

SLUICE VALVE



INSTRUCTION MANUAL ON INSTALLATION OPERATION AND MAINTENANCE

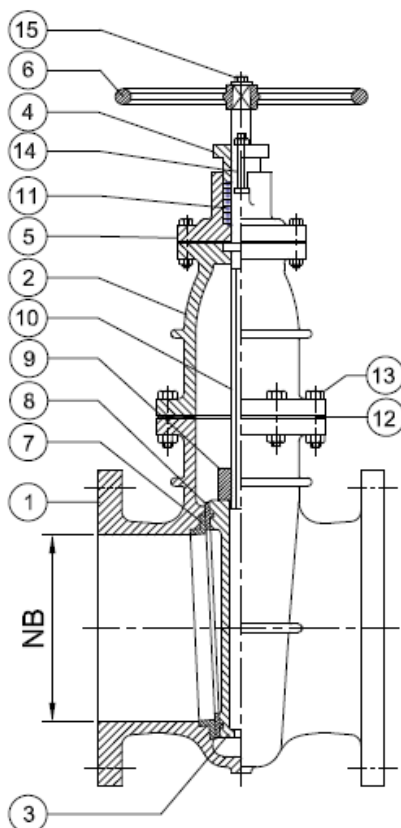
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INTRODUCTION -

Durga Valves generally follows IS: 14846 / BS 5163 / BS 5150 standards for manufacturing of sluice valves. The material construction, dimension and constructional features are made on all of the above standards. Sluice valves come with a huge range of combination on material and seat arrangement with the operational choice of rising spindle / non-rising spindle as per requirement of customers. Sluice valves are supplied with the by-pass arrangement are the optional accessory. Other accessories like Drain Plug, Thrust Bearing, Gear Box or Electrical Actuator with anticlockwise or clockwise rotation for 'SHUT' and 'OPEN' operation. Durga Valves manufacture Sluice / Gate valve are designed with safety measurements, working pressure, and with 100% leak proof. The flanges are provided with bolting slots by which the valve fits with the pipe-line for installation. Basically sluice valves are classified into two types:

1. Rising Sluice Valve.
2. Non Rising Sluice Valve.



MATERIALS OF CONSTRUCTIONS		
SL. No.	DESCRIPTION	MATERIAL & SPECIFICATION
1	BODY	CI / CS / DI / SS
2	BONNET	CI / CS / DI / SS
3	WEDGE	CI / CS / DI / SS
4	GLAND	CI / CS / DI / SS
5	COVER / STUFFING BOX	CI / CS / DI / SS
6	HAND WHEEL	CI / CS / DI / SS
7	BODY SEAT RING	LT BRONZE / SS 304 / SS 316 NICKEL WELD OVERLAY
8	WEDGE SEAT RING	LT BRONZE / SS 304 / SS 316 NICKEL WELD OVERLAY
9	WEDGE NUT	LT BRONZE
10	STEM	SS 410 / 304 / 316 / 431 / IS: 6603
11	GLAND PACKING	JUTE & HEMP
12	BONNET GASKET	RUBBER
13	BOLTS & NUTS	CARBON STEEL
14	T-BOLTS & NUTS	CARBON STEEL
15	SET SCREW	CARBON STEEL
20	BOLTS & NUTS	CARBON STEEL
21	LIFTING LUG	CARBON STEEL



