Butterfly Valve Installation and Maintenance Procedure

This method is for installation and maintenance of wafer type butterfly valve or lug style butterfly valve with a cast iron body construction, SS stem and disc and either EPDM, BUNA-N or Viton liners.

Although the procedure is specifically provided for Bi-Torq butterfly valves but is useful for any other such type of valves.

General Requirements

- The seat, disc, stem and bushing of the butterfly valve should be coated with a silicone lubricant.
- The disc should be positioned at 10° open.
- Where applicable, the faces of each valve should be covered with cardboard, plywood or similar sturdy material to prevent damage to the seat face, disc edge or butterfly valve interior.
- Valves should be stored indoors with face protectors intact. Storage temperature ideally should remain in a range from +40°F to 85°F.
- When valves have been stored for more than 3 months, open and close the valves. Repeat for every 3 months of storage.
- Store valves so that no heavy loads are applied to the bodies.
- Use caution when handling the valve or valve package. Never lift by the valve handle, gear operator, hand wheel, or actuator. Securely place a rope or hoist around the valve body while handling.

Piping/Valve orientation and placement

Piping and flange compatibility

The BI-TORQ BY and MY series butterfly valves have been designed to be suitable for all types of ANSI 125/150flanges, whether flat-faced, raised face, slip-on or weld-neck. These valves have been engineered so that the critical disc dimension at the full open position will clear the adjacent inside diameter of most types of piping, including schedule 40, lined pipe, heavy wall, etc.

Valve location and orientation in piping

A. Valve location: Whenever possible, butterfly valves should be installed 6 pipe diameters from other elements in the pipeline, such as joints, elbows, etc. This might not always be possible, but it is important to achieve as much distance as possible. Where the valve is connected to a check valve or pump, use an expansion joint to ensure that the disc does not interfere with the adjacent equipment.

B. For slurries, sludge, pulp, dry cement or any other media with sediment or particles, manufacturer recommends the valve be installed with the stem

in the horizontal position with the lower disc edge opening in the downstream direction.

Butterfly Valve Installation Procedure

- Make sure the pipeline and pipe flanges are clean. Any foreign material such as pipe scale, metal chips, welding slag, welding rods, etc. can obstruct disc movement or damage the valve.
- The BY/MY series valve has moulded O-rings on the face of a seat.
- IMPORTANT: No gaskets are required as these O-rings serve the function of a gasket.
- Align the piping and then spread the pipe flanges so that the valve body can be easily placed between the flanges without contacting the pipe flanges.
- Check to see that the valve disc has been positioned to a partially open position with the disc edge approximately1/4" to 3/8" from the face of the seat. (Approximately 10°open.)
- Insert the valve between the flanges taking care not to damage the seat faces. Always pick the valve up by locating holes or by using a nylon sling around the valve neck. IMPORTANT: Never pick the valve up by the actuator or operator as damage may occur.
- Place the valve between the flanges, center it, and then span the valve body with all flange bolts.
- **DO NOT TIGHTEN THE BOLTS AT THIS TIME.**
- Carefully open the disc to the full open position, ensuring that the disc does not make contact with the pipe I.D. Systematically remove any jack bolts on flange spreaders and hand tighten the flange bolts. Very slowly close the valve disc to ensure disc edge clearance from the adjacent pipe flange I.D.
- Open the disc to full open and tighten all flange bolts per specifications. Repeat a full open to close rotation of the disc to ensure proper clearances.

Valve Installation Procedure with flange welding

When butterfly valves are installed between ANSI welding type flanges, care should be taken to abide by the following procedures to ensure no damage will occur to the seat:

- Place the valve between the flanges with the flange bores and valve body bore aligned properly. The disc should be in the 10° open position.
- Span the body with flange bolts.
- Take the flange-valve-flange assembly and properly align in the pipe.
- Tack weld the flanges to the pipe.

