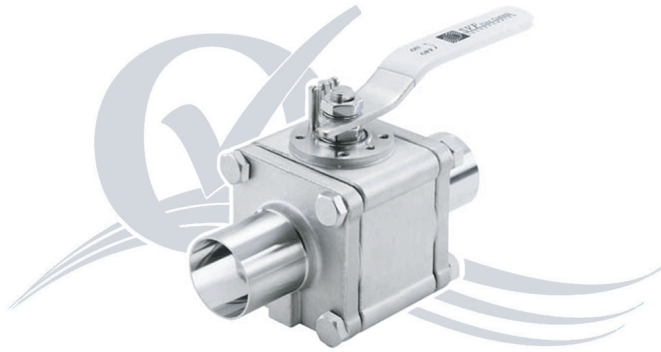


INSTALLATION, OPERATION & MAINTENANCE FOR SVF CleanFLOW™ SERIES BALL VALVES



SB7 CleanFLOW Ball Valve

GENERAL

SVF Ball valves have been designed and engineered to provide long lasting and trouble free service when used in accordance with the instructions and specifications herein.

The following instructions refer only to all SVF Standard Series SB7/SB7F/TSB7 Clean FLOW Ball Valves.

Keep protective cover in place until moment of installation. Valve performance depends upon prevention of damage to ball surface. Upon removal of cover, make sure that the valve is completely open and free of obstruction.

If requested, valves can be shipped from the factory containing a silicon based lubricant which aids in the assembly of the valve. This may be removed with a solvent if found intolerable.

STORAGE:

All manual valves are shipped in the fully open position with protective end caps (covers). Keep all protective packaging, flange covers, or end caps attached to the valves during storage. To avoid damage to the seat due to contact with the balls edge, leave the valve in the fully open or closed position during storage. It is recommended to keep the valves in a clean and dry environment until ready for use.

!!!CAUTION! Safety Precautions!!!

Before removing valve from pipeline NOTE that:

Media flowing through a valve may be corrosive, toxic, flammable, a contaminant or harmful nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that the following minimal safety precautions be taken when handling valves.

1. Always wear eye shields.
2. Always wear gloves and overalls.
3. Wear protective footwear.
4. Wear protective headgear.
5. Ensure that running water is readily accessible.
6. Have a suitable fire extinguisher ready if media is flammable.
7. Be sure that you are aware of the fluid that has been passing through the valve before opening or dismantling any valve. Require MSDS information.

By checking line gauges ensure that no pressure is present at the valve. Ensure that any media is released by operating valve slowly to half open position. Ideally, the valve should be decontaminated when the ball is in the half open position.

These valves, when installed, have body connectors which form an integral part of the pipeline and the valve cannot be removed from the pipeline without being dismantled.

Valves and accessories must not be used as a sole support of piping or human weight. Safety accessories such as safety relief (overpressure) valves are the responsibility of the system designer.

It is the user/system designer's responsibility to use insulation in high temperature applications. Refer to OSHA documents for more details.

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INSTALLATION

The valve may be installed for flow or vacuum in either direction. Carefully exclude pipe sealants from the valve cavity. When installing, use standard gaskets suitable for the specific service. Tighten flange bolts or studs evenly.

OPERATION

SVF valves provide tight shut off when used under normal conditions and in accordance with SVF's published pressure/temperature chart. If these valves are used in a partially open (throttled) position seat life may be reduced.

SVF valves have ¼ turn operation closing in a clockwise direction. It is possible to see when the valve is open or closed by the position of the wrench handle. When the wrench is inline with the pipeline, the valve is open.

Any media which might solidify, crystallize or polymerize should not be allowed to stand in the ball valve cavities unless regular maintenance is provided. If minimal maintenance is required, SVF offers steam jacketed ball valves.

TORQUE REQUIREMENTS

Torque ratings are subject to variations depending on the length of time between cycles and the media in the system.

Breakaway torque is that force which must be exerted to cause the ball to begin to open. Operating torque requirements will vary depending on the length of time between cycles, media in the system, line pressure, and type of valve seat.

MAINTENANCE

With self-wiping ball/seats, SVF valves have a long, trouble free life, and maintenance is seldom required. But, when necessary, valves may be refurbished, using a small number of components, none of which require machining.

SVF valves are designed for easy service and assembly in the field. The following checks will help to extend valve life, or reduce plant problems.

