembly.



Other actuated valve including manual, bevel gearbox, and hydraulic can be lifted using Emerson-supplied lifting lugs on either side of valve yoke top plate as shown above for hydraulic-actuated.

⚠ WARNING

- *Lifting methods are recommended only; always consult a qualified dogger before lifting valve*
- *Be aware of center-of-gravity location provided in GA drawing for each valve; additional controls may be required to limit movement of valve when lifting between horizontal and vertical*
- *Confirm weight of valve from table prior to lifting to ensure selection of equipment has required SWL*
- *If lifting lugs are damaged – do not use to lift valve*
- *Orient lifting lugs in direction of attached chain/sling when connecting – lugs will rotate in direction of load when under minimal loads. Load should be removed from lug (by resting valve on ground) when there is a need to re-orient lugs in direction of load*
- *Care must be taken to limit shock loads during handling and to avoid damage to valve*
- *A spreader is required to aid lifting when using two lugs near center*
- *Chain block is required on one lug, as shown, to adjust chain length and to orient valve vertically*

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

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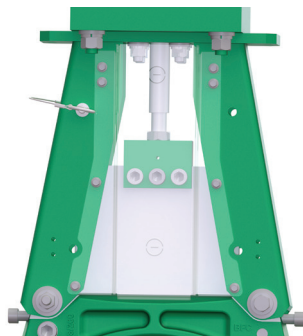
REPLACEMENT OF SEAT AND T. SEAL

⚠ WARNING

Beware of placing limbs in valve bore when Gate is open.

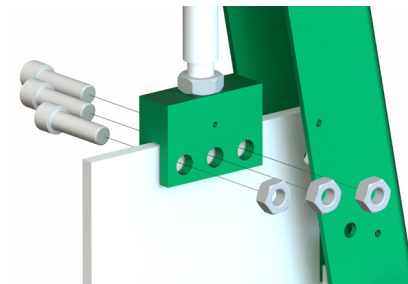
1. Remove Gate Guard

- I. For ease of dis-assembly, Gate should be between 50-75% in open position.
- II. Remove fasteners from both Gate Guards.

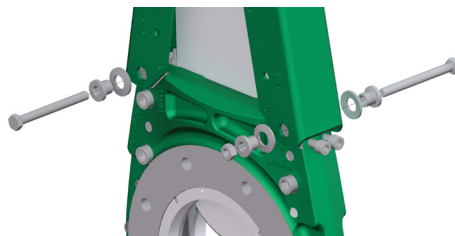


2. Disconnect Yoke from Body

- A. Linear Actuation (AC/HC)
 - I. Remove fasteners from Lifter/Gate connection.



- II. Remove fasteners from Yoke/Body connection.



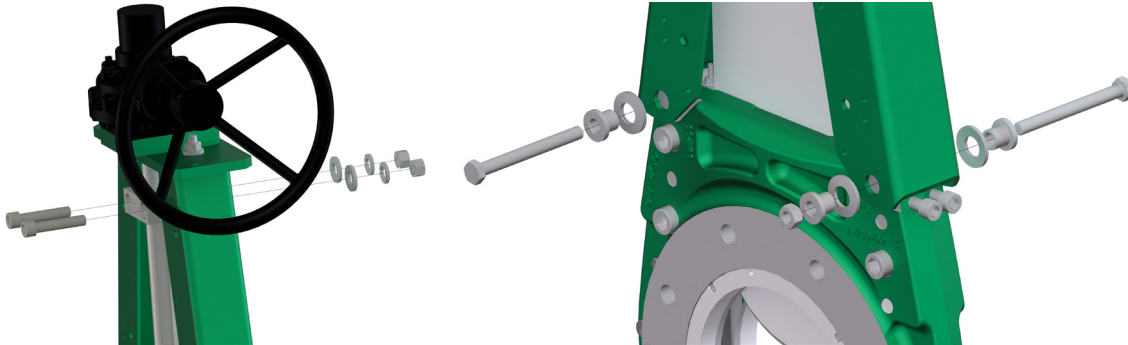
- III. Remove Yoke and Actuator from Body.



