

# KNIFE GATE VALVE



## INSTRUCTION MANUAL ON INSTALLATION OPERATION AND MAINTENANCE

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## INTRODUCTION -

The knife gate is a uni-directional lug type valve designed according to MSS-SP-81 for industrial service applications.

Any increase in temperature due to frictional warmth is negligible, since the relative speed of the moving parts is extremely low.

The risk analysis associated to this directive does not take into account the fluid that goes through the valve, even when such fluid produces an explosive atmosphere. The user must take into account the risks that the fluid generates, such as:

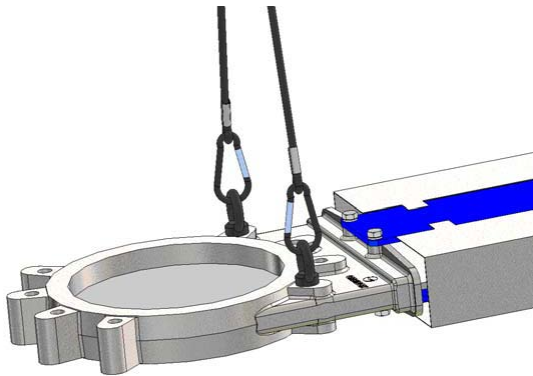
- Heating of the valve surface.
- Generation of electrostatic charges caused by displacement of the fluid.
- Shock waves caused by the installation (water hammer), internal crashes generated by the pellets or the risks due to foreign bodies susceptible of being present in the installation.

## HANDLING -

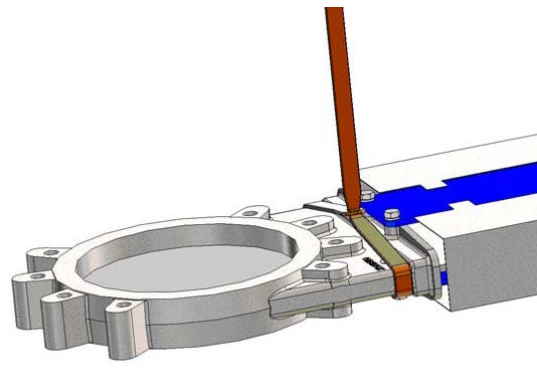
The valves are packed according to the appropriate transport standards. If you receive the packing damaged, please inform the transport company in writing and contact you DURGA representative. When handling a DURGA valve please pay attention to the following points:

- Do NOT attach lifting gear to the valve actuators or gate guards. They are not designed to bear the weight, and could easily be damaged.
- Do NOT lift the valve by the valve bore. This can cause damage to the seating surfaces and seals.
- Check that selected lifting gear is rated to carry the weight of the valve.
- The valve can be handled using eyebolts, soft straps or slings.
- Eyebolts: make sure the eyebolts have the same thread as the bolt holes and they are all well secured. Ideally when using lifting gear to move a DURGA valve, it should be supported by two or more eyebolts screwed into the tapped fixing holes in the valve body.

- Soft straps: with the valve in the closed position, the straps should be placed between the gland area and the bore such that the valve is balanced.



**Handle with eye-bolt**



**Handle with soft straps**

## **INSTALLATION -**

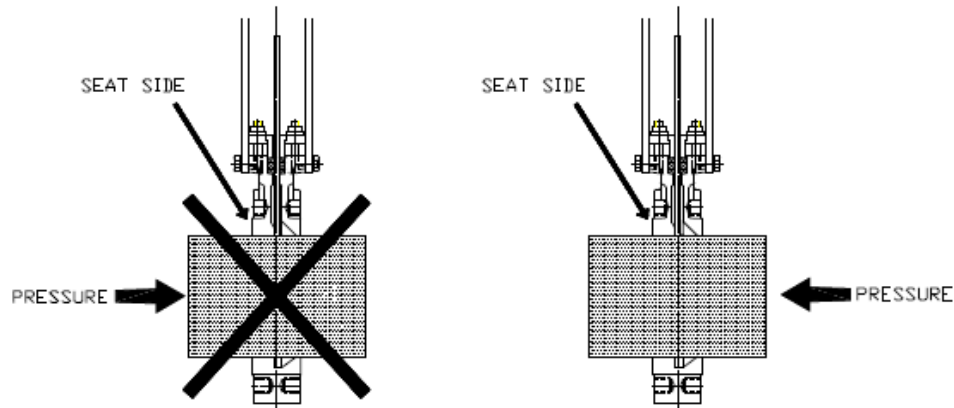
To avoid personal injury or damage to property from the release of process fluid:

- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.
- During installation and maintenance operations, use hand tools (non electric) with Working Allowance.

