CLARKSON URETHANE KNIFE GATE VALVE
FIGURE SU10R

Installation and maintenance instructions for replaceable urethane-lined knife gate valve

IMPORTANT FEATURES

• Face to face to MSS SP-81.
• Bi-directional valve, no special considerations relating to direction of flow are required when installing valve.
• Mating pipeline flanges must be properly aligned - never try to make up for misaligned pipeline flanges using valve body.
• Slip-on or weld-neck flanges can be used - maximum flange inside diameter (ID) to be per ASME B16.5 slip-on/socket welding bore dimension
• Full face flanges typically would improve liner life.
• Flange fasteners should be tightened in a uniform manner using a cross-pattern to achieve optimum uniformly gasket seal.
• A fiber sheet gasket can be used if desired - do not use soft gaskets.
• Pipeline supports and/or expansion joints should be used to minimize pipe loads on valves.
• SU10R valves are suitable for use in either vertical or horizontal lines - if installation in other than vertical orientation additional support will be required for cylinder actuated valves.

GENERAL INFORMATION

The Clarkson SU10R knife gate valve offers bi-directional isolation with a field replaceable liner that completely protects valve wetted area from abrasion and corrosive slurries, increasing reliability and service life.

LABEL CONTENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Example</th>
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<tbody>
<tr>
<td>MAWP</td>
<td>Maximum allowable working pressure</td>
<td>1000 kPa</td>
</tr>
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<td>Comply</td>
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<td>Size</td>
<td>Valve nominal size</td>
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<td>Flange</td>
<td>Valve mounting flange standard</td>
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<td>Body</td>
<td>Body material</td>
<td>ASTM A395-60</td>
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<td>Gate</td>
<td>Gate material</td>
<td>316 S/S</td>
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<tr>
<td>Temp</td>
<td>Maximum working temperature, wet or dry</td>
<td>50°C wet/80°C dry</td>
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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 gland nuts should be checked and adjusted to be a firm torque as these could loosen during transport – overtightening may increase valve operating force and shorten packing life.

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

BOLTING AND INSTALLATION INSTRUCTIONS
1. SU10R flange configuration is a combination of tapped holes in chest and through bolting.
2. Flange mounting holes in chest area have limited depth and care must be taken to ensure flange bolts do not bottom out in chest hole.
3. Studs are recommended in chest holes
4. Flange bolts are a structural component of a SU10R valve and must have a minimum yield strength as follows:
   - Metric: 640 MPa (ISO898 Class 8.8 or better)
   - ISO 3506-1 A2-80 & A4-80
   - ANSI: SAE J429 Grade 5
5. Flange bolts must have required torque as shown in table 1.
6. Additional gaskets are not required as Liner provides sealing to pipe flange.
7. If a gasket is used a thin compressed fiber type is recommended - Do not use thick soft gaskets.

WARNING
Care must be taken when installing studs or bolts in tapped flange chest holes to prevent damage to wall of valve.

TABLE 1 - MINIMUM AND MAXIMUM TORQUE ON FLANGE BOLTS OR STUDS

<table>
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<tr>
<th>Valve size DN (NPS)</th>
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<th>Min torque Nm</th>
<th>Max torque Nm</th>
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<td>67</td>
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<td>All</td>
<td>41</td>
<td>67</td>
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<td>250 [10]</td>
<td>M16, ¾&quot;UNC</td>
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</tr>
<tr>
<td></td>
<td>M20*</td>
<td>80</td>
<td>131</td>
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<tr>
<td>300 [12]</td>
<td>**</td>
<td>80</td>
<td>131</td>
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<td>350-500 [14-20]</td>
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<td>M24 (+1&quot;UNC)*</td>
<td>139</td>
<td>225</td>
</tr>
<tr>
<td>600 [24]</td>
<td>M24</td>
<td>139</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>M27 (+1½&quot;UNC)*</td>
<td>203</td>
<td>330</td>
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</table>