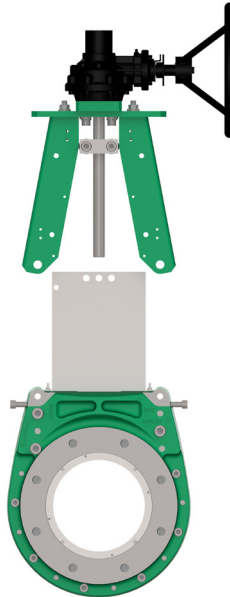
CLARKSON SEVERE SERVICE KNIFE GATE VALVE MODEL KS1

B. Rotatory Actuation (BG)

- I. Remove fasteners from Lifter/Gate connection and Yoke/Body connection.



- II. Remove Yoke and Actuator from Body.



3. Disassemble Body

- I. Loosen Nut.
- II. Loosen Chest and upper Body Bolt fasteners to alleviate compression to gate.
- III. Remove Gate from Body assembly.
- IV. Remove all remaining Chest and Body Bolt fasteners.
- V. Separate each Body half.
- VI. Carefully remove Gate Scrapers prior to removing Transverse Seal.



CLARKSON SEVERE SERVICE KNIFE GATE VALVE

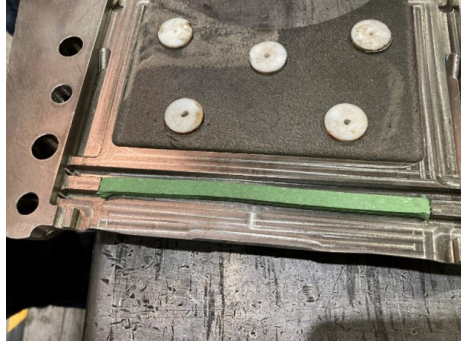
MODEL KS1

4. Re-assemble Body

- I. Check if Packing (636g) is okay to re-use or replace with packing from kit - rectangular profile.
- II. Packing for Transverse Seal will be longer than cavity to allow for preload.

TABLE 3 - PACKING LENGTH

Valve size (NPS)	Extruded Packing Length (in)
2	2.0
3	3.0
4	4.0
6	6.0
8	8.0
10	10.0
12	12.0
14	13.5
16	15.5
18	17.5
20	19.5
24	23.0
26	25.5
28	27.5
30	29.5



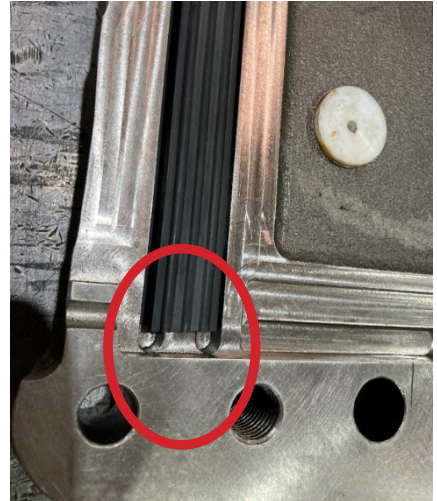
- III. Check Transverse Seal length, trim as necessary per Table 4, then install into Transverse Seal Cavity. Ensure Transverse Seal is centered in cavity. Repeat with second Body.

NOTES

Length of Transverse Seal will be shorter than valve chest width.
 If Transverse Seal is warped or does not lay flat, use a heat gun to flatten out.

TABLE 4 - TRANSVERSE SEAL LENGTH

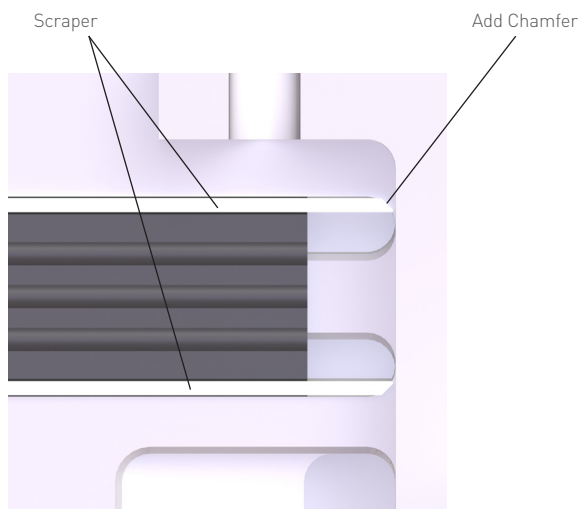
Valve size (NPS)	T-Seal length (in)
2	2.75
3	3.75
4	4.50
6	7.13
8	9.13
10	10.88
12	13.63
14	14.88
16	16.88
18	19.25
20	21.50
24	25.00
26	27.00
28	29.00
30	31.00