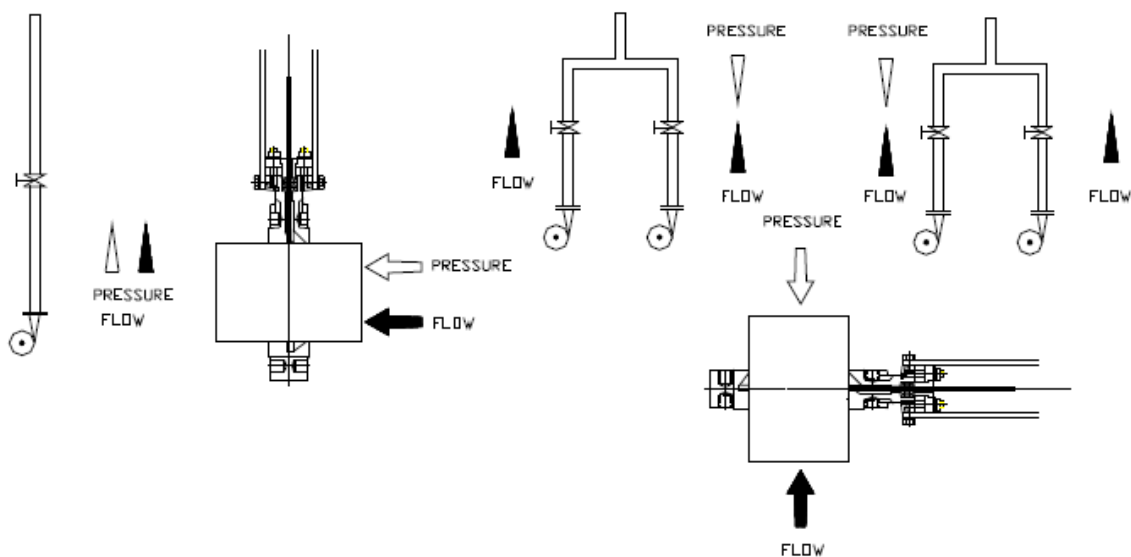
Before installation, inspect the valve body and components for any damage that may have occurred during shipping or storage. Make sure the internal cavities within the valve body are clean. Inspect the pipeline and mating flanges, making sure the pipe is free of foreign material and that the flanges are clean.

The valve is unidirectional. It should be installed with pressure exerted against the seat. The words "SEAT SIDE" are marked on the valve body to indicate the position of the valve

seat. Installation and the correct orientation with respect to the direction of the flow is the responsibility of the user.



It should be noted that the direction of flow and differential pressure, do not always coincide.



Special care should be taken to maintain the correct distance between the flanges and to ensure that they are parallel to the valve body. Incorrect alignment of the valve can cause deformations, which can lead to difficulties in operation.

The valve can be mounted in any position with regard to the pipe. Normally this valve is mounted in horizontal position in a vertical pipeline. In vertical pipelines, the construction of suitable supports will be required (for further questions ask DURGA technicians).

With larger diameters (> 300 mm), heavy actuators (pneumatic, electric, etc.), or with the valve installed horizontally on a horizontal pipeline, the installation will require the construction of suitable supports.

