

Installation, Operation & Maintenance for *SVF* STANDARD Three-Piece Ball Valves

BRASS VALVES

SVF Flow Controls, Inc. 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.

This document includes information for both the Reduced Port and Full Port Series of Three-Piece Brass valves.

CAUTION! Safety Precautions

Before removing valve from pipeline NOTE that: Media flowing through a valve may be corrosive, toxic, flammable, or of a contaminant 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 safety precautions should 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.

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-see DISMANTLING.

Tools

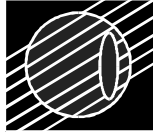
No special tools are required for maintenance of SVF Flow Controls, Inc. valves.

General (Storage)

The following instructions refer to SVF Flow Controls, Inc. BRASS/Solder End ball valves as described in the SVF Flow Controls, Inc. current catalog.

When storing valves, never leave the valves in the partially opened position. Always keep the protective covers in place until the valve is ready for installation. Valve performance depends upon prevention of damage to ball surface. After removing the cover make sure that the valve is completely open and free of obstructions, dirt, particles or any materials that may cause seat or seal damage.

When shipped, valves contain a silicon based lubricant which aids in the assembly of the valve; silicon may be removed with a solvent if found objectionable, alternatively valves can be ordered free of lubricants. Certain ferrous valves are phosphated and oil dipped during the course of manufacture, but the processes used are completely non-toxic.



Solder-End Valves

Soldering of SVF Valves with BUNA body Seals (See "SOLDERING" below for details)

- 1- Prepare a clean working area
- 2- With the valve in the OPEN position, remove the body bolts.
- 3- Separate the pipe ends from the body and remove the seats and body seals taking care not to damage them. Rotating the ball into the partially open position will assist in removing the seats.
- 4- Position the ball to CLOSED to remove it from the body.
- 5- With the soft components removed, loosely re-assemble the valve.
- 6- Solder ends according to common piping practices.
- 7- Complete the welding being careful to avoid weld splatter onto the exposed end faces.
- 8- When cooled, clean the pipe faces and re-assemble the valve center section.
- 9- Slip the center section between the pipe ends taking care not to score the end faces.
- 10- Replace the body bolts and tighten.

Welding of SVF Series Valves with All Other Body Seals (Except BUNA/Rubber)

1. Place the valve in the OPEN position
2. Align the valve between the pipe ends and make the appropriate solder according to standard piping procedures. **NOTE: The body temperature in the seal area must not exceed 392°F.**
3. Allow the valve to cool. Tighten the body bolts according to the torque requirement listed for the valve size.

OPERATION

SVF Flow Controls, Inc. valves provide tight shut off when used under normal conditions and in accordance with SVF Flow Controls, Inc. published pressure/temperature chart.

If these valves are used in a partially open (throttled) position for extended periods, seat life may be reduced.

Any media, which might solidify, crystallize or polymerize should not be allowed to stand in the ball valve cavities unless regular inspection and maintenance is performed. If minimal maintenance is performed, SVF Flow Controls, Inc. offers cavity fillers and/or steam jacketed ball valves.

Manual Operation

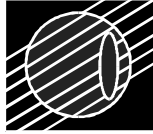
SVF Flow Controls, Inc. valves have ¼ turn operation opening in a counter-clockwise direction. When the handle is positioned across the pipeline, this indicates that the valve is CLOSED.

Remote Operation

Where manual operation is not required valves may be automated for remote operation, instrument controls etc. A range of SVF Flow Controls, Inc. pneumatic and electric actuators are available.

No stop plate is fitted to the valve since end stops are an integral part of the actuator.

Operation will be in accordance with SVF Flow Controls, Inc. Installation, Operation and Maintenance Instructions for relevant actuator.



ABOUT SOLDERING

Silver Soldering (Brazing): Silver solder consists of 30% silver, copper, zinc and tin. The melting range is just over 1200°F (655°C) to about 1400°F (755°C) Silver solder will bind only with clean, non-oxidized metal surfaces. Clean the pipe ends with a special brush and apply flux at once, immediately before soldering. Silver soldering flux must be suspended in spirit, never water.

Phosphor solder can only be used to join copper to copper. It consists of 2-15% silver with copper and phosphor. The melting range is about 640°C to 740°C.