- When tack welding is complete, remove the bolts and the valve from the pipe flanges and complete the welding. Be sure to let the pipe and flanges cool before installing the valve.
- CAUTION: Never complete the welding process (after tacking) with the valve between the pipe flanges. This causes severe seat damage due to heat transfer.

Good Practices for butterfly valve installation

- Pipework opened to allow free valve entry with the disc in a semi-closed position.
- NOTE: Best practice is to have the disc in the 10% open position while installing
- Valve in semi-closed (10% open) position to:

(1) Protect disc edge,
(2) Reduce rubber interference during installation and start-up, and
(3) Help reduce initial torque build-up.

- Disc should be returned to the full open position after flange alignment and before evenly pulling up the flange bolts.
- Tighten flange bolts according to the bolt torques and asper the given diagrams.

Bad Practices for butterfly valve installation

- Pipework not spread sufficiently – could tear rubber seat. Disc in open position will hit flange and score disc edge.
- Disc in fully closed position causes seat distortion. When flanges are drawn up, rubber will close around disc edge creating excessive torque in initial operation.
- Incorrect pipe alignment will cause interference between the disc edge and flange face, creating leakage and excessive torque for opening valve.
- Do NOT use flange gaskets. All BI-TORQ butterfly valve seats have a moulded-in O-ring that creates a positive seal when used in conjunction with standard ANSI flange faces. The use of gaskets unnecessarily might cause leakage or misalignment.
- Do not over torque or improperly tighten bolts in any other pattern than that listed below.

INSTALLATION, SETTING AND MAINTENANCE INSTRUCTIONS CRANE BALANCING VALVES

SCOPE OF THIS DOCUMENT COVERS BELOW MENTIONEDBALANCING VALVES:

DM921 & DMG921 DOUBLE REGULATING VALVE (DRV)

DM931 & DMG931 DA931 & DAG 931 VARIABLEORIFICE DOUBLE REGULATING VALVE (VODRV)

DM941 & DMG 941 DA941 & DAG941 FIXEDORIFICE DOUBLE REGULATING VALVE (FODRV)

FITTING PRESSURE TEST VALVES The pressure test valve with the red tag should be fitted to the body tapping nearest to the inlet end of the valve, and the valve with the blue tag to the tapping nearest to outlet end of the valve. Use a thread sealant and do not exceed1.1//2 turns from hand tight.

Type 931: Remove two of the square headed plugs fitted to the side tapping of the valve. It is recommended that the pressure test valves are fitted to the valve on the side of the flow direction arrow and I.D. plate. They can be fitted on the opposite side if access is limited without any reduction in accuracy.

Type941: Remove the square headed plugs fitted to the top of the valve and replace with the test valves provided.

INSTALLATION

All valves: Valves must not be lifted by the hand wheel The valves should be installed in a straight run of pipe of the same nominal size with the arrow pointing in the direction of flow. They may be orientated at any angle. The gaskets must be assembled so that they are concentric with the pipe bore and do not intrude into it, or the measurement accuracy may be reduced.

When used for end of line service, a blanking flange should be fitted. A blanking flange is not required for temporary installation or servicing. Crane recommends that the valve is not left unattended in this condition if the system has been filled.

Type 941: To ensure maximum flow measurement accuracy, it is essential that the piping is straight for a minimum length equivalent to 5 diameters on the inlet and 2 diameters on the outlet. If it is located on the outlet side of a pump, the equivalent straight length of pipe leading up to the valve must be a minimum of10 diameters.

The valves are calibrated to give the correct readings when used with BS1387 medium grade pipe for sizes up toDN150 (6”). Larger sizes are calibrated for use with BS3600or BS EN 10220 pipe, having a wall thickness of 6.3mm

(1/4”). Schedule 20 pipe is also satisfactory. Pipes with a significantly different bore will give an altered reading. If in doubt consult Crane Fluid Systems Sales Dept.

VALVE SETTING INDICATOR

The micrometer style hand wheel uses two scales:

1) A grey plastic sleeve within the hand wheel which has 8, 12 or 18 numbered rings depending on the size of the valve.

