CAST STEEL VALVES

Bolted Bonnet Gate Valves

2”–24”, (50–600 mm), 150#-300#

MAINTENANCE MANUAL

DURGA VALVES PVT. LTD.

ICHAPUR ROAD, CANAL SIDE, SANTRAGACHI, HOWRAH-711104

RECEIVING AND PREPARATION FOR INSTALLATION -

RECEIVING INSPECTION

All valves must be examined for signs of damage that may have occurred during transportation. Any damage should by analyze and a report should be issued. Serious damage should be reported to your local DVPL representative or to the Customer Service Manager so that a suitable arrangement for repairs can be made without delay.

QUALITY CONTROL INFORMATION

For valves purchased with Quality Control (QC) certification, check the package of documents to see that the Quality Control certificates are complete as per the purchase order.

STORAGE

Valves should be stored in a suitably sheltered place to prevent contamination by weather, dirt or dampness. The valve is shipped with end protectors on the inlet and outlet which should stay on the valve until it is ready for installation.

HANDLING AND PREPARATION

On large valves, a hoist is needed to assist installation. A sling should be placed under the valve body or around the valve yoke so that the unit can be lifted vertically to its final destination. End protectors must be removed from all types of valves and connections must be checked for cleanliness. Any visible foreign matter must be removed from end connections on valves. It must be cleaned properly with a suitable solvent such as acetone or alcohol. Do not use solvents containing chloride or fluoride.

INSTRUCTIONS FOR GATE VALVES -

The flow through gate valves can be from either end. There may be exceptions to this if bypass piping is welded to the valve body or if a pressure relief hole is drilled in one side of the valve gate. Check your piping layout drawing to ensure correct position and direction of flow. Gate valves should be installed and welded into the pipeline with the wedge or disc in the fully closed position. If the valve is left open or partially open, it could distort and leak during operation. Also, leaving the valve in a fully closed position helps prevent weld spatter from falling directly onto the mating faces of the seats.

The preferred orientation of a gate valve is upright. The valve may be installed in other orientations, but any deviation from vertical is a compromise. Installation upside down is not recommended because of possible dirt build-up in the bonnet. It is best to consult DVPL Engineering department during quotation review process as to remedial measures required (hard facing of guides) when valves over 12” (300 mm) are tilted beyond 45° from the stem vertical orientation.

NOTE: Gate valves should not be used for throttling to control the flow, they are normally fully open or fully closed. If left in partially open position could result in severe damage to body seats, wedge, stem & guide rails.

GENERAL MAINTENANCE -

General

All valves require examination before being put into operation. Additionally, valves should be inspected regularly during operation and should receive prompt attention when trouble arises. As a general rule, valves should be subjected to scheduled maintenance.

Smoothness of Operation

Stem threads, gearing and other working components outside the fluid area should be lubricated frequently and at least once every six months. Specific lubricants and frequency of application are shown in the recommended lubrication. Valves that are not operated frequently and which may remain open or closed for long periods of time should be worked (even if only partially) about once a month.

RECOMMENDED LUBRICATION

PART	APPLICATION	FREQUENCY
Stem Threads	Directly to threads	When threads appear dry
Yoke Nut	Inject through grease fitting at hub of yoke	Concurrently with stem thread lubrication
All threaded parts except stem and yoke nut	Thin coat on thread	On valve assembly only

GENERAL ASSEMBLY INFORMATION

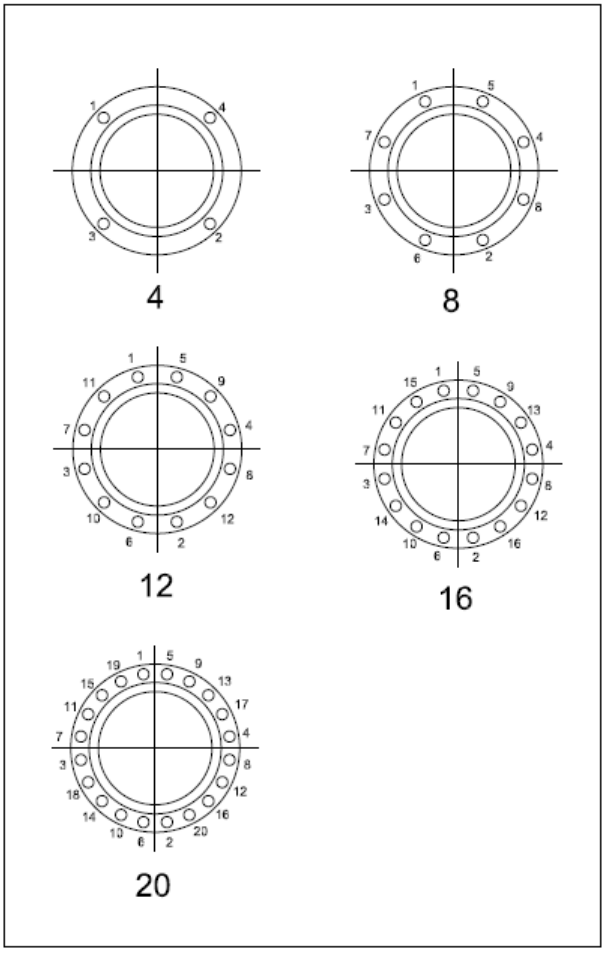
1. The most important fact to be considered is the cleanliness of all parts. All rust and dirt should be removed from all parts with a wire brush or emery cloth. Oil and grease should be removed with suitable solvents.