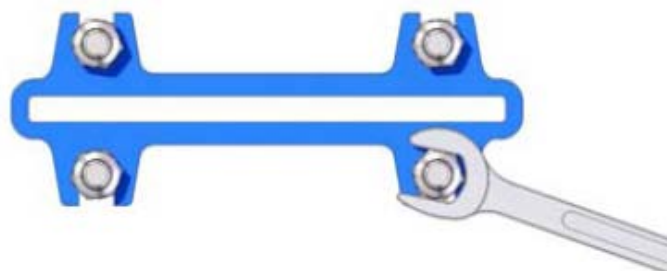
In vertical pipelines, the construction of suitable supports is always required (for further information please consult the technical department at DURGA). Once the valve is installed, test that the flanges have been fastened correctly and that all electrical and/or pneumatic connections have been properly made.

These instructions must be observed when installing a DURGA knife gate valve at requested zone:

- Make sure the valve is marked according to the requested zone and it includes all anti-static devices.
- Check continuity between the body of the valve and the pipe.
- This check must be done every time the valve has been removed from the line, serviced, and put back to the line.

The operation of automated valves is limited only with fitted gate covers.

First, operate the valve with no flow in the pipeline. Then test operation and valve seal with flow. It should be noted that the packing material might settle in shipping/storage, which can cause minor leakage. This can be remedied by tightening the gland follower during installation. The nuts shall be tightened gradually and crosswise until the leakage stops. Check that there is no metal contact between the gland follower and the gate.



If the gland follower nuts are pulled to hard, the force needed to operate the valve will increase, the valve function will be affected and the box packing lifetime will be shortened.

Once performance has been tested, the valve can be put into operation.

## ACTUATORS -

- **Hand wheel:** To open the valve, turn the hand wheel anticlockwise. To close, turn the hand wheel clockwise.
- **Lever:** To operate the valve with this device, first loosen the locking clamp located on the top of the yoke. Then either open or close the valve by moving the lever in the desired direction. Finally, fix the position of the lever with the locking clamp.
- **Pneumatic:** Valves are usually supplied with a double acting pneumatic actuator although, upon request, we can supply single-acting actuators. In either case the feed pressure can vary between 3, 5 and 10 Kg/cm<sup>2</sup>. However, the size of the actuator for each valve has been designed for a feed pressure of 6 Kg/cm<sup>2</sup>. It is essential for a good maintenance of the cylinder that air should be well dried, filtered and lubricated. It is recommended to actuate the cylinder 3-4 times before the start up, once it is installed in the pipeline.
- **Electric actuator:** Depending on the type or make of the electric actuator, specific instructions (i.e. a manufacturer's manual) will be supplied.

## MAINTENANCE -

The valve must not undergo any modifications without a previous agreement with DURGA. DURGA shall not be liable for any damages that may arise due to the use of non original parts or components.

To avoid personal injury or damage to property from the release of process fluid:

- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.
- During installation and maintenance operations, use hand tools (non electric) with Working Allowance.

The only maintenance required is to change the gland packing or the seal if the valve is a resilient seated type. The life of these elements will depend on the working conditions of the valve such as: pressure, temperature, abrasion, chemical action, number of operations, etc.

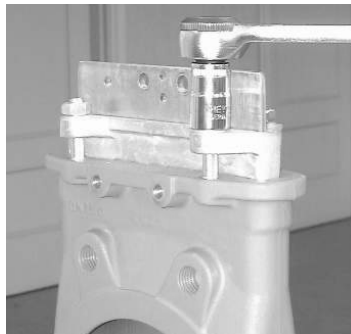
### **Replacement of the gland packing:**

- 1) Depressurize the circuit and place the valve in close position.
- 2) Remove the gate guards (for automatically actuated valves only).
- 3) Release the spindle or stem from the gate. (Photo 1)
- 4) Loosen the screws of the yoke and remove it (without losing the actuator).
- 5) Loosen the nuts of the gland follower and remove it. (Photo 2)
- 6) Remove the old packing rings and clean the stuffing box.

- 7) Insert the new packing rings, making sure that the ring joints alternate (the first on one side of the gate, the next on the other and so on). (Photo 3)
- 8) Once the necessary packing rings have been inserted, proceed with a steady initial tightening of the gland follower.(Photo 2)
- 9) Place the yoke (with the actuator) and screw it.
- 10)Fix the stem to the gate. (Photo 1)
- 11) Remount the gate guards.
- 12)Carry out some operations with a loaded circuit and then re-tighten the gland follower to prevent leakage.