2) A collar snapped into a groove on the outside of the hand wheel boss which is numbered 0 to 9 around the circumference.

As the valve is opened from the fully closed position, each turn of the hand wheel reveals one extra ring on the plastic sleeve. When closed, the zero on the collar lines up with a groove in the sleeve and each number represents 1/10 of a turn.

The fully open position is reached when all rings on the sleeve are visible and the zero again lines up with the groove. A total of 10 settings are available therefore for each turn of the hand wheel.

REGULATION

Type 921: Flow regulation is achieved by adjusting the hand wheel setting until the desired flow rate is obtained. The micrometer type hand wheel will indicate the final setting.

Type 931: Flow regulation is achieved in the same way as the Type 921. The flow rate may be derived from the pressure drop signal measured across the pressure test valves. Flow charts are available on request for all valve sizes. They show the flow rate which results for the pressure drop measured, depending on the hand wheel position.

Type 941: Flow regulation and measurement is obtained in the same way as with the Type 931. With this valve, a different chart is required and the relationship between pressure drop and flow is not altered by the hand wheel setting.

SETTING FACILITY

- The valve setting at which the required flow rate may be achieved may be retained by loosening the memory stop screws and sliding the memory stop up until it contacts the grey plastic sleeve protruding from the hand wheel. Retighten the screws.

- The valve is now set and may be closed and reopened to the set point. A Hex. wrench is provided for this adjustment. Sizes up to DN 150 require a 3mm wrench, and larger sizes a 4mm wrench.

VALVE ISOLATION

Tight valve shut off at high working pressures will require closing torques which are higher than can be obtained manually with the hand wheel, and will require the use of a closing bar or wrench. Valve sizes of DN200 and larger have a square cast in to the top of the hand wheel for this purpose. A guide to the torques required for a 16 bar pressure drop across the valve are shown in the table. These torques may be applied without risk of damaging the valve.

MAINTENANCE

- No routine maintenance is required, however it is possible to tighten the gland packing should a leak occur between stem and gland nut:
- Unscrew the hand wheel nut and remove the hand wheel. Mark the hand wheel so that it may be replaced later in the same position relative to the stem.
- The gland nut is now revealed and may be tightened as required. For sizes DN65 (2.1/2”) to DN100 (4”) use a27mm socket. For sizes DN125 (5”) and DN150 (6”) use a32mm socket. Larger sizes have two M8 studs and nuts (13mm spanner).
- Only tighten the nut sufficiently to cure the leak. Overtightening may make the valve difficult or impossible to operate. (The balancing valves are not provided with backseats. Under no circumstances should the gland nut be removed without first isolating the valve and relieving any residual pressure.)Replace the hand wheel and check that the valve may be operated without requiring excessive torque at the hand wheel.

PRESSURE EQUIPMENT DIRECTIVE 97/23/EC

These valves are for use on non-hazardous liquids only –Group 2, as defined by the pressure equipment directive97/23/EC. Valves are classified as SEP (sound engineering practice) and as such cannot be CE marked and do not require a declaration of conformity.

Method Statement for Installation and Maintenance of Strainer

Strainers are installed to prevent foreign matter e.g. scale and dirt causing damage to pipeline equipment.

Service temperature and pressure indicated on the identification plate or body marking should not be exceeded.

Crane strainer shave not been designed as fire safe pressure equipment.

Strainers must be installed into a well-designed system and it is recommended that the system be inspected in accordance with the appropriate member state legislation. In the UK – The Pressure Equipment Directive 97/23/EC and the Pressure Systems Safety Regulations 2000.