2. All threaded parts (cap screws, nuts and studs) must be well re-lubricated. The stem and yoke nut threads should be cleaned of all old grease before new grease is applied to the threads.

3. Repaired or replacement parts must be checked to see if all repair procedures have been done and that all replacement parts (e.g. packing rings, gasket, etc.) have been checked for size so that they will fit into the valve you are servicing.

4. All orientation marks assigned during disassembly must be observed so that correct orientation is maintained. Where applicable, orientation marks should be made on parts near the body serial number (e.g., wedge, disc, seat etc.)

BOLT TIGHTNING SEQUENCE



PARTIAL DISASSEMBLY - GASKET REPLACEMENT

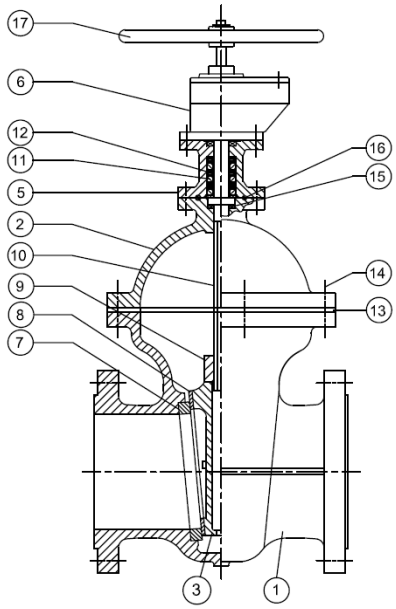
1. Valve should be in partially open position.
2. If the valve is equipped with a leak off pipe, disconnect it first. Leak off pipes should be cut approximately six inches from the bonnet.
3. Remove body/bonnet nuts.
4. Once all the nuts are removed, the entire bonnet assembly can be lifted from the valve body. When lifting the bonnet assembly, care should be taken to prevent the internal parts from disengaging from the stem. It is very important to match–mark the body/bonnet and the wedge in order to maintain proper orientation of these parts at reassembly.
5. Remove used gasket.
6. During inspection check the body/bonnet studs for damage. Studs may have been damaged when removing seized nuts. If studs are damaged, replace them.
7. Install new gasket. For corrugated steel with graphite strips gasket and spiral wound gasket, body and bonnet flange surface must be completely cleaned and free of oil and grease.

8. Line up the bonnet assembly with the body and lower onto the body.
9. Apply lubricant to the body/ bonnet studs and nut flats then install body/ bonnet nuts. Tighten nuts in strict accordance with the body/bonnet bolt tighten sequence.

TOTAL DISASSEMBLY -

1. Partial Disassembly - Gasket Replacement
2. Loosen gland nuts and then carefully pull stem out through bottom of the bonnet.
3. Unscrew gland nuts from gland studs.
4. Remove packing flange.
5. Only if required, remove groove pins in order to remove gland studs.
6. Unscrew the backseat only if necessary.
7. Carefully remove old packing rings. Care should be taken not to scratch the walls of the packing chamber during the removal of the packing rings.
   DVPL has cast gate valve 2" to 24" (50-600 mm) CL-150 to CL-300.

GA DRAWING -



MATERIALS OF CONSTRUCTION			
SL. No.	DESCRIPTION	MATERIALS	SPECIFICATIONN.
1.	BODY	CAST STEEL	ASTM A216 Gr. WCB
2.	BONNET		
3.	WEDGE		
4.	GLAND		
5.	STUFFING BOX		
6.	SPUR GEAR UNIT	MFR'S STD	-
7.	BODY SEAT FACING	STAINLESS STEEL	ASTM A276 Type 304 ASTM A743 CA15
8.	WEDGE SEAT FACING	13% Cr. STAINLESS STEEL, DEPOSITED ON WCB	
9.	WEDGE NUT	L.T. BRONZE	IS:318, LTB-2
10.	STEM	STAINLESS STEEL	ASTM A276 Type 410
11.	SQ. RING	PTEF	-
12.	'O'- RING	RUBBER	NEOPRENE
13.	GASKET	SPIRAL WOUND S.S. AISI-304 WITH CA FILLER / CAF	
14.	STUDS / BOLTS & NUTS	CARBON STEEL	A193, Gr.B7 & A194, Gr.2H
15.	THRUST BEARING PLATE	L.T. BRONZE	IS:318, LTB-2
16.	'O'- RING	RUBBER	NEOPRENE
17.	HAND WHEEL:-	C.I / M.S	IS:210 / IS:2062 Gr.E 250 BR