**Photo 1**



**Photo 2**



**Photo 3**

#### **Replacement of the seal (only applicable to resilient seated valves):**

- 1) Remove the valve from the pipeline.
- 2) Remove the gate guards (for automatically actuated valves only).
- 3) Release the spindle or stem from the gate.(Photo 1)
- 4) Loosen the screws of the yoke and remove it (without losing the actuator).
- 5) Loosen the nuts of the gland follower and remove it.(Photo 2)
- 6) Remove the old packing and the gate and clean the stuffing box.
- 7) Remove the seal retainer ring which supports the seals.
- 8) Remove the worn seal and clean the seal housing.
- 9) Once the new seal is cut according to size, insert it into the seat housing (making sure that the union of the seal is at the top). (Photos 4 and 5)
- 10)Insert the seal retainer ring by hammering gently around the edge.(Photos 6 and 7)



11) Remount the gate.

12) Once the necessary packing rings have been inserted, proceed with a steady initial tightening of the gland follower. (Photo 2).

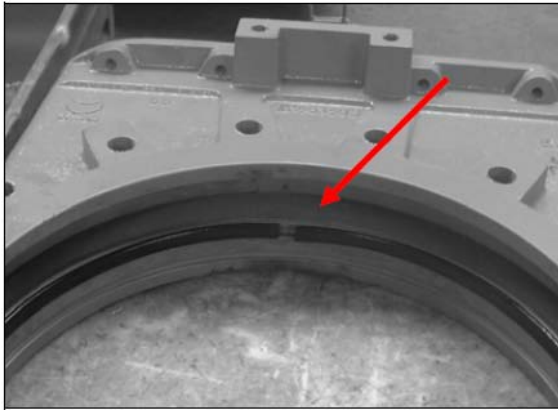


Photo 4

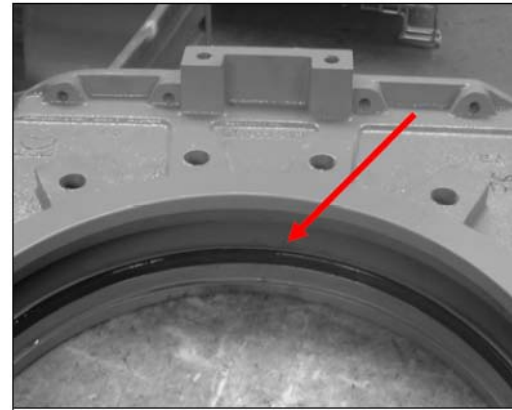
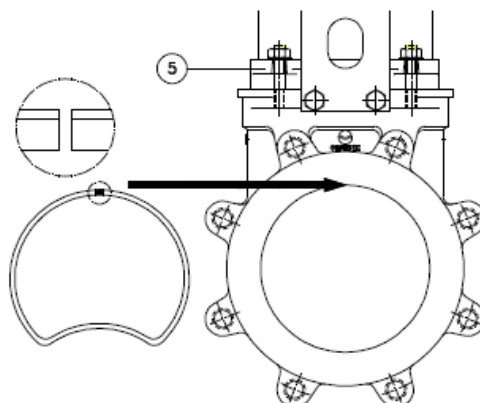


Photo 5

### Replacement of the PTFE seal:

Follow the same procedure with following notes:

- 1) To obtain a tighter shut off in stainless steel valves (CF8M body), the machined housing of the seat is sealed with plastic glue. This is not necessary in cast iron valves. With the seal in this position:
- 2) Make a circle; joining the ends and making a heart-shaped form (see the following diagram).
- 3) Insert both ends of the seal in the upper side of the machined housing of the seat (adjacent to the gland follower, push the round part with your finger and insert the seal into the housing. If the diameter of the valve is small (DN150), a vice can be used.