The wedge is a part which locks water flow from one side to another side and restricts it. This can be made up of different material as per application sectors of the product. The wedge has a motion of upward and downward motion by controlling it manually or actuator. Sluice valves are characterized as having either a rising or a non-rising stem. Rising stems provide a visual indication of valve position because the stem is attached with the wedge such that the wedge and stem rise and lower together as the valve is operated. Non-rising stem valves may have a pointer threaded onto the upper end of the stem to indicate valve position, since the gate travels up or down the stem on the threads without raising or lowering the stem. Non-rising stems are used underground or where vertical space is limited. Bonnets provide leak proof closure for the valve body. Gate valves may have a screw-in, union, or bolted bonnet. Screw-in bonnet is the simplest, offering a durable, pressure tight seal. Union bonnet is suitable for applications requiring frequent inspection and cleaning. It also gives the body added strength. Bolted bonnet is used for larger valves and higher pressure applications. Another type of bonnet construction in a gate valve is pressure seal bonnet. This construction is adopted for valves for high pressure service, typically in excess of 16 MPa (2250 psi). The body limit of taking stress is 25 MPa we use this parametrical limit while testing the valve. The unique feature about the pressure seal bonnet is that the body - bonnet joints seals improves as the internal pressure in the valve increases, compared to other constructions where the increase in internal pressure tends to create leaks in the body-bonnet joint. Sluice valves may have flanged ends which are drilled according to pipeline compatible flange dimensional standards. Gate valves are typically constructed from cast iron, ductile iron, cast carbon steel, gun metal, stainless steel, alloy steels, and forged steels.

SEALING ARRANGEMENT

The sluice valve has 2 parts body & bonnet together they get assembled by with min 3mm thick. Gasket required between the junction of body & bonnet a sheet of rubber provided to prevent any leakage may occurs due to improper bolt tightening. Another sealing is available at the gland at the lower part of gland are sealed by O-ring, around the spindle washer are also been provided as a sealing. Another constructional feature is the spindle slot with the slot & key hand wheel are fitted tight to turn spindle by turning hand wheel.

BOLT TIGHTENING

Bolt tightening is one of the main steps of installation. Bolts are eventually obtained metal to metal contact between the flange & body. Over-tightening and un-even tightening can cause undue



stress on the valve body & can cause of increase the torque required to increase to turn it. A following table is shown for torque of bolt on size of the valve.

INSPECTION ON RECEIPT, HANDING, STORAGE & PRESERVATION -

INSPECTION ON RECEIPT AND HANDLING

At receipt of the product, ensure that there is no transit damages to the product received, especially on valve flanges, operating actuators etc. Also ensure that parts and accessories are received as per ordered scope of supply. Special operators (if any), like Electric Actuators / Pneumatic Actuators / Hydraulic Actuators & their accessories (if any) are sent loose packed along with the product for their safe transportations. Use the safe lifting device (e.g. sling, hoist, hook etc) of adequate capacity. Do not pass the slings through the weak parts of the product / accessory. (E.g. by-pass bends – when it is assembled on the valve). The valve should be transported so that the inlet side flange rests on the horizontal floor. Support the valve properly during transportation to avoid toppling. Handle the product carefully – do not push, drag, drop from height. If damages, short supply or wrong supply are observed, report the same immediately to the contact person mentioned in this manual.

STORAGE & PRESERVATION

If the valve has to be stored at site before installation, store it on horizontal level surface in dry and clean atmosphere. Store the products in well-covered sheds, protected from sun, rain and dust. In the instance if the valve is required to be stored for long duration, ensure that rust preventive should be applied on the machined corrodible surfaces. It is advisable to give a coat of grease on seat rings during the storage period. Keep the seat rings away from dusty atmosphere. Gear Box, Electrical / Hydraulic / Pneumatic Actuators & Accessories should also be stored under shed & away from dust, dirt or any rainfall or water.

INSTRUCTIONS FOR INSTALLATION -

CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION

Before taking the Sluice / Gate Valve for pipe installation, make sure that it is cleaned from inside and outside and there are no foreign or metallic objects sticking on its sealing elements. Also clean the valve interior passages to remove any foreign matter & rust preventive on machined surfaces. Do not attempt to force electric actuator assembly on the gear box connecting shaft. In case of any difficulty in proper fitment of the key ways, please die-burr the bore, key ways & keys



with polish paper. In any case, do not hammer the actuator surface to drive it in. If difficulty persists, contact DVPL. Ensure that the entire rust preventive on the machined surface in the flow area is removed, before the valve is put in pipe-line. Note the name plate details on the valve details on valve body and valve pressure rating adequacy with respect to operating pressure. Valves should be installed in the pipeline, only after verifying the sealing ability of valve. This can be done by examination of the seat surfaces for freedom from surface damages, scratch marks / dent marks as well as uniform mating of body diaphragm rings and door rings. If abnormalities of this type are observed contact DVPL. Sluice / Gate Valve are designed to generally operate in horizontal pipe lines or in vertical pipe lines when the flow is upwards - unless otherwise pre specified by the customer. Operate the Sluice / Gate valve manually from full close to full open and full open to full close. Ensure that there is no undue resistance / friction in the operation. Before connecting valve & pipeline flanges, ensure that they do not have parallel, angular and radial gaps. While fitting the valve in pipeline, ensure that diagonally opposite bolts is simultaneously & uniformly tightened.