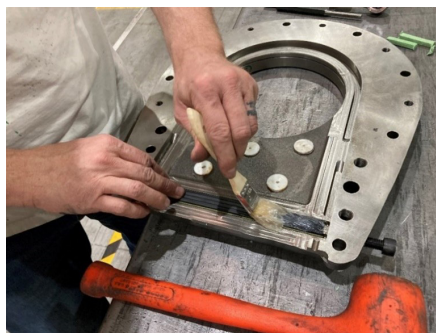
CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

IV. Cut Gate Scrapers to match Valve chest width. Add chamfer to clear radius corners in Transverse Seal Cavity. Scrapers will help hold Transverse Seal down by sitting on top of lip. Repeat with Second Body.



V. Once Scrapers are installed, apply a layer of Dow111 to whole length of Transverse Seal. Repeat with second Body.



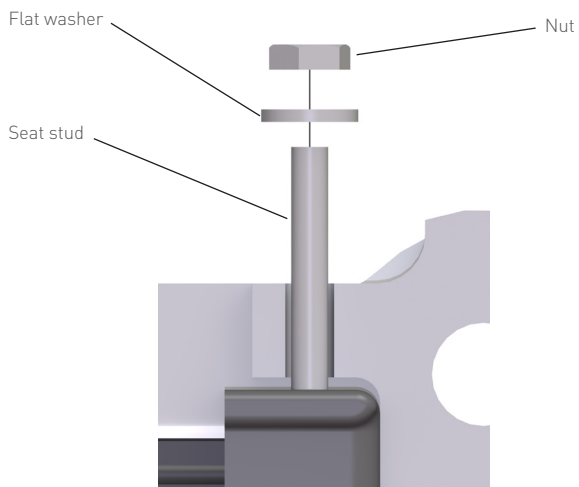
VI. Apply Dow111 to interior of Seat and place Seat in designated groove on one Valve body half. Ensure Seat Stud lines up in slots at top of body and Seat Ramp profile of Seat aligns with mating feature of Body.



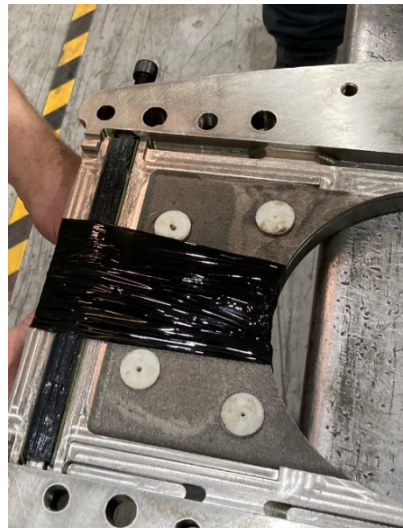
CLARKSON SEVERE SERVICE KNIFE GATE VALVE

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VII. Use a flat washer and a nut to prevent Seat from moving. Only tighten by hand at this stage.



VIII. Add shrink wrap or equivalent to Body half without Seat from port to the top, securing Packing, Transverse Seal, and Scrapers. This will prevent movement while putting body halves together.