SOLDERING

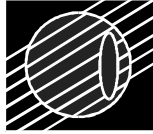
1. Cut tube and square. Ream, burr and size.
2. Use sand cloth or steel wire brush to clean both tube and cup to a bright metal. Steel wool is not recommended.
3. Apply flux to outside of tube and inside of solder cup. Surfaces to be joined must be completely covered. Use flux sparingly.
4. Be sure that valve is fully open. Apply heat to tube first. Transfer as much heat as possible through tube into valve. Avoid prolonged heating of valve itself.
5. Use just enough solder: with wire solder, use 1" for 3/4" valve, etc. If too much solder is used, it may flow past tube and clog seating area. The correct amount of solder is 1-1/2 times the diameter of the fitting or valve.
6. Remove excess solder with small brush while "plastic", leaving a fillet around end of valve as it cools.

BRAZING

The strength of a brazed joint does not vary appreciably with the different brazing materials, but depends to a large extent upon the maintenance of proper clearance between the outside of the tube and the valve socket. The interior dimensions of brazing valve sockets are machined to the closest tolerances and finished smooth to promote full capillary attraction.

Note: Care should be observed in cleaning and in removing residues of the cleaning medium. Attempting to braze a contaminated or improperly cleaned surface will result in an unsatisfactory joint. Brazing alloys will not flow over or bond to oxides. Oily or greasy surfaces repel fluxes, leaving bare spots that oxidize and result in voids and inclusions.

1. Cut tube end square to exact length needed, so that tube will enter valve socket all the way to the shoulder. Ream, burr and file.
2. Clean tube to a distance slightly more than what will fit into the socket, and clean valve socket. Wire brushes may be used, but avoid removing an excessive amount of metal. Fine sand cloth or emery cloth may be used with the same precautions. Steel wool is not recommended.
3. Apply flux to tube and socket sparingly and with a fairly thin consistency. Avoid flux on areas not cleaned, particularly inside of tube.
4. Assemble parts to be brazed. If fluxed parts are allowed to stand, the water in the flux will evaporate. Dried flux is liable to flake off, exposing metal surfaces to oxidation. Assemble joint by inserting tube into socket hard against the stop. The assembly should be firmly supported so that it will remain in alignment during the brazing operation.
5. Apply heat to parts to be joined. The preferred method is by oxy-acetylene flame. Heat tube first, beginning one inch from edge of valve. Sweep flame around tube in short strokes up and down at right angles to run of tube. To avoid burning through tube, the flame should be in continuous motion and not allowed to remain on any one point.



6. Apply flame to valve at base of socket. Heat uniformly, sweeping flame from fitting to tube until flux on fitting becomes quiet. Avoid excessive heating of valve.
7. When flux appears liquid and transparent on both tube and valve, start sweeping flame back and forth along axis of joint to maintain heat on parts to be joined, especially toward the base of the valve socket.
8. Apply brazing wire or rod at point where tube enters valve socket. Keep flame away from rod or wire as it is fed into the joint. Move flame back and forth as alloy is drawn into joint. When the proper temperature is reached, alloy will flow readily into space between tube outer wall and valve socket. When joint is filled, a continuous rim of brazing alloy will be visible.

Note: On one inch and larger valves, it is difficult to bring a whole joint up to temperature at one time. It will frequently be found desirable to use a double tip torch to maintain the proper temperature over the larger area. A mild preheating of the whole socket area is recommended. Larger valves should be disassembled or the bonnets wrapped with wet rags or padding.

MAINTENANCE /TROUBLESHOOTING

General

With self-wipe ball/seats and pressure equalizing slots, SVF Flow Controls, Inc. valve have a long, trouble free life, and maintenance is seldom required. But, when necessary, valves may be refurbished, using a minimal number of components, none of which require machining. SVF Flow Controls, Inc. valves are designed for easy service and assembly in the field. The following checks should, however, 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 packing area even under a wide range of pressure and temperature fluctuations. If stem leakage is evident proceed as follows:

Stem Leakage 1/4" – 2 1/2" Valves

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, and replace using new 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. Standard wrenches should only be used. Excessive force will damage the bolts.

If there is still leakage it will be necessary to dismantle the valve and replace the body seals.

In-line leakage

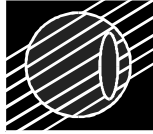
Check that valve is fully closed. If it is, leakage will be due to damaged seat or ball sealing surfaces and it will be necessary to dismantle the valve.

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.

Leakage at pipeline joint

Threaded End Valves

Test for tightness of threaded ends. If loose, tighten with standard wrench – excessive force will damage the end. Joint compound should be used according to standard piping practices.



Weld-end Valves

Examine welds for leak point. Correct as necessary according to the guidelines provided in this manual.