CHECKS FOR THE PIPE-LINE BEFORE INSTALLATION

Clean the pipeline shell thoroughly flashed out so that it does not contain any foreign matters which may damage the valve internals. Avoid parallel, radial and angular mismatch between connecting flanges of valve and the pipeline. Upstream and downstream piping should be adequately supported and anchored (if required) in such a way that the piping system does not impose any forces & moments on the valve body and the hydraulic thrust arising due to valve closure is carried & sustained by valve supports. Valve flanges are not designed to carry any external loads and moments arising due to pipe expansions / contractions. It is advisable to use flange adapter assembly, after the valve to facilitate valve dismantling and to prevent any undue loads being transmitted to valve flange. Provide suitable concrete block for supporting the valves. It is advisable to install a support for the valve at bottom to prevent any sagging to be caused by weight of the valve. Ensure that pipeline flanges are parallel and are mating the valve flange without leaving any parallel, angular or radial gap between the flanges. Do not over-tighten the flange bolts / nuts to make the flanges parallel forcefully. That may develop undue stresses in the valve flanges & body leading their deformation & malfunctioning. If the Sluice / Gate Valves are supplied with by-pass arrangement (against specific order requirement) ensures the by-pass arrangement on the valve is intact. For the valve supplied with rising spindle, ensure that there is adequate space available to accommodate the rising spindle when valve is fully open condition.



Maximum flow velocity in the pipe-line should not exceed 4 m/s. The valves are mainly designed for handling clear water with maximum impurities of 5000 ppm.

COMMISSIONING -

PRE-COMMISSIONING CHECKS

Ensure manually that the valve operates smoothly. Flow direction of the valve matches with that in the pipeline. The entire pipe flange bolting is properly tightened. Surge protection devices (if any) are operative.

1) COMMISSIONING Open the By-pass Valve across the valve (if provided). Charge the pipe-line with clean water. Ensure that there is no leakage through flange gaskets. Now the valve is commissioned for its operation.

2) OPERATION By-pass valve (if provided) – keep it open while every start / stop cycle of the pump. Once the Sluice / Gate valves closed, the by-pass valve may be kept closed till next operation of the valve. In case the manually operated Sluice / Gate Valve demands excessive force to operate ensure that there is no mechanical obstruction in pipeline or operating mechanism. Do not use means like levers on hand wheel to exert addition force. These hand wheels are designed to be weak links to protect other expansive parts in operators.

3) MAINTENANCE & TROUBLE SHOOTING

SL. NO.	CHECKING PARAMETER	METHOD OF CHECKING	FREQUENCY OF CHECKING	PROBABLE REASON	ACTION TO BE TAKEN
1.	Leakage through valve seat	Visual	During Operational	External object caught between disc face & body ring.	The external object has to be removed by flushing and if it does not work, open the flange joint to reach the object and remove manually.
2.	Condition of Body seat ring / Wedge seat ring	Visual/ Feeler Gauge	During overhauling	Worn out / Deformed or damaged Seat faces.	Replacement of Faces is to be done.
3.	Condition of spindle & Spindle nut / Yoke sleeve threads	Visual	During Operation/ overhauling	Long period of operation or Excess force applied.	Replacement of Spindle or spindle nut is to be done.
4.	Leakages from Gland	Visual	During Operational	Gland packing are made of perishable	Tightening of gland bolts/ replacement of existing gland packing with new one and and tightening



				materials and they loose their water tightening capacity over a period of time.	the gland bolts.
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