* and larger
** all

NOTE
Maximum torque should not be exceeded to ensure threaded flange holes in valve body are not damaged.
1. SU10R polyurethane liner flange provides sealing between valve and pipe flange.
2. Liner flange is locked to valve body by a locking tab which is compressed by pipe flange locking liner to valve.
3. Slip-on flanges can be used however must compress liner on locking tab and provide a seal on liner as described in the following conditions:
   - Inside diameter of pipe flange no larger than ASME B16.5 slip-on/socket welding minimum bore dimension
   - Pipe flange bore must be concentric with valve bore
4. Flat flanges with a bore matching valve bore will provide optimum sealing and liner life.

WARNING
1. Soft flange and pipe lining material will not compress liner flange to achieve a reliable seal.
2. Consult Emerson for advice on using SU10R in applications with non-metal pipe/liner/flange.
CLARKSON URETHANE KNIFE GATE VALVE

FIGURE SU10R

WORKING OUT BOLT AND STUD LENGTHS FOR FLANGES

WARNING

Check flange bolting is correct length for chest bolts. Bolts that are too long will damage chest and/or prevent valve isolation. Chest bolts that are too short could result in threads stripping. Consider studs for chest flange holes.

NOTE

Liner face-to-face dimension is slightly larger than MSS-SP81 as liner acts as a gasket and will compress during installation.

For blind chest thread bolt length

Bolt length = Washer thickness + Pipe flange thickness + Chest full thread depth.

Always round down to avoid damage at bottom of tapped hole. If rounding down more than 3 mm consider adding flat washers and rounding down to ensure maximum thread engagement is achieved in chest holes.

For through bolt length

Bolt length = Washer thickness + 2 x Pipe flange thickness + Valve face to face + Nut thickness.

Round up or add at least 5 mm to ensure full nut engagement plus two threads.

TABLE 2

<table>
<thead>
<tr>
<th>Valve size DN (NPS)</th>
<th>Valve Face to face</th>
<th>Chest full thread depth</th>
<th>Flange bolting AS 2129 Table C, D</th>
<th>Flange bolting AS 2129 Table E</th>
<th>Flange bolting ASME 150</th>
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<td>M30 75 260 110</td>
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<td>M27 60 230 100</td>
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OPERATIONAL CONSIDERATIONS

WARNING
All valves should be operated within their design pressure and temperature ranges

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 of gloves when operating manual valves to minimize risk of injury.
4. All manual handwheel operated valves are designed for hand input of less than 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, and in these cases perform cycling in small increments using the lightest/slowest settings possible to achieve desired performance as excessive torque may indicate unexpected high thrust in valve.
7. For electric motor actuation travel switches must be set to close a valve with no more than 1 mm Liner compression after fully closed.
8. Care should be taken to ensure electrical motors are wired correctly in 3-phase systems as damage to valve may occur with incorrect direction of movement.

LOCKOUTS

Options
All valves should be operated within their design pressure and temperature ranges

1. Optional mechanical lockouts for open and closed are available for hand wheel, pneumatic and hydraulic valves.
2. Handwheel style Lockouts are available on BG operated valves.
3. Energy lockouts required for electric, pneumatic and hydraulic cylinder actuators.

WARNING
Product limitation
Mechanical lockouts on a linear actuated valve will not resist potential energy of actuator and are designed to prevent gate movement caused by line pressure or gravity.
GENERAL MAINTENANCE

Emerson recommends Clarkson SU10R valves be inspected every 60 days as follows:
1. Cylinder rods:
   - Wipe to remove any particles
   - Inspect for wear and leaks
2. Packing gland:
   - Check for leaks or worn packing
   - Check torque on gland nuts
3. Polyurethane liner:
   - Examine body and flange for leakage
   - Leaks indicate damaged liner

NOTE
Storage of SU10R valve should be with gate 100% closed to maintain liner integrity.