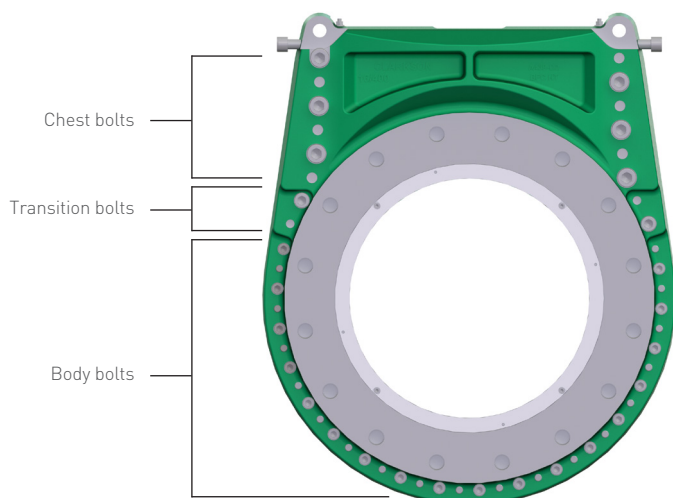
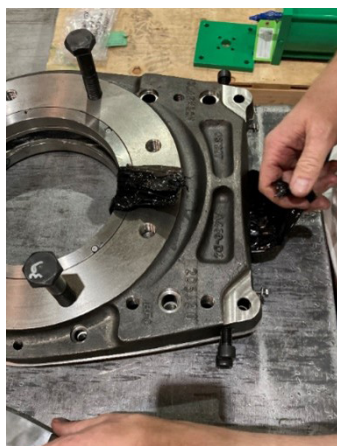
CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

IX. Place second Body half on top of first Body half. Ensure second Body lines up with Seat. Cut shrink wrap and remove from Body assembly. Place Body, Chest and Transition - if available - Bolts by hand on one Body half, adding anti-seize to each Bolt. Once Body halves are together by hand on one side, tighten nuts to Seat Stud by hand as it may appear to be loose at this point. Ensure that Seat cavity aligns.

⚠ WARNING

Beware of pinch points when bringing body housings together. Bolts in Body may be used to bring housings together. If weight is < 35 lbs. Use other suitable and safe lifting techniques such as a crane if weight is > 35 lbs



CLARKSON SEVERE SERVICE KNIFE GATE VALVE

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X. Apply thin layer of Dow111 to gate surfaces and edges to help with installation. Install Gate in vertical position is highly recommended. Take care not to hit Transverse Seal components while installing Gate.



XI. Once Gate is installed into Valve Assembly, install second set of Body, Chest and Transition - if available - Bolts to second Body half. Begin to torque down fasteners in sequence, as shown below. Repeat torquing sequence for other side.

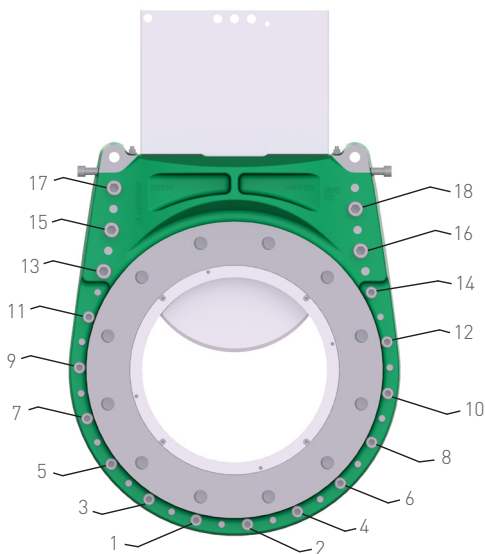
NOTES

Once Body assembly is upright, it is recommended to double check torque of each Bolt.

Torque values are based on steel bolting, well lubricated with heavy graphite and oil mixture.

TABLE 5 - BODY FASTENER TORQUE

Valve size (NPS)	Chest bolt (Nm)	Transition bolt (Nm)	Body bolt (Nm)
2	60	-	60
3	110	-	60
4	110	-	60
6	110	-	60
8	260	-	110
10	260	-	60
12	260	-	110
14	260	-	110
16	500	260	110
18	860	500	260
20	860	500	260
24	1700	860	500
26	1700	860	500
28	1700	860	500
30	1700	860	500



CLARKSON SEVERE SERVICE KNIFE GATE VALVE MODEL KS1

XII. Torque Nut on Seat Studs evenly per Table 6.

TABLE 6 - SEAT NUT TORQUE

Valve size (NPS)	Torque (Nm)
2	10
3	10
4	10
6	10
8	10
10	10
12	10
14	10
16	10
18	10
20	10
24	10
26	20
28	20
30	20



5. Re-Assemble Yoke and Actuator Assembly to Gate

A. Linear Actuation (AC/HC)

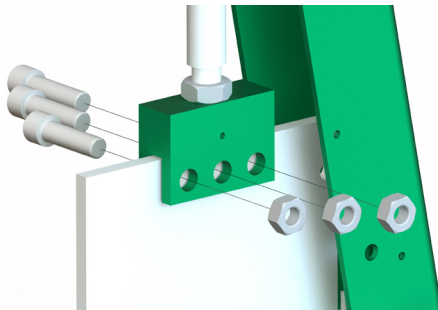
I. Attached Lifter to Gate using Lifter Bolts and Nuts. Use Loctite 242 for threads. Torque Bolts per Table 7

NOTE

For 2" through 4" HC/AC Actuation, Clevis pin may be used instead of Bolt.

