

PROCEDURES-SERIES 20/21 BUTTERFLY VALVES

I. Shipment & Storage

A. The seat, disc, stem and bushing of the butterfly valve should be coated with silicone lubricant as recommended by Fuller Technical Bulletin 1028.

B. The disc should be positioned at 10° open.

C. The faces of each valve should be covered with cardboard, plywood, plastic plates, etc. to prevent damage to the seat face, disc edge, or butterfly valve interior.

D. Valves should be stored indoors with face protectors intact. Temperature should preferably be 40° to 85° F.

E. When valves are stored for a long time, open and close the valves once every 3 months.

F. Ship and store valves so that no heavy loads are applied to the bodies.

II. Installation Considerations-Piping and Valve Orientation and Placement

A. **Piping and Flange Compatibilities-** The Series 20/21 butterfly valves have been designed to be suitable for all types of ANSI 125/150 flanges, whether flat-faced, raised-faced, slip-on, weld-neck, etc. (Type C stub-end flanges conform to no standard for the flange face and are not recommended for use with resilient-seated butterfly valves.) These valves have been engineered so that the critical disc chord 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. If in question, one should compare the minimum pipe I.D. with the published disc chord dimension at full open.

B. Valve Location and Orientation in Piping

1. **Valve Location** Butterfly valves should be installed if possible a minimum of 6 pipe diameters from other line elements, i.e., elbows, pumps, valves, etc. Of course, 6 pipe diameters is not always practical, but it is important to achieve as much distance as possible. Where the butterfly valve is connected to a check valve or pump, use an expansion joint between them to ensure the disc does not interfere with the adjacent equipment.

2. Valve Orientation

a. In general, Fuller recommends the valve be installed with the stem in the vertical position and the actuator mounted vertically directly above the valve; however there are those applications as discussed below where the stem should be horizontal. The valve should not be installed upside down.

b. For slurries, sludge, mine tailings, pulp stock, dry cement, and any media with sediments or particles, Fuller recommends the valve be installed with the stem in the horizontal position with the lower disc edge opening in the downstream direction.

c. For valve orientation downstream of pump, bend, etc., see Fuller Technical Bulletin 105.

III. Installation Procedure

A. General Installation

1. Make sure the pipeline and pipe flange faces are clean. Any foreign material such as pipe scale, metal chips, welding slag, welding rods, etc., can obstruct movement or damage the seat.

2. The Fuller elastomer seat has molded o-rings on the face of the seat. **As a result no gaskets are required as these o-rings serve the function of a gasket.**

3. Align the piping and then spread the pipe flanges a distance apart so as to permit the valve body to be easily dropped between the flanges without contacting the pipe flanges.

4. Check to see that the disc has been positioned to a partially open position, with the disc edge about ¼" to 3/8" from the face of the seat (approximately 10°).

5. Insert the valve between the flanges, taking care not to damage the seat faces. Always pick the valve up by the locating holes or by nylon sling on the neck of the body. Never pick up the valve by the actuator or operator mounted on top of the valve.

6. Place the valve between the flanges, center it, and then span the valve body with all flange bolts, but do not tighten the bolts. Carefully open the disc to the full open position, making sure the disc does not hit the adjacent pipe I.D. Now systematically remove jack bolts on other 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. Now open the disc to full open and tighten all flange bolts per specification. Finally repeat a full close to full open rotation of the disc to ensure proper clearances.

B. Installation with Flange Welding- When butterfly valves are to be installed between ANSI welding type flanges, care should be taken to abide by the following procedure to ensure no damage will occur to the seat:

1. Place the valve between the flanges with the flanges bores and valve body bore aligned properly. The disc should be in the 10° open position.

2. Span the body with the bolts.

3. Take this assembly of flange-body-flange and align it properly to the pipe.

4. Tack weld the flanges to the pipe.

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

IV. Maintenance and Repair

The many Fuller features minimize wear and maintenance requirements. No routine lubrication is required. **All components-stem, disc, seat, bushing, stem seal, etc., are field replaceable, no adjustment is required.** If components require replacement, the valve may be removed from the line by placing the disc near the bolts. **No valve maintenance, including removal of manual or power actuators, should be performed until the piping system is completely de-pressurized.**

V. Disassembly and Assembly

A. **Disassembly-** Remove handle, manual gear box or actuator from actuator mounting flange. Remove the body bolts and pull the lower half away from the seat. Pull the seat and disc stem from the upper body half. Remove bushing and seal from the upper body. Push the seat into an oval shape and remove the disc stem by withdrawing the short stem end first.

B. **Disassembly-** Push the long stem end of the disc into the seat, then push the seat over the disc stem short stem. Place the disc stem and seat into the upper body half. Align the lower body bolt lugs with the upper body lugs and position lower body in the seat. Replace the body bolts and tighten. Install the stem seal, then the stem bushing. Replace handle, manual gear box or actuator on the actuator mounting flange. Note: The body halves have a matching casting node on one side only to ensure correct assembly of body halves.

PROCEDURES -SERIES 30/31/34 BUTTERFLY VALVES

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B. The disc should be positioned at 10° open.