Strainer Installation Method Statement

Preparation:

- Ensure strainer is suitable for service conditions e.g. pressure, temperature, and service media.
- Remove dust caps/flange protectors, where fitted.
- The installation shall be designed to provide adequate means of draining and venting to avoid harmful effects such as water hammer, vacuum collapse, corrosion and uncontrolled chemical reactions and to permit cleaning, inspection and maintenance in the correct manner.
- The strainers have not been designed to include corrosion, erosion or abrasion allowances. Any queries regarding service applications should be addressed to the Crane Fluid Systems – Technical Sales Department.
- The strainers have been designed for loadings, appropriate to its intended use and other reasonably foreseeable operating conditions. Loading's caused by traffic, wind and earthquake have not been taken into account.
- It is the responsibility of the installer to ensure that the strainers do not exceed the allowable limits of pressure. However the strainers are designed to withstand a momentary pressure surge of up to 10%above the maximum working pressure.
- The piping system shall be so designed to reduce the risk of fatigue due to vibration of pipes.

Location:

- Strainers should be located to ensure access is provided for subsequent maintenance of the valve.
- Strainers should be installed in the correct orientation with the angled portion of valve pointing down.
- To ensure strainers work at best efficiency, valves must be installed so that the strainer basket is in the direction of flow. An indication arrow is cast on the valve body.

Piping Supports:

These must be carefully aligned and at the correct distance between centres for the size and type of pipe. The following publications provide details of correct spans and installation details:

BS3974, Specification for Pipe Supports (Available from BSI)

DOI Directorate of M & E Engineering Services, M &E No. 3 (Available from HMSO)

(Standards relevant at the time of design)

Flanged Joints:

Bronze and cast iron flanges may be damaged by overtightening the bolts. The following procedures will reduce this risk:

– Make sure the pipe flanges are correctly aligned.

– Full-face gaskets reduce the stresses in flat face flanges and should be used with bronze flanges.

– Low strength carbon steel bolting has traditionally been used to restrict the load imposed on iron flanges, but should not be used for temperatures above 200°C.

– Always use the correct size and number of bolts.

Do not match a flat-faced flange to a raised face flange.

Threaded Joints:

- The strainers are supplied with taper threads and, with the use of a thread sealant will give a pressure tight seal.
- To avoid distortion of the valve when fitting and tightening pipe, the valve must be held securely using the flats provided at the end of the valve to which the pipe is being fitted.
- The male thread on the pipe must have, fully formed, undamaged threads.

Press-Fit Joints:

For Press-Fit, please refer to the Geberit websitewww.geberit.co.uk where installation instructions for Press-Fit can be found.

Strainer Routine Maintenance Guidelines

- Ensure that the strainer is isolated from the pipeline before commencing work.
- Remove the strainer cap and screen and clean out any sediment and other debris.
- Check for damage to the screen and renew if necessary with a screen of the same material and construction.
- Re-assemble the screen and cap using a new gasket. The procedure detailed below should be followed to ensure correct location of the screen in the strainer body.

Strainers with Screwed Cap:

Step 1: Fit gasket into the groove in the cap. Step 2: Push the screen into the inside of the cap, making sure it fits squarely. Step 3: Assemble the cap back into the body and tighten.

Strainers with Bolted Cap:

Step 1: Fit the gasket into the groove in the cap. Step 2: Place the screen inside the body making sure it is seating correctly. Keep the screen in this position using a steel rule or something similar temporarily held across the opening in the body. Step 3: Place the cap in position on the body studs and push home, making sure the screen engages the seating in the cap. Tighten down each nut gradually to ensure equal compression before fully tightening.

General Consideration

- Maximum operating pressure reduces as service temperature increases. Pressure and temperature limitations are shown by the valve body marking or on the identification plate, and must not be exceeded.
- Strainers are not designed to operate under high shock loadings.
- Where pressure increases occur due to shock loading (water hammer), they should be added to the working pressure to obtain the total pressure acting on the valve.

- The total must not exceed the pressure rating of the valve.
- A pressure surge, or shock, is usually caused by the rapid closure of a check valve or quarter turn valve resulting in a sudden reduction in flow rate.
- The surfaces of strainers in service may be subject to extreme temperatures; care should be taken when handling.

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Y-Strainer Installation and Maintenance Guidelines

This page is providing you some important guidelines for installing and maintaining the Y-Strainers. These tips shall help you in achieving the quality work and right first time.

