



Flo-Tite Tri-Pro Series

Models HPF and HPS

3-Piece Ball Valves

Installation, Operation and Maintenance Manual

Note: Before using a valve, read the entire IOM carefully and make sure you have a clear understanding of all information included.

This manual describes the procedures for the safe and efficient installation, operation, and maintenance of Flo-Tite Tri-Pro Series Ball Valves. **Failure to follow the procedures in this manual may result in Flo-Tite warranties being voided.** Problems with the operation and maintenance of these valves should be directed to the nearest Flo-Tite Representative.

The Flo-Tite Tri-Pro Series is designed as a split body, three-piece construction, to allow ease of access for maintenance of the valve ball and seat without special tools. This line of valves utilizes the “free floating” ball principle. The ball is not fixed but is free to move with the line pressure. As a result, these valves are capable of tight shut-off with the flow in either direction or dead-ended, regardless of the position of the valve in the line. The downstream seat, which is opposite the pressurized side, of a closed valve, must carry the load exerted by the line pressure on the ball, while the upstream seat is subject to little load or wear. For this reason, it is sometimes possible to increase useful seat life by turning the valve end-for-end in the pipeline.

INSTALLATION:

A. Receiving and Preparation Procedure

- A1. Remove shipping protection
- A2. Inspect the valve(s) for transportation damage*
- A3. Inspect the valve bore and remove any debris
- A4. Cycle the valve and inspect the valve for smooth operation, size permitting
- A5. As shipped from the factory, valves contain a silicone based lubricant. This is for break-in and may be removed if it is objectionable for a particular application by disassembling and solvent washing.

*If transportation damage is found, immediately take pictures for record purposes and contact the inbound carrier to submit a claim.

B. Installation Procedure

B1. General – The valve may be fitted in any position in the pipeline. Prior to installing the valve, the pipe on either side of the intended installation should be checked to be free of dirt, debris, weld slag, etc. to prevent damage to the seats, seals and surface of the ball. The piping must also be free of tension or compression.

WARNING – Never use the valve as a pipe support or structural member.

B2. Installation of the Flo-Tite Tri-Pro Models HPF/HPS 41 or 51 with NPT connections. Valves with screwed ends should be treated as a single unit and should not be dismantled when installing into the pipeline. Before installing the valve, ensure that the threads on the mating pipe are free from excessive grit, dirt or burrs. Use thread sealant compatible with system media to apply mating threads. Apply wrench only on the hexagon end of the valve cap.

Caution – Tightening by using the valve body or handle can seriously damage the valve.

B3. Installation of Models HPF/HPS 42 or 52 (SWE) and HPF/HPS 43 or 53 (BWE) with Weld-In-Place Ends. Flo-Tite Weld-In-Place Ends have been designed to allow the Tri-Pro Valve to be installed in the pipeline by welding without disassembly of the valve. The integrally cast heat sink rings dissipate the heat of fusion created by the welding process without damage or degradation of the valve internals, including the seats and seals. The valve must be in the fully open position when welding. Welders should be qualified to an applicable procedure approved under ASME Section IX of the Boiler and Pressure Vessel Code. Note – Before welding, the welder should understand that the temperature of the valve body in the valve seat area should not exceed the rated temperature of the specific seating material installed in that valve. Maximum temperatures should not exceed the following for these specific seat materials:

PTFE – 300°F
50/50 - 425°F

RPTFE - 350°F
PEEK or CTFM - 450°F

TFM - 350°F
UHMWPE - 200°F

Caution – The valves should be used in a well designed, adequately protected system to ensure that the external and internal pressure and temperature limits are not exceeded. The valve body rating can be higher than the seat rating.

It is the welder's responsibility to maintain body temperatures at or below the above. Directing moving air and/or wrapping a wet cloth around the valve will help dissipate the heat. Locate and position the valve in the pipeline and confirm that the line is not under tension. Tack each end of the valve in four places. Confirm correct position and alignment and proceed to complete the seal weld on each end for SWE units (Models 42/52) or complete the fillet weld on the BWE units (Models 43/53).

Caution – Avoid applying excessive heat. Do not apply heat to the valve body. If multiple passes are required to achieve a specific weld size, stop after each pass and monitor the valve body temperature.

C. OPERATION:

C1. Manual operation of the valve is accomplished by turning the handle ¼ turn (90 degrees).

*The valve is open when the handle is “in-line” with the valve or pipeline. The valve is closed when the handle is “across” or perpendicular to the valve or pipeline.