REPACKING INSTRUCTIONS

1. Pressure in valve MUST be removed.
2. See section on liner replacement for instructions on removal of actuator, bridge and gate/gland box.
3. See table below for packing length by valve size.
4. Packing should be cut with 45 degree mitres on ends of each piece of packing.
5. Mitres in a row MUST sit on top of each other and placed in middle of long side in gland box.
6. Packing is slightly longer than gland box length to ensure compression in join.
7. Joins for different layers of packing should be staggered to opposite side to ensure joins are not aligned between each row of packing.
8. All sizes have two rows while DN 600 has three.
9. Work packing around gate - there should be no twists.
10. Use a blunt tool to work packing into gland.
11. Follow re-assembly instructions in liner replacement section.
12. Cycle gate several times as this will distribute packing forces - then adjust gland box nuts again.

WARNING
Take safety precautions to avoid risk to personnel from unexpected leakage through packing when valve is first exposed to pressure.
CLARKSON URETHANE KNIFE GATE VALVE

CYLINDER SUPPORT METHODS FOR HORIZONTALLY OR OFF-VERTICAL MOUNTING

1. Cylinders may require additional support when mounted in an orientation other than vertical and failure to do so could lead to premature 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.

PACKING SIZES

<table>
<thead>
<tr>
<th>Valve size DN (NPS)</th>
<th>Packing length mm (inch)</th>
<th>Packing section mm (inch)</th>
<th>Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 (2)</td>
<td>196 (7.72)</td>
<td>10.0 (⅜)</td>
<td>2</td>
</tr>
<tr>
<td>80 (3)</td>
<td>260 (10.24)</td>
<td>10.0 (⅜)</td>
<td>2</td>
</tr>
<tr>
<td>100 (4)</td>
<td>310 (12.20)</td>
<td>10.0 (⅜)</td>
<td>2</td>
</tr>
<tr>
<td>150 (6)</td>
<td>430 (16.93)</td>
<td>12.7 (½)</td>
<td>2</td>
</tr>
<tr>
<td>200 (8)</td>
<td>537 (21.14)</td>
<td>12.7 (½)</td>
<td>2</td>
</tr>
<tr>
<td>250 (10)</td>
<td>650 (25.59)</td>
<td>12.7 (½)</td>
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<td>300 (12)</td>
<td>745 (29.33)</td>
<td>12.7 (½)</td>
<td>2</td>
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<td>350 (14)</td>
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<td>12.7 (½)</td>
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<td>400 (16)</td>
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<td>450 (18)</td>
<td>1040 (40.94)</td>
<td>12.7 (½)</td>
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<td>500 (20)</td>
<td>1140 (44.88)</td>
<td>14.0 (⅜)</td>
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<tr>
<td>600 (24)</td>
<td>1370 (53.94)</td>
<td>15.0 (⅜)</td>
<td>3</td>
</tr>
</tbody>
</table>

HANDWHEEL, HYDRAULIC OR BEVEL GEAR OPERATED VALVES

Equipment orientation
Valves may be stored in vertical or horizontal position.

Preparation for storage
1. Valves may be stored as shipped, provided storage facility and equipment orientation instructions are followed.
2. If valve packaging is altered or removed for receiving inspection, repackage valve as originally received.

Storage inspection
Visual inspection 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 un-wrapped:
   - Check flange covers are in-place protecting liner.
   - Apply loctite 9660 rust inhibitor (or equivalent) to flange holes in chest.

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.

INSTALLATION A
Turnbuckle for adjustment
Saddle style hanger

INSTALLATION B
Saddle style support
Appropriate tie-in capable of supporting load

INSTALLATION C
Alternate head-support, saddle style preferred
Turnbuckle for adjustment

HANDWHEEL, HYDRAULIC OR BEVEL GEAR OPERATED VALVES

WARNING
Valves must be stored with gate in closed position to maintain Liner integrity.