SVF ball valves utilize live-loaded stem seals featuring Belleville Washers (disk springs) that maintain constant pressure on the Stem Seal area even under a wide range of pressure and temperature fluctuations. If stem leakage is evident proceed as follows:

STEM LEAKAGE

Examine the disk springs (Belleville Washers) for damage. If in good condition tighten the gland nut until disk springs are firmly compressed, then back nut off 1/16th of a turn. If damaged, dismantle the stem down to the gland, fit new disk springs with their outer edges touching, replace and retighten using gland nut. Further maintenance necessitates dismantling of the valve.

LEAKAGE AT BODY JOINT

Check for tightness at the body connector bolts. If loose, tighten body bolts. Excessive force will damage the bolts. (See Table A below) If there is still leakage it will be necessary to dismantle the valve and replace the body seals.

IN-LINE LEAKAGE

Check that the valve is fully closed. If leakage occurs while the valve is in the closed position, a seat or ball sealant surface may be damaged and it will be necessary to disassemble the valve.

NOTE: Stem leakage and leakage at body joint, if not cured by simple means described above, necessitate dismantling valve. If there is no stem leakage the stem assembly should not be touched.

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REBUILDING

Before rebuilding, check that all the correct components are available and that they are fit for reassembly. When rebuilding, cleanliness is essential to allow long valve life and provide cost effective maintenance. CAUTION: NO BODY OR STEM SEALS ARE REUSABLE. Care must be taken to avoid scratching the seats and seals during installation.

NOTE: Caution must be taken with valves that have been in hazardous media. They must be decontaminated before disassembly, by relieving the line pressure and flushing the line with the valve in the partially open position. Protective clothing, face shields, gloves, etc., MUST BE USED for this operation.

A DISASSEMBLY OF VALVE (Removed from line)

- 1.) Remove the End Connectors (#2) by removing the Body Bolts (#16) and Body Bolt Nuts (#17).
- 2.) Once the End Connectors (#2) have been separated from the Body (#1), remove the Body Seals (#6) and Seats (#5).
- 3.) Make sure the Ball is in the closed position, thus the Ball (#3) can be removed easily from the Body (#1).

B REMOVING STEM ASSEMBLY - 1/4" ~ 2" **

Refer to drawing on Page 5

- 1.) Remove Handle (#13) by removing Handle Nut (#15) along with the Lock Washer (#14).
- 2.) Remove the Locking Arm (#12), Tab Lock (#11), Stem Nut (#10), Belleville Washers (#9), Gland (#8), Stem Seals (#7) and Thrust Washer (#7A).
- 3.) Push the Stem (#4) down into the body cavity to remove. Once removed take off the Thrust Washers (#7A and #21).

B-1 REMOVING STEM ASSEMBLY - 2-1/2" ~ 4" **

Refer to drawing on Page 6

- 1.) Loosen Handle Bolt (#16) on Handle Adapter (#14) to remove the Pipe Handle (#15).
- 2.) Remove Tab Lock (#11), Stem Nut (#10), Belleville Washers (#9), Stopper (#13), Gland (#8), Stem Seals (#7) and Stem Locating Ring (#12).
- 3.) Push the Stem (#4) down into the body cavity to remove. Once removed take off the Thrust Washers (#19 and #19A).

C INSPECTION

- 1.) The ball and the surfaces of the seats should be free of pit marks and scratches. Light marring from the action of the ball against the seats is normal and will not affect the operation of the valve.
2. The stem, thrust bearing, stem seal, and surrounding body should be free of pit marks and scratches.

D REASSEMBLY - 1/4" ~ 4"

- 1.) Refer to "REMOVING STEM ASSEMBLY" (Per Valve Size) listed in the column on the left of this page. Follow the reverse order for Reassembly.
- 2.) When stem assembly is complete, tighten Stem Nut according to the values in Table A.
- 3.) With the Stem (#4) in the closed position, insert the Ball (#3) into Body (#1) so that stem slot engages with the tang at the base of the stem.
- 4.) Make sure Body Seals (#6) rest squarely on center seal surface of the body.
- 5.) Insert seats in body. Make sure seats rest firmly on back surface of each recess.
- 6.) Merge the End Connectors (#2) with the body (#1).
- 7.) Insert and tighten Body Bolts/Nuts (#16 for sizes 1/4" ~ 2"; #17 for sizes 2-1/2" ~ 4") diagonally, in accordance to the cross pattern procedure shown on the following page.
- 8.) In the final assembly step ensure that Body Bolts/Nuts are tightened according to torques values in Table A.

