BUTTERFLY VALVE FLANGE TYPE

INSTRUCTION MANUAL ON INSTALLATION OPERATION AND MAINTENANCE

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INTRODUCTION -

Durga Valves make Butterfly Valves are generally manufactured as per IS-13095/91 / AWWA C-504 / BS 5155 standards for constructional features dimension and material of construction. The Butterfly Valve also comes in various combinations of material and seating arrangement with choice do Rubber Seated, Eccentric, Wafer Type as per customer requirements. The Butterfly Valve are also supplied with optional accessories such as By-pass arrangement, Hydraulic operated, Gear Box and Electrical actuator (option of clock wise or anti-clockwise operation). Durga Valves make Butterfly Valves are designed to achieve leak tightness and withstand pressure as per required application. The disc and shaft shall be designed to withstand the maximum pressure differential across the valve in either direction of flow. Any means of attachment between the Shaft & Disc shall be such as to preclude components becoming loose in service. On integral seating's and lining where used and their means of attachment shall be such as to preclude their becoming loose in service. However it is designed according torque wise that, its performance in the field smoothly.

CONSTRUCTION -

The Butterfly Valves are designed for stopping the running water in the pipe as a result there won't any flow on the another end of the pipe. On the construction there is a disc as per bore diameter of the pipe. The disc is mounted on an axis and the axis is a shaft which is extended up to the outside of the pipe and that shaft rotated by a hand wheel or sometimes actuator. Overall this is working and construction of the Butterfly Valves. But the device (Butterfly Valve) should be installed properly to make this mechanical device work. The disc or seat which stops the flow of water that should be designed has a certain pressure to work. If the pressure exceeds then the valve can explode.

OPERATION -

By-pass valve (if provided) – keep it open while every Start / Stop cycle of the Pump. Once the Butterfly Valve closed, the By-pass valve may be kept closed till next operation of the valve. The disc is positioned in the center of the pipe; passing through the disc is a rod connected to an actuator or gear box on the outside of the valve. Rotating the Actuator/Gear Box 90° counter clockwise turns the disc perpendicular to the flow. Then the valve is fully open, so that it allows an

almost unrestricted passage of the fluid. Rotating the actuator/Gear Box 90° clockwise turns the disc parallel to the flow then valve will be closed, so that it completely blocks off the passageway.

The valve position is indicated by the orientation of the flats or key on the top of the valve shaft. If the flats or the centerline of the key are transverse to the pipeline axis, then the valve is closed. If the flats or the centerline of the key are in line with the pipeline axis, then the valve is open. When actuators or gear box are used to operate the valve, the operating instructions of the actuator or gear box must be compiled with. In case the manually operated Butterfly 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.

APPLICATION OF THE PRODUCT -

Butterfly valves have a huge demand in worldwide market. Because of its simple design and it does not take much space. Comparatively any other product it can give 100% leakage proof. Butterfly Valves are used in this sector of industries as follows:

Water Treatment Plant.

Power Separation Plant.

Pulp Paper Industries.

Chemical processing.

Marine.

Steel industries.

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 safe transportations, use the safe lifting device (e.g. sling, hoists, hook etc) of adequate capacity. Do not pass the sling 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. In case of using actuator, the earthing connection should be checked before starting up the operation.

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. The liner's parts should not be in contact with copper or manganese. As well as valve must be free from talcum powder & ceramic products. It is necessary to clean the valves without using abrasive products, trichloroethylene & hydrocarbons. The older one has to be used first to control the safe storage. Gear Box, Electrical / Hydraulic / Pneumatic Actuators & Accessories should also be stored under shed & away from dust, dirt or any rainfall or water.

CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION -

Before taking the Butterfly 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 ensures 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 / don't marks as well as uniform mating of body diaphragm rings and door rings. If abnormalities of this type are observed, contact DVPL.

Butterfly Valves 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 Butterfly 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.

Next the free space between the pipe flanges should be checked, and the valve should be inserted through the gap, ensure that they do not have parallel, angular and radial gaps. Gasket also placed between the flanges. Then few bolts are placed in the flanged coincide holes. The next step to open the disc at 90° and put the rest of bolts with the nut. Ensure that diagonally opposite bolts simultaneously & uniformly tightened no leakages in between the flanges while fitting the valve in pipeline.