**Lubrication:**

Twice a year, it is recommended to remove the protection cap and fill up the stem protector halfway with calcium-based grease with the following characteristics: highly water resistant, low ash content, and excellent adherence.

**Special requirements for DURGA valves:**

- The maintenance personnel must be made fully aware of the risks of explosion, and it is advisable that they receive specific training.
- Periodicity of check and evaluation of graphite packing status and valve electrical conductivity must be determined by end user according to valve working conditions. In any case, once the valve is put into operation, the packing area must be revised after the valve has been stroked 100 times or after 3 months of operation, whatever happens first. After this preliminary check, new checking periods must be determined by end user based on the results of this first check.
- Clean the valve periodically to prevent dust accumulation. Do not sweep or dump the dust. Always use a vacuum cleaner system
- Dead en service is not allowed.
- Do not apply any new coating to the valve. Should it require new coating, please contact our closest representative.
- Allowed seals: EPDM, VITON, NITRILE, GRAPHITE and METAL (no seal)
- Allowed packing: ST and GRAPHITE packing.

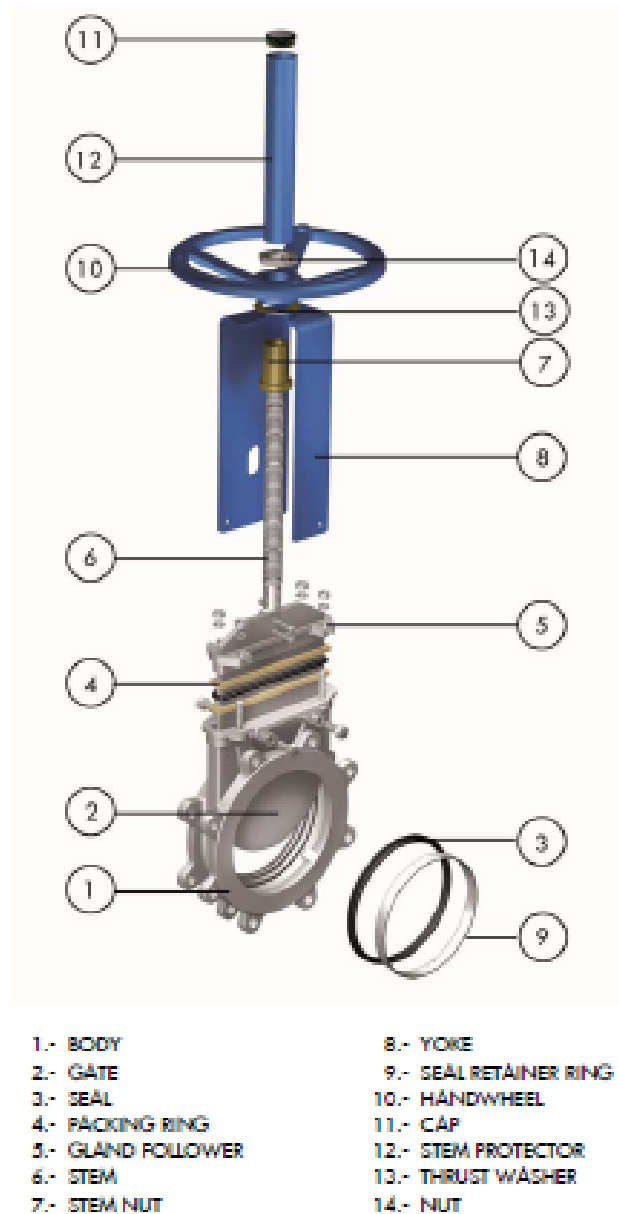
**STORAGE -**

For long storage periods keep the valves indoors in a safe and dry place and protect it from any impact and or vibrations.

- Storing temperatures: -10°C to +40°C
- Valves must be stored in either full open or full closed position.

- For any component installed in the valves, electric motors, solenoid valves, etc, please refer to their own instructions manuals

## PARTS LIST & DRAWING -



### Our Contact office & e-mail id:

H.O & WORKS ==== PH: 033-2677 8088, E-MAIL: [ho@dvpl.co.in](mailto:ho@dvpl.co.in)

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