** Reassemble in Reverse Order.

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TORQUE SPECS

Certain precautions need to be followed when tightening bolts down to their corresponding torques to help prevent bolt galling. There are two passes each bolt has to undergo during the process, first pass and the final pass. Once every bolt has met the first pass requirement, the final pass can be initiated. When tightening down bolts it is necessary to follow the corresponding bolt pattern shown below.

TABLE A: TORQUE REQUIREMENTS (in-lbs)

| Valve Size | Bolt Pattern | Body Bolts | | Stem Nuts |
|------------|--------------|------------|------------|-----------|
| | | First Pass | Final Pass | |
| 1/4" | 4 | 48 | 80 | 35 |
| 3/8" | 4 | 48 | 80 | 35 |
| 1/2" | 4 | 48 | 80 | 35 |
| 3/4" | 4 | 48 | 80 | 35 |
| 1" | 4 | 101 | 168 | 80 |
| 1-1/2" | 4 | 207 | 345 | 115 |
| 2" | 4 | 207 | 345 | 115 |
| 2-1/2" | 4 | 207 | 345 | 265 |
| 3" | 8 | 207 | 345 | 530 |
| 4" | 8 | 346 | 576 | 530 |

REPAIR KITS

Repair Kits are available from SVF Flow Controls, Inc. Table B below shows what the kits consist of. When ordering a Repair Kit, please be sure to specify the type, size and seat material of the valve.

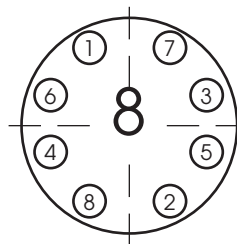
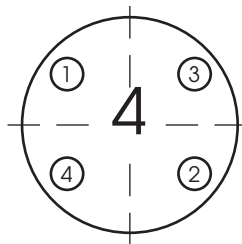
When repairing a valve use only SVF Flow Controls, Inc. authorized spare parts including bolts and nuts, etc. In addition to maintenance kits, spare parts are available from SVF Flow Controls, Inc. (balls and stems). If additional parts are required (body and ends) it is normally recommended that the complete valve be replaced.

Components from a different valve series should not be used with the repair of any other valve. If the valve is altered in any way, no liability can be accepted by SVF Flow Controls, Inc.

TABLE B: GENERAL REPAIR KIT

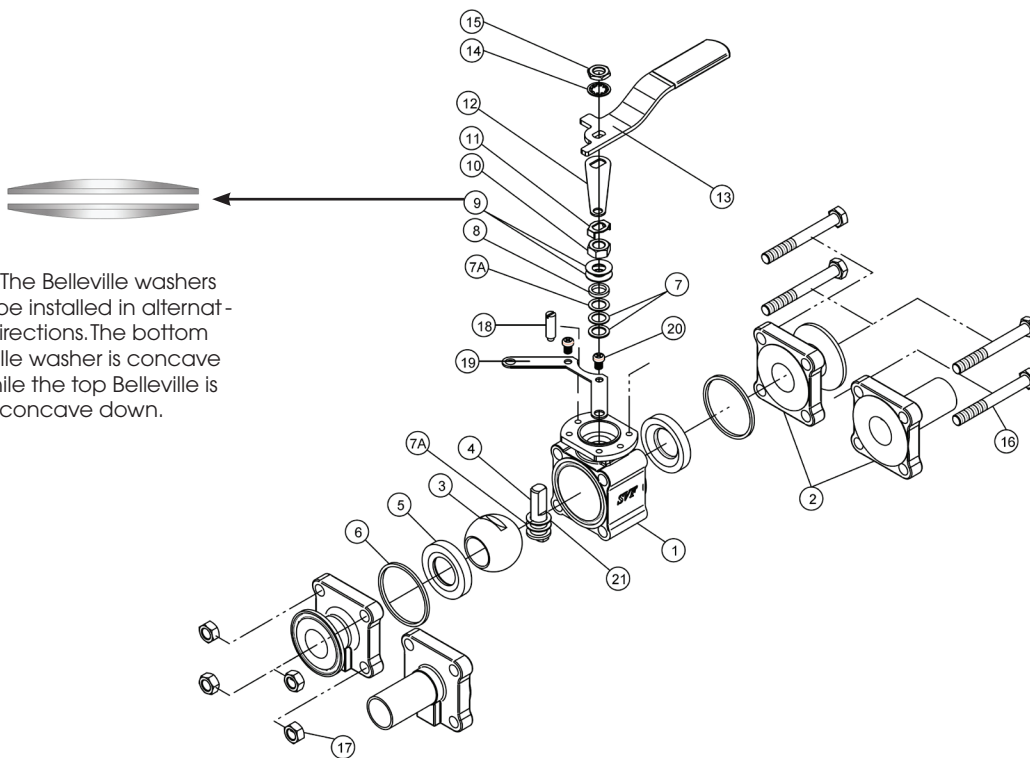
| Part | Quantity |
|--------------------|----------------------------|
| Thrust Washer | 3 (2 on Sizes 2-1/2" ~ 4") |
| Stem Seals | 2 (3 on Sizes 2-1/2" ~ 4") |
| Belleville Washers | 2 |
| Seats | 2 |
| Body Seals | 2 |
| Gland | 1 |