INSTALLATION A
Turnbuckle for adjustment
Saddle style hanger

INSTALLATION B
Saddle style support
Appropriate tie-in capable of supporting load

INSTALLATION C
Alternate head-support, saddle style preferred
Turnbuckle for adjustment

RECOMMENDED LONG TERM STORAGE
Storage procedures maximize product integrity during extended storage up to 5 years.

WARNING
Valves must be stored with gate in closed position to maintain Liner integrity.

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.
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Storage inspection
Visual inspection 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 un-wrapped:
   - Check flange covers are in-place protecting liner.
   - Apply loctite 9660 rust inhibitor (or equivalent) to flange holes in chest.

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

WARNING
Contact factory prior to performing any maintenance if valve is still covered under warranty.

PACKING SIZES

<table>
<thead>
<tr>
<th>Valve size DN (NPS)</th>
<th>Packing length mm (inch)</th>
<th>Packing section mm (inch)</th>
<th>Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 (2)</td>
<td>196 (7.72)</td>
<td>10.0 (⅜)</td>
<td>2</td>
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<tr>
<td>80 (3)</td>
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<td>150 (6)</td>
<td>430 (16.93)</td>
<td>12.7 (½)</td>
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<td>200 (8)</td>
<td>537 (21.14)</td>
<td>12.7 (½)</td>
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<td>650 (25.59)</td>
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<td>1370 (53.94)</td>
<td>15.0 (⅜)</td>
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</tbody>
</table>
### Notes

D = The face to face dimension.

E = The maximum valve or upstand clearance dimension for installation.

G = The maximum valve width clearance dimension for installation.

Pneumatic actuator sizing is based on clean water service at 1000 kPa valve line pressure and 550 kPa (80 psi) actuator air supply pressure for valves up to DN 250. For valves DN 300 to DN 600, clean water service at 550 kPa valve line pressure and 550 kPa (80 psi) actuator air supply pressure.

---

**Dimensons (mm)**

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<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
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<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
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<th>B/gear mass (kg)</th>
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Liner Replacement

General
1. The SU10R valve has a replaceable liner.
2. SU10R valves are bi-directional, so there is no need to check orientation of gate or liner during re-assembly.
3. Liner repair kits contain a new liner, packing kit and cord to assist with fitting a liner in a body.
4. Gland box packing should be replaced when a liner is replaced.
5. No special tooling is required.
6. Valve information can be seen on a tag located next to gland box.

Tools and Equipment

A valve can be disassembled and re-assembled with common tools and lifting equipment as follows:
1. Spanners (open end/ring)
2. Socket set
3. Flat blade screwdrivers or tyre lever
4. Allen keys
5. Pliers
6. Rattle gun or nut runner if available
7. Torque wrench
8. Silicone grease, silicone oil, or soapy water
9. Lifting equipment

Notes
1. Body bolts are required to be torqued, or an experienced operator can estimate value.
2. Aids in liner installation.
3. Small valves can be serviced without lifting equipment, however large valves (> DN 200 [NPS 8]) require lifting equipment and generally easier with 2 persons.

Valve Disassembly for Liner Replacement

Warning
Beware of placing limbs in valve bore when gate is open.

1. All work shall be undertaken by trained personnel in handling heavy parts where pinch points are present.
2. Valve gate should be in a closed position so that it does not move [drop] when body bolts are removed.
3. Prepare pipeline for valve removal by removing line pressure.
4. Isolate air/hydraulics/electricity to actuators as required.
5. Take valve weight with lifting equipment and remove flange bolts.
6. Separate pipe flanges from valve and lift valve from pipeline.
7. Small valves that can be lifted by hand can be disassembled on a bench.
8. Large valves (> DN 200 [NPS 8]) should be disassembled in a vertical orientation, as this actuator and gate to be lifted out vertically by overhead hoist.
9. Gate should be in closed position remove clevis pins/fasteners.