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 Butterfly Valves are supplied with By-pass arrangement (against specific order requirement) ensures the by-pass arrangement on the valve is intact. Maximum flow velocity in the pipe-line should not exceed 4 m/s. It is important that well qualified and skilled person will perform the job.

BOLT TIGHTENING -

Bolt tightening is the one of the main step 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.

The Bolt tightening sequence:

Valve Size	Bolt Size	Torque (In-Lbs)	Torque (Ft-Lbs)
80	M16	80	7
100	M16	80	7
125	M16	118	10
200	M20	118	10
250	M20	164	14
300	M20	164	14
350		215	18
400		215	18
450		262	22
500		262	22
600		262	22

Torque values are based on clean, dry threads. Reduce value by 10% if threads are oiled before assembly.

WARNING -

Make sure that the valves are used within the technical specification required. Do not try to dismount any parts of the valve while it is mounted in the pipeline or any media inside.

GENERAL SAFETY INSTRUCTION -

Prior to the performance of inspection and maintenance work on the valve or its assemblies, shut off the pressurized pipeline, depressurize it and secure it against inadvertent activation. Depending on the type and hazard risk of the fluid conveyed, comply with all required safety regulations. After completing the maintenance works and before resuming operation, check all connections for tightness. Statutory and local provisions as well as the safety and accident prevention regulations must be observed and complied with at all times. Servicing, maintenance and inspection work as well as the replacement must be carried out by qualified person.

MAINTENANANCE INSTRUCTION & TROUBLESHOOT -

Routine maintenance is not necessary for our valves. If however valve does need to be serviced or repaired. For that we following the way mentioned below.

REMOVING THE VALVE FROM PIPELINE -

Turn the valve clockwise in to almost close position. Loosen the all bolts of the flanges; remove the bolts to allow the valve to be withdrawn from between the flanges.

VALVE DISASSEMBLY -

Turns valve into open position.

Remove the actuator or gear box by taking off bolts to its adjacent flanges.

Then slowly remove gland plate, seal, bush, shaft, and take off the disc.

Using screw driver as a lever on the liner, and taking care not to damage the surface, push the liner to the inside until its final remove.

VALVE ASSEMBLY -

Clean all the components and replace the damage parts.

Sl. No.	Checking Parameter	Method of Checking	Frequency of Checking	Probable Reason	Action to be Taken
1.	Leakage through valve ring	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.	Hand wheel cannot operate the valve	Performanc e	During Operation / overhauling	Gear box or electrical actuator has not been working due to long period of operation or excess force applied	Replacement of that component is to be done.

Without using screw driver, assembled the valve inversely of above steps

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.

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.

Sr.	Parameter to check	Method of checking	Weekly	During overhaul
01	Leakage through DE/DNE ends, side flange gaskets	Visual	●	
02	Noise / Vibrations while opening or closing the valve	Feel	●	
03	Condition of resilient disc seal for cuts, deformation & resilience	Visual & feeler gauge		●
04	Condition of shaft seal for cuts, deformation & resilience	Visual		●
05	Condition of shaft bearing	Visual		●

Durga Butterfly Valves require very little maintenance if maintenance check point are attended to during periodical inspection & during overhaul. However valves could malfunction in unusual conditions of usage, water contamination and may require maintenance as below and other miscellaneous problems could have come which cannot be eliminate so the above inspection or pre-caution has to be taken.

For using actuator in the operation:

For use of actuator the closing of the seat should be seen on the indicator over there will be to positions (A) SHUT. (B) OPEN. The hand wheel turned till the indicating point reaches to OPEN or SHUT position. The 2nd positions are placed such way that they both have a difference of 90°. Close the valve manually till the movement of the disc is stopped by the limiting stopper in the gear box; move the disc ring till the contact line of the seal and body ring is parallel to the edge of the body ring. It is necessary to check the seat ring whether there would be any wear or not. By a feeler gauge (0.05mm) we can measure the body seat ring and body distance. If the distance is

minimum then there won't be any be any readjustment required. If we find any more clearance or there is body seat ring metal to metal takes place then re-adjustment required. Loosen the grub screws we can readjust the setting of seat ring. When the satisfactory adjustment takes place then the grub screws again tightened till the tightened limit otherwise over tightening can be cause of undue stress on the body.