REFURBISHING

Fire Safe Valves

To remove valve from pipeline, extract body connector bolts to remove the body from between the body connectors. (The body will not slide out unless the pipeline is sprung apart sufficiently to clear body location rings fit into machined recess in both body and body connectors)

To dismantle stem assembly, first remove the wrench nut, and wrench from stem.

Using wrench to prevent the stem from turning, remove the gland nut, disk springs, and gland, it is not normally possible to remove gland packing at this stage. Withdraw the stem through the body cavity and remove the stem thrust seal from stem or body recess. Gland packing may now be removed.

Clean all components thoroughly and examine all seating / sealing surfaces.

Inspect the surface of the ball. The ball must have no scratches across its seating surface or any damage to the port lip, as it will damage the new seats. A damaged ball must not be re-used – install a new ball.

Rebuilding

Before rebuilding, check that all the correct components are available and that they are fit for re-assembling. When rebuilding, cleanliness is essential to allow long valve life and provide cost effective maintenance.

Fit inner seat ring before stem assembly.

Fit stem thrust seal to stem and insert stem through body cavity into stem hole and fully up into body recess. Fit gland packing, gland and disk springs. Disk springs are concave. Using wrench to prevent stem from turning, fit gland nut and screw down until disk springs are firmly compressed. Back off 1/16th of a turn.

Operate stem several times and readjust. Over-tightening will only reduce the life of the stem assembly. Now fit wrench stop plate and wrench nut to stem assembly and move stem into closed position – wrench across the pipeline.

With the stem still in the closed position, the ball may be inserted into the body cavity by sliding the ball slot over the stem tang. Open the valve.

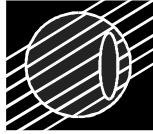
NOTE: The ball must be in the open position since a closed ball protrudes beyond the body cavity and ball will be damaged against body connectors when body is removed or rotated. Also, with the valve in the open position, the ball is retained by the stem tang and cannot fall out of the body cavity.

The second seat ring and body connector seals may now be fitted.

NOTE: A trace of silicon based lubricant or clean grease (such as petroleum jelly), if compatible with the pipeline media, will ease the rebuilding by holding the seat rings and body connector seals in place. Use no grease with abrasive additives.

The valve may be installed back into the pipeline by sliding the body in between the body connectors. The pipeline should, however, be sprung apart sufficiently to clear valve body and avoid damage to seat rings, body connector seals and body connector sealing face.

Locate body on centerline of pipework, fit body connector bolts and nuts, and by tightening, pull together body and body connectors. Connector flanges will be metal to metal, standard wrenches should only be used – excessive force will damage the bolts.



TEST: If practical, perform a leakage test.

Spare Parts Kits

Example: Ordering a Spare Parts/Repair Kit

REPAIR KIT	VALVE SERIES	SIZE	SEAT/SEAL
RK-	R6 or R8-	05 = 1/2"	TT
	N8-	07 = 3/4"	NG
	L8-	10 = 1"	RT
	B8-etc.	12 = 1-1/4"	DB

Spare Parts Kits are available from SVF Flow Controls, Inc. and consist of the following:

- (A) 2 seat rings, 2 body connector seals for 1/4" – 4" valves.
- (B) 1 stem thrust seal, 2 packing gland for 1/4" – 2" valves, 1 set of Belleville washers
- (C) 1 stem thrust seal, 3 gland-packing rings for 3" and 4" valves.

When ordering Spare Parts Kits, please be sure to specify type and size of valve and seating material required.