Figure 4
Tag located next to gland box

Figure 5
Large valve supported and orientated vertically for initial disassembly, and allows actuator and gate to be removed easily by overhead hoist.
Removal of pneumatic (AC) and bevel gear (BG) actuators:
DN 50 - DN 150 (NPS 2 - 6) AC and BG
10. Remove mounting screws from AC or BG and lift actuator off bridge as piston rod/spindle with clevis will pass through bridge.

WARNING
1. Applying air to pneumatic actuator has potential pinch point.
2. Only use low pressure and low flow rate if using an air supply to assist with retracting an air cylinder (AC).

DN 200 - DN 600 (NPS 8 - 24) AC actuated
11. Clevis is attached to piston rod with a thread - partially retract piston rod (low pressure and low flow rate air could assist) and remove clevis from piston rod.
12. Remove AC mounting screws and lift AC off bridge as piston rod without clevis will pass through bridge.

Removal of bridge
15. After removal of AC and BG actuators - Cap screws securing bridge pillars can be removed, and if fitted remove cap screws attaching lockout posts to bridge.
16. Tap bridge with a mallet to separate it from pillars and remove.
17. If lockout posts are fitted, loosen locknuts at bottom of post, and unscrew lockout posts and remove along with locknuts.
18. Leave pillars attached to body as pillars provide leverage to aid removal of body from liner.

DN 200 - DN 600 (NPS 8 - 24) BG actuated
13. Remove mounting screws from BG.
14. Wind HW on BG input and support BG on spindle as it rises and is threaded-off spindle.

Removal of gate and gland box
19. Remove gland box nuts and washers.
20. To remove compression on liner from gate, loosen body bolts - do not totally remove body bolts at this stage.
21. Remove gland box and gate as an assembly.
22. For large valves > DN 250 - Gate should be lifted with aid of overhead hoist.
23. For small valves place valve flat on a workbench and remove gate by hand.

WARNING
1. Two persons should lift DN 150 and DN 200 gates.
2. Check gland box is wedged on gate before proceeding
3. Gland box may stay located on gate due to packing compression - be careful that gland box does not slide on gate.
4. If Gland box is loose on gate - remove it before removing gate from body.

Loosening locknuts and unscrewing lockout posts.

Valve without actuator, fasteners attaching lockout posts to bridge have been removed. And service person is tapping bridge upwards to separate it from pillars.
Removal of body from liner

21. Once gate is removed place valve on a horizontal surface remove body bolts - liner will keep body halves together on a bench.
22. For larger valves it will be necessary to have valve a little off workbench for access to bolts.

WARNING
For safety do not place hands under the valve use a socket wrench to hold bolts.

23. Split top body half from liner (see Figure 11) - use a blunt flat blade screwdriver or a tyre lever to collapse liner flange.

NOTE
1. For large valves 2 levers may be used to collapse liner.
2. Avoid damage to body paint.
3. Top body half needs to be lifted as liner flange is collapsed.

With valve horizontal on a bench or floor remove body bolts – Liner will keep body halves together with bolts removed.

Gland box nuts have been removed and body bolts are loosened (but not removed yet) to allow gate to be withdrawn from liner.

Liner flange is flexible and easily pulled away from body - this allows liner flange to be collapsed into body.

Liner is separated from bottom body half easily - collapse liner flange at top of bore and pull top of liner away from body [see Figure 13].

5. Body bolts and associated nuts should be replaced if thread is damaged, and must be Class 8.8 per ISO898, or A2-80 and A4-80 per ISO3506-1.

INSPECTION

1. Inspect all components and replace as necessary
2. Remove old packing from gland box - Packing should be replaced when liner is replaced
3. Remove any sharp edges on gate, and check for any wear that may effect face-sealing on liner around perimeter of gate.
4. When re-assembling orientate best face downstream.
CLARKSON URETHANE KNIFE GATE VALVE

VALVE ASSEMBLY

1. Lubricate body flange and bore with either silicone oil, silicone grease or soapy water to aid assembly of liner.
2. Place liner on a flat surface next to body half, wrap cord around liner under flange twice with ends at bottom of bore (see cord shape in Figure 14).
3. Lift a body half and locate it over liner flange then push body down at bottom of bore ensuring to locate liner flange at the bottom of the bore.
4. Cord ends should be made accessible (see Figures 15 and 16).
5. Proceed to pull on cord ends and work liner flange through valve bore - progressively from bottom to top by alternating between each end of cord (see Figures 17 and 18).