REPLACING OF SEAL RING -

The seal ring which is made up of EPDM rubber. It is placed over the seat of the butterfly valve, by taking the measurement of rubber taken over the periphery of the seat but the ends are should be kept in a distance of 2% from the nominal diameter of the valve size. The picture can make you more understandable. Cut the ends of the seat ring at an angle of 45° lay on the disc over its "T" or "L" groove which has been already made over the surface of the disc. The linear gap between the cords should be 2% approximately it's a standard side sometimes to tighten up the seat ring it can be more. e. g. for 1000mm sized valve the seat ring should be [1000-(2/100] =999.8mm. The gap provided to create the stretch or tension. The both ends are connected or fixed by using "FEVIKWIK". Before installing the seat ring the disc much be cleaned thoroughly all the clamping ring, clamping bolts, taps, grub screws etc. if there is any impurities or foreign matters are present then the installation may have any extra gaps to eliminate that cleaning of the parts & disc surface is required. Now install the seat ring on the groove which is provided on the disc match the faces of the disc groove to the seat ring groove just put a little effort on it take the little areas on the periphery seat ring lay on it. After installing all the sides of the seat ring now check the body ring makes satisfactory contact with the seat ring.

DRIVING END SIDE SEALING ASSEMBLY -

Disconnect the valve from the pipe-line, then remove the hand wheel if there is a manual operated or for actuator disengage by removing nuts adaptor plates can be disengaged. Now the "U" cup seal can easily replace if it is worn-out. After replacing the ring visually check all sides of the ring surface should be make a satisfactory contact to the shaft. If any improper installation takes place for the sealing it may cause of leakage from the driving end. The leakage of water from DE can cause of damage the Actuator because it is an electric device so water is non-permissible.

NON DRIVING SIDE SEAL ASSEMBLY -

The Non driving end does not have any moving part except shaft. So just turn hexagonal screw anti clockwise Remove the cover and replace the gasket the inner side worn-out as the main shaft turns inside of gasket.

REPLACING SHAFT BEARING / BUSHES -

The bush / bearing have the major function of make stoppage of water by turn the disc. If the improper metal to metal contact has happened or any chips of metal gets then the operation may affected. Sometimes DVPL use bush rings made up of GUNMETAL, STAINLESS STEEL, etc. as per requirement to make the valve more efficient. Initially the valve disengaged from pipeline by dismantling the flange joints. Removing the valve should be kept rest on smooth & clean flat surface. In case of large NB (nominal diameter) of valve there must be crane facilities should be available to lift out of the pipeline. Remove the shear pin (the pin which fixed the shaft to the disc) disengage shaft to disc / seat. Pull out the shaft clearly it shows the shaft bearing / bush take out that outside to the body of valve by the help of puller if bush is fixed by collar try to push the bearing / bush push the outward from the valve body. Take out the bush carefully while taking out the bush body of valve or boring should not be harmed or damage. Replace the bushes of both ends before fitting bush inner bore should be cleaned as well as clean all the machined part of valves now rest process is the putting back all the spare parts back into the valve in a sequence manner.

IMPORTANT NOTE: All the spare parts are used must be having a brand name and Govt. registered company while replacing those parts.

SAFETY INSTRUCTION -

These safety instructions are written on the manual to make the operation, maintenance the client should take the valves in working condition for a long time. Durga Valves design the product on the safety measurements but there also some external or foreign matters also present at the premises where the valves are installed. This cannot be eliminated, but if we install the valves as per instruction it can be minimized. Users are responsible for the correct working of the product.

GENERAL INFORMATION ON SAFETY -

DVPL products are designed for different sectors with their own application. Cleaning of the valves inside and outside may restrict any hazards to get inside of the valves.

The person who has installed the valve should have only authority to take out spare parts of the valves; he must be trained to use adequate tools.

Before installing the valve kindly read all the above instruction which we have mentioned.

The products designed with permissible use, application, & product rating. The operation should be within the limit of all parameters if the limit will increase there must be a chance of permanent Failure of the product.

Clean all the controlling units which are connected to the product. Hazardous or flammable materials should not be stored near to the valves.

INTIMATING PRODUCT / PERFORMANCE COMPLAINT -

While communicating regarding product order and other queries the following information helps us.

DVPL order acceptance Number.

Product Description Type, Size, Pressure rating etc.

Product serial No. (This is hard punch marked on Valve Flange)

Paint color.

If there any complaint retailed to DVPL regarding wrong supply or damage or revise the order kindly Communicate with the JOB NO. That helps us to track cause of the problem.

Our Contact office & e-mail id:
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