CleanFLOW™ SERIES BOLT PATTERNS - BOLT TIGHTENING SEQUENCE



MATERIALS OF CONSTRUCTION FOR SVF CleanFLOW™ SERIES BALL VALVES - Sizes 1/4" ~ 2"

| Item # | Part Name | Materials | Recommended Spare | Wetted |
|--------|--------------------|---------------------------------|-------------------|--------|
| 1 | Body | 316L Stainless Steel A351-CF3MN | - | X |
| 2 | End Connectors | 316L Stainless Steel A351-CF3MN | - | X |
| 3 | Ball | 316L Stainless Steel A351-CF3MN | - | X |
| 4 | Stem | 316L Stainless Steel A351-CF3MN | X | X |
| 5 | Seats | TFM1600™ | X | X |
| 6 | Body Seals | PTFE | X | X |
| 7 | Stem Seals | TFM1600™ | X | - |
| 7A | Thrust Washers | PEEK | X | - |
| 8 | Gland | 316 Stainless Steel | X | - |
| 9 | Belleville Washers | 17-7 pH | - | - |
| 10 | Stem Nut | Stainless Steel | - | - |
| 11 | Tab Lock | Stainless Steel | - | - |
| 12 | Locking Arm | Stainless Steel | - | - |
| 13 | Handle | Stainless Steel | - | - |
| 14 | Lock Washer | Stainless Steel | - | - |
| 15 | Handle Nut | Stainless Steel | - | - |
| 16 | Body Bolts | SS 304 (A2-70) | - | - |
| 17 | Body Bolt Nuts | SS 304 (A2-70) | - | - |
| 18 | Stop Pin | Stainless Steel | - | - |
| 19 | Locking Plate | Stainless Steel | - | - |
| 20 | Locking Plate Bolt | Stainless Steel | - | - |
| 21 | Thrust Washer | TFM1600™ | X | X |



MATERIALS OF CONSTRUCTION FOR SVF CleanFLOW™ SERIES BALL VALVES - Sizes 2-1/2" ~ 4"

| Item # | Part Name | Materials | Recommended Spare | Wetted |
|--------|----------------------|---------------------|-------------------|--------|
| 1 | Body | CF3MN | - | X |
| 2 | End Connectors | CF3MN | - | X |
| 3 | Ball | CF3MN | - | X |
| 4 | Stem | CF3MN | - | X |
| 5 | Seat | TFM1600™ | X | X |
| 6 | Body Seals | PTFE | X | X |
| 7 | Stem Seals | TFM1600™ | X | - |
| 8 | Gland | 316 Stainless Steel | X | - |
| 9 | Belleville Washers | 17-7 pH | X | - |
| 10 | Stem Nut | Stainless Steel | - | - |
| 11 | Tab Lock | Stainless Steel | - | - |
| 12 | Stem Location Ring | Stainless Steel | - | - |
| 13 | Stopper | Stainless Steel | - | - |
| 14 | Pipe Handle Adapter | Stainless Steel | - | - |
| 15 | Pipe Handle | Stainless Steel | - | - |
| 16 | Handle Nut/Set Screw | Stainless Steel | - | - |
| 17 | Body Bolts | SS 304 (A2-70) | - | - |
| 18 | Stop Pin | Stainless Steel | - | - |
| 19 | Thrust Washer | TFM1600™ | X | X |
| 19A | Thrust Washer | PEEK | X | X |
| 20 | Body Bolt Nuts* | SS 304 (A2-70) | - | - |

* Note #20 Body Bolt Nuts are for Valve Size 2-1/2" Only. Body Bolt Nuts are not shown on this drawing.

NOTE: The Belleville washers are to be installed in alternating directions. The bottom Belleville washer is concave up while the top Belleville is concave down.



NOTE: The Stem Seals (#7) are to be installed (stacked) as shown.