NOTE

1. One end of cord will usually need to be secured while other is pulled, and a blunt flat bladed screwdriver can also be used to work flange into position.
2. Be careful not to damage paint.
3. Liner flange is seal between valve and pipe flange so avoid damaged to flange face.
4. As liner flange is "rolled" onto valve bore, cord will be unwound from flange and completely removed (see Figure 19).
5. Turn-over valve body and if required adjust liner so it sits in valve chest cavity - rotate liner by hand until it is in position (see Figure 20).

FIGURE 14

Wrap cord under flange as shown in the above pattern. Cord should wrap around twice and ends located at bottom of bore. Loops in end of cord allow for extra grip or securing one end while pulling on other.

FIGURE 15

Push bottom of body down and locate ends of cord through valve bore.

FIGURE 17

Work flange through valve bore - move from bottom towards top.

FIGURE 19

Finish at the top of valve bore.

FIGURE 16

Liner flange located at bottom of valve bore and cord in place.

FIGURE 18

Work each side in turn.

FIGURE 20

Liner installed in first body half.
8. Wrap cord around liner flange.
9. Lift second body half into position and locate cord ends as before (see Figures 21 and 22).
10. Proceed to work liner flange through bore - using cord as before - it is normal for liner to be stiffer during installation of second body half.
11. Once liner is installed remove cord as before.
12. Liner and body halves will now stay assembled while fitting body bolts.
13. Adjust any misalignment of body halves (when viewed at top of valve) with a soft mallet.

WARNING
Do not lift valve until body bolts are in place and torqued.

14. Fit body bolts with nuts finger tight - do not tighten nuts otherwise gate will be difficult to install (see Figure 25).
15. Once a number of bolts are installed around valve it can be moved safely to fit all bolts.
16. Repack gland box with new packing - fit packed gland box to gate.

NOTE
1. Gland box should only be pushed along gate far enough to allow gate to be fully inserted into liner (see Figure 26).
2. Follow procedure in the previous section for packing the gland box.

17. Valve assembly is now a reversal of disassembly.
18. Orient valve body in same position as when gate was removed.
19. Lower gate into liner until gate is in closed position - if gate is tight in liner then body bolts need to be loosened.
20. Torque body bolts after gate is fully closed.

NOTE
1. Gland box should not be pushed down into position until all body bolts are torqued.
2. Body bolts should be torqued to a minimum of 80% of value in table.
3. For DN 450 and DN 600 valves three lower body bolts are a different size to chest bolts and torques are different.
4. Body bolts and nuts are high tensile and should only be replaced with same grade or higher.
5. Liner flange OD should be concentric with “recess” in valve body (see Figure 27).

NOTE TO FIGURE 25
1. Assembler is seen fitting chest bolts
2. There are three body bolts (two across bore centreline and one at bottom) must be below / flush to prevent interference with pipe flange.

* As liner is assembled to second body halve there is a potential pinch hazard.
21. Once body bolts are torqued, tap gland box down over studs with a soft mallet - keep gland box parallel with gate top edge to avoid misalignment with studs.
22. Commence using nuts (with washer) when there is enough thread showing on studs.
23. Torque nuts firm and evenly around gland box.

NOTE
1. Do not over-torque or gate cycling forces will increase.
2. Final packing adjustment is done during valve commissioning.
3. Visually check gland box is square to body.

24. If lockouts are fitted, see next section on this and lockouts should be fitted before bridge.

Manual HW and hydraulic actuated
25. Fit bridge using cap screws with loctite 243 and torque - MHW and HC should already be attached to bridge.