C2. Flo-Tite Tri-Pro Series valves can be operated with either manual gears, electric or pneumatic actuators. For instructions on installation and operation, refer to the IOM for the correct operator.

C3. Flo-Tite Tri-Pro Series valves may include one of several different styles of limit switches and positioners. Please refer to the appropriate IOM for each device.

MAINTENANCE:

CAUTION – Ball valves can trap fluid in the ball cavity when closed. Be prepared to capture and manage any liquid retained in the valve body when disassembling the valve.

WARNING – If the valve has been in hazardous fluid, review applicable MSDS sheet and decontaminate the valve before disassembly. All persons involved with the disassembly should wear personal protection equipment such as aprons, gloves, face shield, etc. to prevent personal injury.

Access to the valve internals starts with relieving pressure in the pipeline. Turn the valve handle to the 45 degree, half open, position and flush the line, when applicable, to remove any hazardous material from the line. Consult the metal tag attached to the valve body to determine the correct seat and seal materials. Repair kits can be ordered from the local Flo-Tite Representative. This should be done prior to any disassembly work.

CAUTION - Valves with actuators, limit switches or positioners should have these devices disassembled from the valve prior to disassembling of the valve.

WARNING- Use extreme caution disconnecting any electrical and/or pneumatic sources to the valve to protect against personal injury. Isolate the valve actuator prior to disconnecting.

Replacing body seats and seals-

Place the handle in the fully open position. Remove three cap screws and loosen the fourth on one side. Repeat on the opposite side with the corresponding cap screws. The center body should “roll” out. The body seals and valve seats can be removed and replaced from each end cap. **Note** – It may be necessary to allow for some pipe flex or spread to completely remove the center body from the ends once all bolts are removed.

Replacing stem seals-

With the valve in the closed position, carefully remove the ball and place on a clean shop rag to prevent damage to the ball or allow the buildup of any debris. Remove the handle nut, handle and stem nut. Gently tap the top of the stem with a non-metallic hammer to allow the stem to move into the body cavity. A lock washer, Belleville washers, packing gland sleeve and packing will now be free to come out of the packing gland (Note: A packing pick may be required to remove some of the packings). The stem can carefully be removed from the body to replace the thrust bearing and guide seal.

CAUTION-

1. Ensure that the anti-static spring is retained in the stem as the stem is removed and again when the stem is re-inserted.
2. Carefully note the sequence that all internal pieces come apart as it is mandatory that they can be reinstalled in the same sequence.

Visual Inspection-

Clean and inspect all metal parts. It is not necessary to replace the ball and stem unless the seating surfaces have been damaged by abrasion or corrosion. Flo-Tite strongly recommends that all seats, seals and packing be replaced whenever a valve is disassembled for reconditioning. This is the surest protection against subsequent leakage after reassembly. Replacement parts are sold in kit form. Refer to the metal tag attached to the side of the valve body to identify the specific sealing materials used. Kits can be obtained via the local Flo-Tite Distributor. Replacement parts should be purchased prior to valve disassembly. Required information to purchase replacement parts include:

- a) Line Size
- b) Model Designation
- c) Seat/Seal materials – see stamping on a metal tag attached to the valve body.

Valve Reassembly -

Note- the valve may be reassembled and operated dry when no lubricants are allowed in the system; however, a light lubricant on the ball and stem will aid in assembly or reduce initial operating torque. The lubricant used must be compatible with the intended system fluid.

Replace the stem in the reverse order from above based on valve size, including reattaching the handle. Turn the handle to the closed position. This will align the stem and the ball. Slide the ball into position. Turn the handle to the open position to help hold the ball in place. Install seats and seals in the end caps with the spherical curvature facing the ball. “Roll” the body back up making sure the seats and seals in the end caps are secure and in the correct position. Valve needs to be inclosed position when tightening. Replace the three cap screws on each side and hand tighten. Final tightening should be done in a star pattern. Cap screws should be tightened per below.

Packing, packing gland sleeve, Belleville washers, lock washer and gland nut can be assembled. The gland nut should only be hand tightened to prevent over compression of the packing. The pipeline needs to be re-pressurized slowly to prevent any water hammer. Any stem leakage can be corrected by tightening the stem nut one flat at a time.

Note: Make sure ball is in closed position before tightening up the end connections.

WARNING- Over tightening the stem nut will lead to over-compression of the packing, cause premature wear of the packing and require additional force to operate the valve.