DETAILED MAINTENANCE GATE -

Packing Chamber Leakage

If moisture or dripping occurs around the stem, the following points must be investigated before removing the packing:

1. Check if the packing flange is torque, down to the correct torque.
2. Check if the live-load arrangement is in correct order. If it is not correct, open the valve to the backseat position and tighten up on the back seat firmly.
3. Check if the gland bushing is binding against the packing chamber wall or stem. If so, fully open the valve and tighten the stem against the backseat firmly. Loosen the packing flange and realign the gland bushing. Tighten up the packing flange a little at a time on each side.
4. After retightening, first open then close and retighten nuts.

Body/Bonnet (Gasket) Leakage

To maintain the tightness of a factory–tested bolted bonnet valve, it is essential to apply sufficient bolt tension at all times by having the proper torque on the nuts. The original torque might be lost due to vibration, relaxation of material caused by frequent temperature and pressure fluctuations, or by creep in high temperature applications. Gasket bolt tension should be checked at approximately one–year intervals and if necessary.

Seat Leakage

An indication of a valve leak is a pressure loss in the high pressure line side after a valve has been properly closed. In the case of hot water or steam lines, note whether the downstream pipe remains hot beyond the usual length of time. This type of leak may be the result of a distorted seat caused by improper welding of the valve into the pipeline or seating damaged caused by foreign particle matter or by stress relieving temperatures that may have been used during installation. Leaks can also develop from failure to close the valve tightly, resulting in high-velocity flow through a small opening. The hard facing material is corrosion and erosion-resistant, but grooves, pit marks or other surface irregularities may still form on the mating surfaces. Valves which leak should be repaired as quickly as possible to prevent greater damage caused by high velocity.

Wedge and Disc Repairs

1. Disassemble valve for gate valves and inspect the wedge or disc for scratches or damage.
2. If seating faces are scratched, the wedge or disc must be lapped. Slight pitting, grooving or indentations no deeper than 0.005" (0.1 mm) can be removed by lapping. If defects cannot be corrected by lapping, wedge or disc should be ground or machined. For **Wedge Gate** DVPL recommends that a maximum of 0.015" (0.4 mm) on each side be removed from a 10-degree seated wedge and 0.010" (0.25 mm) on each side for a 7-degree seated wedge.
3. For the lapping, a flat plate, preferably cast iron, should be used and an abrasive lapping compound mixed with olive oil should be evenly distributed over the. Only light, even pressure should be applied to the plate, lifting the wedge or disc as often as possible to prevent accumulation of particles in one area and to allow for proper distribution of the lapping compound. The lapping plate should be turned slightly every few strokes to maintain a flat surface. The part should be lapped until seating faces are smooth
4. Thoroughly clean off the lapping compound with a suitable cleaning fluid such as acetone or alcohol. Do not use solvents containing chloride or fluoride

Seat Repairs

1. If seating faces are damaged, the body seat must be corrected by lapping. Slight pitting, scratches or indentations no deeper than 0.005" (0.1 mm) can be removed by lapping. If defects cannot be corrected by lapping, the seats should be ground using specialized automatic grinding/lapping equipment.
2. In those cases where the automatic grinding and lapping machine is not employed, seat faces must be repaired using a lapping plate. The plate should be made of cast iron if possible and should be large enough to cover the face of the seat. Apply lapping compound mixed with oil and distribute evenly over the plate. Lap seat by moving lapping plate in a circular motion on seat face. Lap until both seats have smooth faces and then

clean off the lapping compound very thoroughly with a suitable cleaning fluid such as acetone or alcohol.

ASSEMBLY -

Bonnet/Body Assembly

1. Install new gasket. For corrugated steel with graphite strips gasket and spiral wound gasket, body and bonnet flange surface must be completely cleaned and free of oil and grease.
2. Lift and carefully lower the stem/wedge assembly.
3. Lift the bonnet using a chain block or come along, and partially lower through the stem. Place the junk ring (packing spacer) and lantern ring if so equipped followed by the gland bushing and packing flange.
4. Apply recommended lubricant to the body/bonnet studs and nut flats then install body bonnet nuts.
5. Verify operation by cycling at least three times from fully open to fully closed position.

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