If you want to read a full method statement for strainer installation you can search our website.

First we shall see some useful installation tips and this will follow the o-ring replacement tips.

Y-Strainer Installation Tips

1. **Flow Orientation:** Cartridge/Cap projection will point downstream.

2. **Axial Alignment:** To avoid damage to the housing –ensure that the inlet and outlet piping center-lines are in alignment. For flanged units, ensure connecting flanges are parallel with the strainer's sealing surfaces.

3. **Connection Spacing:** Observe end-connection spacing, given in tables below. For flanged units, do not rely on bolts to draw connecting pipes to strainer. Err on the side of less, rather than more spacing to minimize stresses on the housing welds. Allowance for NPT thread, or Socket Weld insertion will further reduce the spacing.

4. **Flanged Connection Gaps or Misalignment:** If the gap between rigidly mounted inlet and outlet piping flanges is too large to accommodate the strainer (e.g., gap of 1/16"or more), or if the inlet and outlet piping flanges are not carefully aligned (e.g. angular deviation of 2° or more), there are many spacers to fill the gap, fix the alignment, or both.

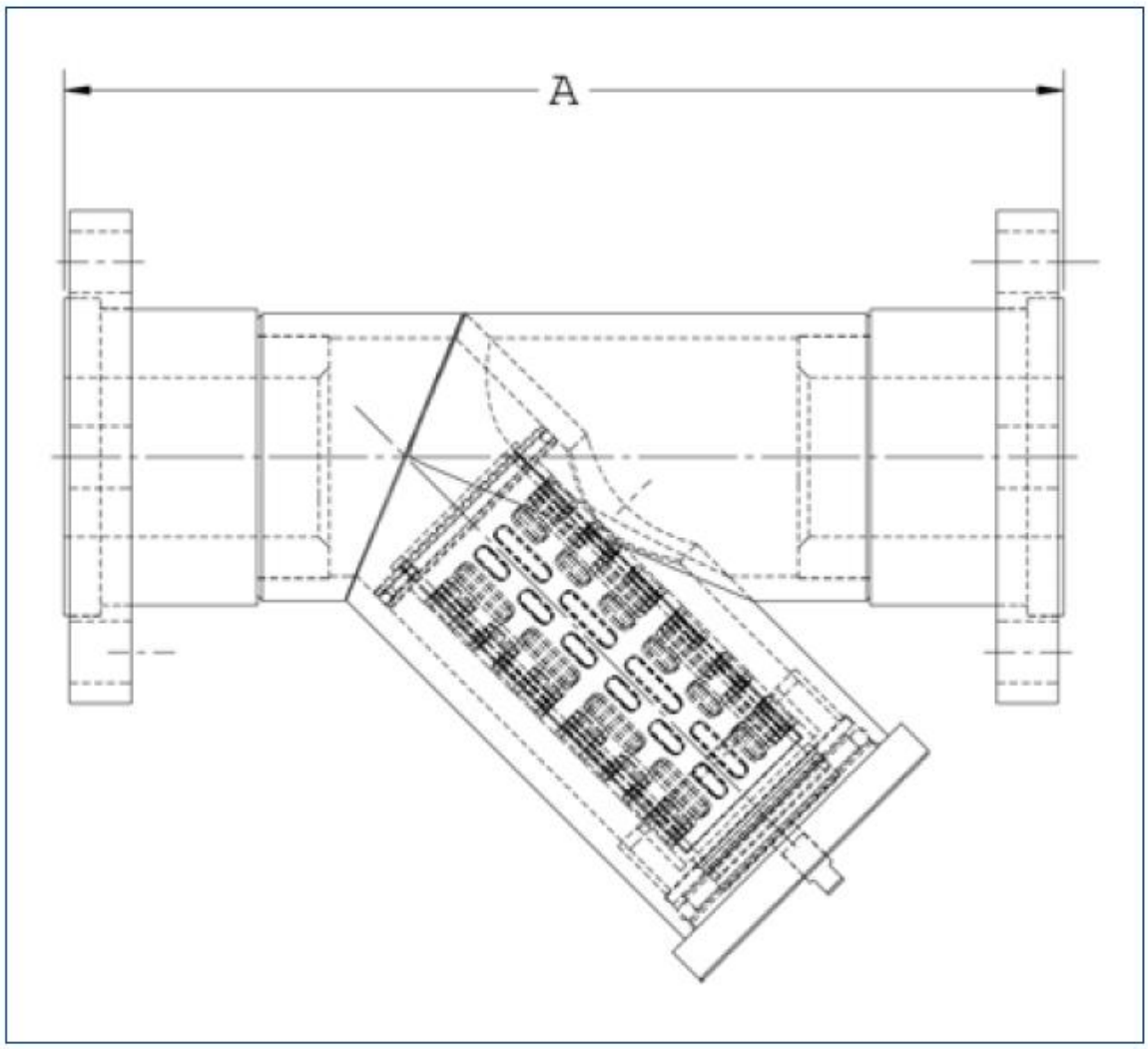
For information on purchasing such spacers, provide the center-line distance plus the angular gap to be filled to your distributor who will provide you with a quotation. If the gap is less than 1/16" or the misalignment is less than2°, 1/16" gaskets at each end are satisfactory to fill the gap/ misalignment.