DN 50 - DN 150 AC and BG
26. Fit bridge using cap screws with loctite 243 and torque.
27. Attach AC and BG to bridge using mounting screws - piston rod/spindle with clevis will pass through bridge.

DN 200 - DN 600 AC actuated
28. Fit bridge using cap screws with loctite 243 and torque.
29. Attach AC to bridge using mounting screws - Piston rod should be partially retracted as this will allow clevis to be screwed-on to piston rod.
30. Extend piston rod to align clevis with holes in gate.

WARNING
1. Applying air to pneumatic actuator has potential pinch point.
2. Only use low pressure and low flow rate if using an air supply to assist with retracting an air cylinder (ACL).
3. Beware of placing limbs in valve bore when gate is open.
31. Attach clevis to gate with pins.

DN 200 - DN 600 BG actuated
32. Attach spindle with clevis to gate using pins - note clevis will not pass through bridge.
33. Fit bridge using cap screws with loctite 243 and torque.
34. Supporting BG wind HW on BG input and lower onto bridge as spindle is threaded-on to drive nut.
35. Attached BG to bridge using mounting screws with loctite 243 and torque.

Body bolt recommended maximum torques.

21. * Ensure liner flange is concentric with recess.

22. FIGURE 27
Body bolts torqued with gland box in position and studs being torqued.

23. FIGURE 28

24. FIGURE 29

Gland box and bridge fitted.

BODY BOLT RECOMMENDED MAXIMUM TORQUES

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* Same as chest bolt
CLARKSON URETHANE KNIFE GATE VALVE

FIGURE SUTOR

WARNING
Beware of placing limbs in valve boring when gate is open.

Check valve is ready for installation
36. Check all fasteners are installed torqued.
37. Cycle valve and check for operation.
38. Leave gate in fully open position ready for installation.
39. If cycling valve with a manual actuator, applying some soapy water, silicon oil or silicone grease to gate to reduce friction between gate and liner.

WARNING
It is recommended to hydro-test valve to 1.5 x MAWP after repair and prior to installation to minimize risk of unexpected leakage after installation.

Valve installation
40. See the previous section on valve installation.
41. Ensure pipe flanges do not apply force on valve liner flange during installation as this may damage liner/integrity of gasket.
42. Gate should be fully open during installation.

NOTE
1. One end of lockout post is not threaded.
2. Use gland studs adjacent to lockout hole in gate.
3. There is no connection between bridge and lockout post on DN50 (2).

LOCKOUT ASSEMBLY AND ADJUSTMENT

Assembly
1. To fit lockouts - Bridge should not be fitted to the valve.
2. Fit the two lock nuts (thin nuts, black arrow) to studs and screw down firm on gland box adjusting nuts.
3. Screw both lockout posts all the way down onto locknuts.
4. Before fitting bridge thread two cap screws into bridge ensuring these will align with lockout posts, and thread a locknut on before screw engages into top clearance hole in lockout post.
5. Locate bridge on pillars and align cap screws fitted in ‘4’ into lockout posts.
6. Fit bridge using cap screws with loctite 243 and torque.

NOTE
Refer to point 2 of assembly and adjustment
Refer to point 4 of assembly and adjustment
Refer to note 2 of assembly and adjustment

Adjustment
7. With gate in closed position adjust lockout posts so that lockout pin when fitted in both lockout posts is located no more than 2 mm above gate.
8. Using lockout pin to stop rotation of both lockout posts, torque bottom locknuts.
9. Thread top locknuts down onto lockout post and torque.
10. Check lockout pin can fit into top hole in lockout post, and check pin will also hold gate in open position.

NOTE
If lockout pin does not fit over gate in closed position, adjust gland packing box down until lockout pin fits over gate.

FIGURE 30
Installed lockout post - Locknuts have not yet been torqued down onto top of lockout post.
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