TABLE 7 - LIFTER BOLT TORQUE

Valve size (NPS)	Lifter bolt torque (Nm)
2	20
3	20
4	20
6	80
8	220
10	220
12	220
14	340
16	340
18	660
20	660
24	1150
26	2300
28	2300
30	2300

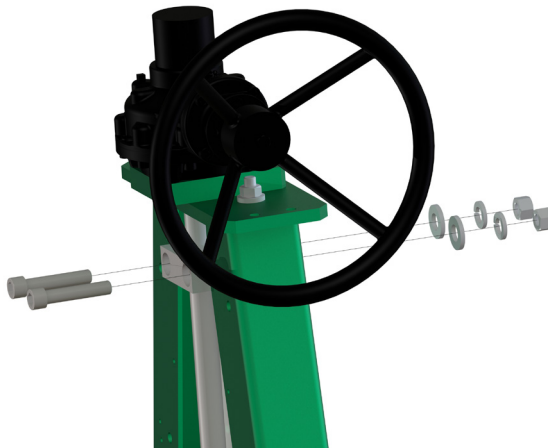


CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

B. Rotary Actuation (BG)

I. Attached Lifter to Gate using Lifter Bolts, Flat Washers, Lock Washers and Nuts. Torque Bolts per Table 7.

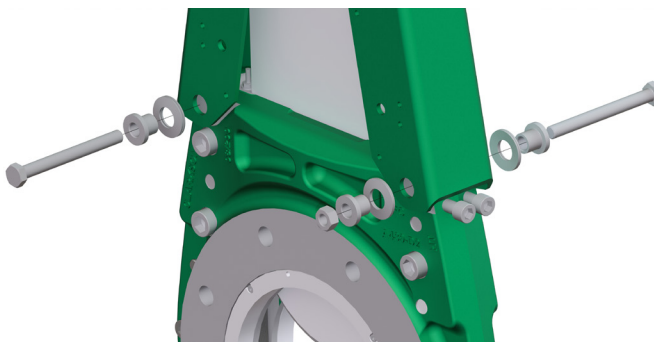


6. Re-Assemble Yoke to Body

I. Attach Yoke/Actuator assembly to Valve Body assembly using Yoke Bolts, Yoke Bushings, Belleville Washers, and Yoke Nuts. Once Yoke fasteners are installed, torque bolts per Table 8.

TABLE 8 - YOKE BOLT TORQUE

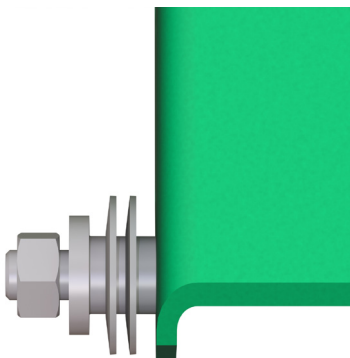
Valve size (NPS)	Yoke bolt torque (Nm)
2	90
3	90
4	90
6	90
8	150
10	150
12	350
14	350
16	690
18	690
20	690
24	1180
26	2340
28	2340
30	2340



NOTES

Orient Belleville Washer such that concave side faces Yoke.

If multiple Belleville washers are required, stack in Parallel.



II. Install Gate Guards.

CLARKSON SEVERE SERVICE KNIFE GATE VALVE

MODEL KS1

7. Materials for Replacement

- I. DOW Corning 111
- II. Loctite 242
- III. Seat Kit
- IV. Transverse Seal Packing Kit
 - a. Kit will include two sets of packing
 - i. Rectangular profile for Transverse Seal Cavity
 - ii. Round profile for Packing through Packing Bolts at sides of Valve Assembly

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