C. The faces of each valve should be covered with cardboard, plywood, plastic plates, etc., to prevent damage to the seat face, disc edge, or butterfly valve interior.

- D. Valves should be stored indoors with face protectors intact. Temperature should be preferably 40° to 85° F.
- E. When valves are stored for along time, open and close the valves every 3 months.
- F. Ship and store valves so that no heavy loads are applied to the bodies.

II. Installation Considerations-Piping and Valve Orientation and Placement

A. Piping and Flange Compatibilities- The Series 30/31/34 butterfly valves have been designed to be suitable for all types of ANSI 125/150 flanges, whether flat-faced, raised-face, slip-on, weld-neck, etc. (Type C stub-end flanges conform to no standard for the face and are not recommended for use with the resilient-seated butterfly valves.) These valves have been engineered so that the critical disc chord dimension at the full open position will clear the adjacent inside diameter of most heavy types of piping, including Schedule 40, lined pipe, heavy wall, etc. If in question, one should compare the minimum pipe I.D. with the adjacent published disc chord dimension at full open.

B. Valve Location and Orientation In Piping

1. Valve Location Butterfly valves should be installed if possible a minimum of 6 pipe diameters from the other line elements, i.e., elbows, pumps, valves, etc. Of course, 6 pipe diameter is not practical, but it is important to achieve as much distance as possible. Where the butterfly valve is connected to a check valve or pump, use an expansion joint between them to ensure the disc does not interfere with the adjacent equipment.

2. Valve Orientation

- a. In general, Fuller recommends the valve be installed with the stem in the vertical position and the actuator mounted vertically directly above the valve.; however there are those applications as discussed below where the stem should be horizontal. The valve should not be installed upside down.
- b. For slurries, sludge, mine tailings, pulp stock, dry cement, and any media with sediments or particles, Fuller recommends the valve be installed with the stem in the horizontal position with the lower disc edge opening in the downstream direction.
- c. For valve orientation downstream of pump, bend, etc., see Fuller Technical Bulletin 1025.

III. Installation Procedure

A. General Installation

1. 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 or seat.
2. The Fuller elastomer seat has molded o-rings on the face of the seat. **As a result, no gaskets are required as these o-rings serve the function of a gasket.**
3. Align the piping and then spread the pipe flanges a distance apart so as to permit the valve body to be easily dropped between the flanges without contacting the pipe flanges.
4. Check to see that the valve disc has been positioned to a partially open position, with the disc edge about ¼" to 3/8" from the face of the seat (approximately 10° open).
5. Insert the valve between the flanges, taking care not to damage the seat faces. Always pick the valve up by the locating holes or by using a nylon sling at the neck of the body. Never pick up the valve by the actuator or operator mounted on top of the valve.
6. Place the valve between the flanges, center it, and then span the valve body with all flange bolts, but do not tighten the bolts. Carefully open the disc to the full open position, making sure the disc does not hit the adjacent pipe I.D. Now systematically remove jack bolts on other 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. Now open the disc to full open and tighten all flange bolts per specification. Finally repeat a full close to full open rotation of the disc to ensure proper clearances.

B. Installation with Flange Welding- When butterfly valves are to be installed between ANSI welding type flanges, care should be taken to abide by the following procedure to ensure no damage will occur to the seat:

1. 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.
2. Span the body with the bolts.
3. Take this assembly of flange-body-flange and align it properly to the pipe.
4. Tack and weld the flanges to the pipe.
5. When tack welding is complete, remove the bolts and the valve from the pipe flanges and complete the welding of the flanges. Be sure to let the pipe and flanges cool before installing the valve. **NOTE: Never complete the welding process (after tacking) with the valve between pipe flanges. This causes severe seat damage due to heat transfer.**

IV. Maintenance and Repair

The many Fuller features minimize wear and maintenance requirements. No routine lubrication is required. **All components- stem, disc, seat, bushing, seal, etc., are field replaceable, no adjustment is required.** If components require replacement, the valve may be removed from the line by placing the disc near the closed position, then supporting the valve and removing the flange bolts. **No valve maintenance, including removal of manual or power actuators, should be performed until the piping system is completely de-pressurized.**

V. Disassembly and Assembly

A. Disassembly- Remove hand, gear operator, or actuator from actuator mounting flange. Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole, then remove the stem, bushing, and seal. Remove the disc from the seat, protecting disc edge at all times. Push the seat into an oval shape, then remove the seat from the body.

B. Assembly- Push the valve seat into an oval and push it into the body with seat stem holes aligned to the body stem holes. Insert stem seal and bushing. Push stem into the stem hole until the bottom of the stem is flush with the inner top edge of the seat. Install a light coating if silicone or grease on the I.D. of seat. Insert the disc into the seat by lining up the disc hole with the stem hole of the seat. Note: The broached double "D" flats in the disc must be toward the bottom of the valve body. With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole. Make certain that when pushing stem through disc bottom, the broached flats of stem and disc are aligned. Replace the stem bushing and two stem retainers, then replace the "Spirolox"® retaining ring back into position.