NOTE: We strongly recommend use of Formula-8 Teflon PTFE paste sealant, on PTFE-to- PTFE NPT threaded joints.

Operating Pressures

- Maximum operating pressure varies with temperature, Y-strainer size and material.
- As a general rule, maximum long term operating pressures at room temperature are shown in the table below.
- Short-term operating pressures can be substantially higher with PTFE units since creep would not be a factor.
- For guidance in higher temperature environments, contact the Y strainer factory.
- End Connection Spacing and Maximum Long-Term Operating Pressures at Room Temperature

Nominal Size		***End Connection Spacing Dim A***	***PVDF Y-Strainer***	***PTFE Y-Strainer***
(in.)	**(mm)**	**(inches)**	***(PSI)***	**(PSI)**
1/8"	**NA**	7.4	150	65
1/4"	**NA**	7.4	150	65
3/8"	**16**	7.4	150	65
1/2"	**20**	7.4	150	65
3/4"	**25**	9.9	150	50
1"	**32**	9.9	150	50
1-1/4"	**40**	10.6	150	35
1-1/2"	**50**	10.6	150	35
2"	**63**	12.2	100	30
3"	**90**	14.7	60	25
4"	**110**	17.3	60	N/A



YStrainer O-ring Replacement

- O-rings are user-replaceable; Spares can be purchased from the factory. Dash numbers are given in the table below.
- Removal and installation of o-rings is mostly easily accomplished when the o-rings are pre-heated in hot water.
- Always use a plastic tool to avoid damaging the sealing surfaces of the o-rings and their seats.

O-ring AS 568 Dash Numbers

O-ring AS 568 Dash Numbers

Nominal Size		***PVDF and PTFE Y-Strainer***	***PVDF Y-Strainer***	***PTFE Y-Strainer***
(in.)	**(mm)**	**Cartridge[1] O-ring**	**Cap[2] O-ring**	**Cap[2] O-ring**
1/8"	**NA**	-116	-118	-119
1/4"	**NA**	-116	-118	-119
3/8"	**16**	-116	-118	-119
1/2"	**20**	-116	-118	-119
3/4"	**25**	-125	-220	-221
1"	**32**	-125	-220	-221
1-1/4"	**40**	-226	-228	-228
1-1/2"	**50**	-226	-228	-228
2"	**63**	-231	-335	-335
3"	**90**	-242	-346	-346
4"	**110**	-356	-358	N/A

[1]Standard cartridge o-ring: FEP encapsulated hollow-core silicone rubber
[2]Standard cap o-ring: FEP encapsulated solid-core silicone rubber.