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

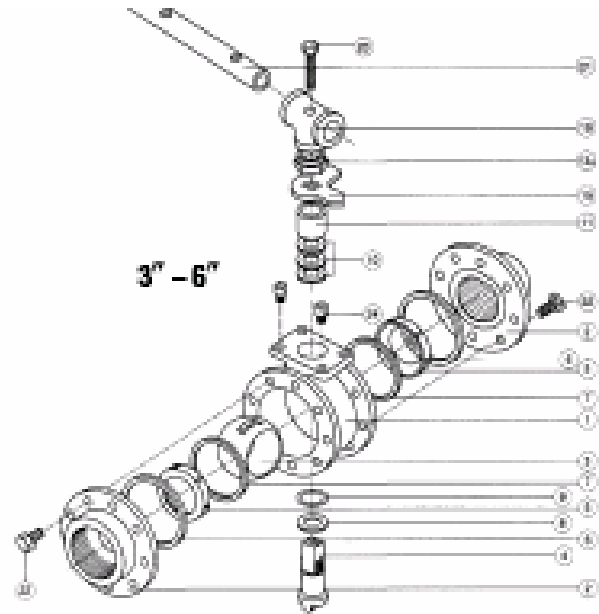
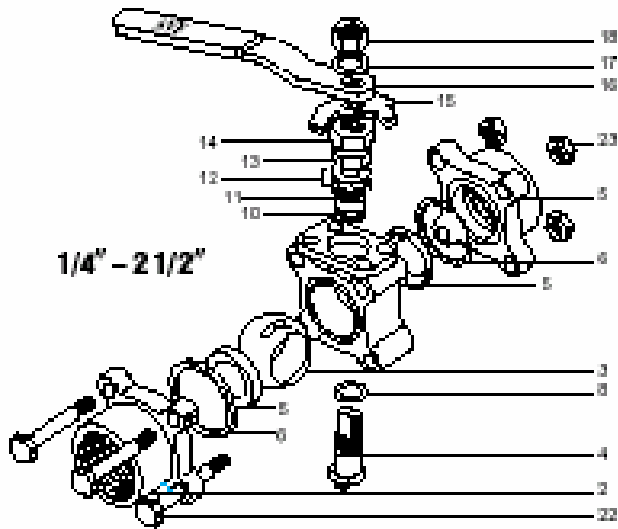
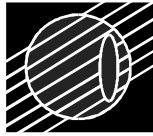
Components from a different valve series should not be used with the repair of any other valve. If the valve is altered in any way, no liability can be accepted by SVF Flow Controls, Inc.

DISMANTLING

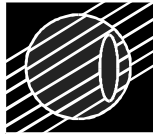
If the valve is closed or not in fully open position as suggested, refer to Safety precautions before proceeding.

During dismantling, do not assume that the valve is totally decontaminated. Harmful fluid, etc. may still be trapped in the valve cavities.

To remove valve from pipeline, extract body connector bolts and slide the body out from between the body connectors. It is in most cases unnecessary to remove the body completely away from the pipeline. Remove all but one of the body connector bolts, and with this remaining bolt slackened, the body may be rotated out from the line using the remaining bolt as a hinge.



Item#	Description	Material
1	Body	BRASS
2	Body Connector	BRASS
3	Ball	316SS, A-20, Monel, Hast-C
4	Stem	316SS, A-20, Monel, Hast-C
5	Valve Seat	TFM, TFE, RTFE, NRG, DELRIN, UHMWPE, PEEK, VX1
6	Body Connector Seal	TFE, GRAPHOIL, NRG, BUNA, VITON, UHMWPE
7	Retainer ring 2-1/2" – 6"	316SS, Carbon Steel
8	Stem Thrust Ring	NRG
9	Stem Location Ring 2-1/2" – 6"	Stainless Steel
10	Stem Packing	NRG (Standard)
11	Gland Follower	Stainless Steel
12	Belleville Washers	Stainless Steel
13	Packing Nut up to 2-1/2"	Stainless Steel
13A	Packing Nut 3" to 6"	Cad. Pltd Steel, Stainless Steel
14	Lock Tab	Stainless Steel
15	Handle Stop	Stainless Steel
16	Handle	Stainless Steel
17	Lock Washer	Stainless Steel
18	Handle Nut	Stainless Steel
19	Wrench Hub	Cad. Pltd Steel, Stainless Steel
20	Hub Bolt	Cad. Pltd Steel, Stainless Steel
21	Wrench	Cad. Pltd Steel
22	Body Connector Bolt	Stainless Steel, Carbon Steel
23	Body Connector Nut	Stainless Steel, Carbon Steel
24	Stop Pin	Stainless Steel



Ordering Parts and Components

Note: When ordering parts, keep in mind that the “R” Series Regular Port valves and the “B” Series Full Port valves use interchangeable parts. Refer to the table below to see the valve size comparison. **(See page 5 for ordering Seal Kits).** Refer to “**VALVE ORDER CODE SYSTEM**” (page 6) for Material and Seat codes.

SIZE	SIZE
R8	B8
1/4"	XX
3/8"	XX
1/2"	XX
3/4"	1/2"
1"	3/4"
1-1/4"	1"
1-1/2"	1-1/4"
2"	1-1/2"
2-1/2"	2"
3"	2-1/2"
4"	3"

Center Sections (Example)

Size	Series	Materials
1"-	R6 or R8- (or N8, B8 etc.)	6066TT- (always use the 0 in position 2)

End Connectors (Example)

Size	Component	Series	Materials
1"-	End-	R6 or R8- (or N8, B8 etc.)	SS, CS, Alloy-20 etc.

Ball (Example)

Size	Component	Series	Materials
1"-	Ball-	R8- (or N8, B8 etc.)	SS, Monel etc.