Mounting Actuators –

Flo-Tite has designed the Tri-Pro series valves with a top works that is compatible with the requirements of the ISO-5211 bolting flange. This makes the valve compatible for mounting actuators from multiple manufacturers. Flo-Tite’s own **Air-Con** pneumatic actuators and **Pro Torque** electric actuators are easily adaptable to the Tri-Pro valve series. Please refer to the specific actuator supplier’s IOM directions for installation directions.

Repair Kits –

Repair kits typically consist of replaceable seats, body seals and packing seals. Refer to the unit nameplate, as shown, to confirm what materials are currently installed. Contact your local Flo-Tite Representative to order and receive the kits prior to any maintenance work.

VALVE - SOFT PARTS							
SEAT	STEM SEALS		BODY SEAL		O-RINGS		
TFM	F	TFM	F	TFM	F	VITON	V
CTFM	Y	CTFM	Y	CTFM	Y	EPDM	E
PTFE	T	RTFM	X	PTFE	T	PTFE	T
RPTFE	R	PTFE	T	RPTFE	R	BUNA	B
50/50	S	RPTFE	R	50/50	S	NONE	N
UHMWPE	U	50/50	S	UHMWPE	U		
PEEK	P	UHMWPE	U	PEEK	P		
Cavity Filled	C	PEEK	P	Graphite	G		
Metal	M	Graphite	G	Kel-F	K		
Kel-F	K						

Body Assembly Torque Values

Valve Size	Hex Socket Size	Bolt Torque (in-lb)
(3/4" HPS)----- (1/4"- 1/2" HPF)	M8	200
(1" HPS)----- (3/4" HPF)	M8	240
(1-1/4" HPS)----- (1" HPF)	M10	330
(1-1/2" HPS)----- (1-1/4" HPF)	M10	417
(2" HPS)----- (1-1/2" HPF)	M12	521
(2-1/2" HPS)----- (2" HPF)	M14	521
(3" HPS)----- (2-1/2" HPF)	M16	1440
(4" HPS)----- (3" HPF)	5/8"	1800
4" HPF	3/4"	3000

Standard Seated Valve Torque (In-Lb)

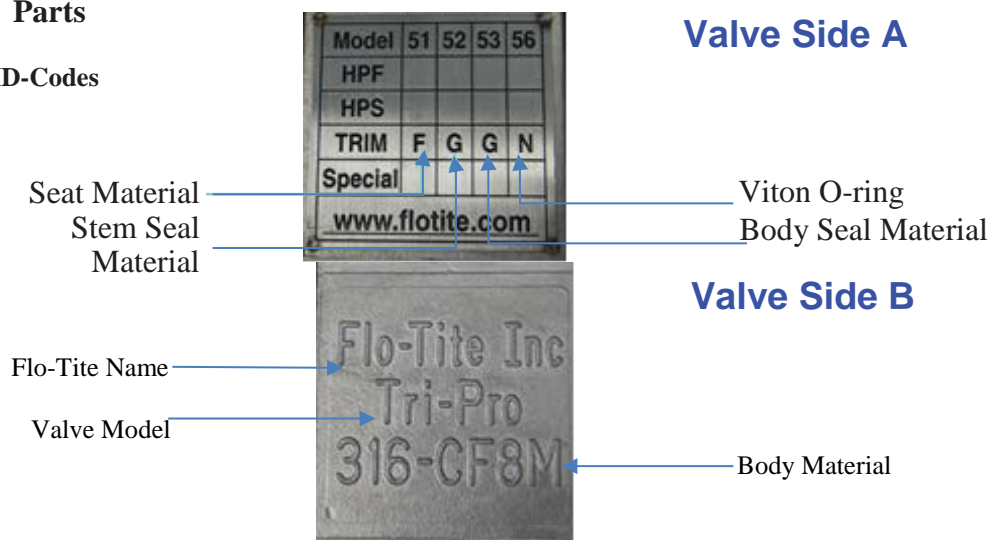
Model	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
HPF	75	75	85	140	190	320	430	560	950	1200	2,832
HPS	XX	XX	XX	85	140	190	320	430	560	950	1200

Valve Markings- Casted into valve bodies include the following; Flo-Tite Name, Model Numbers, Body Material, Valve Size, & WOG Pressure Rating

All Flo-Tite valves have metal nameplates spot welded to the valve body.

Standard Trim Soft Parts

ID-Codes



Please carefully review all important procedures in this manual. If anything is unclear, please feel free to contact Flo-Tite directly.

BILL OF MATERIALS:

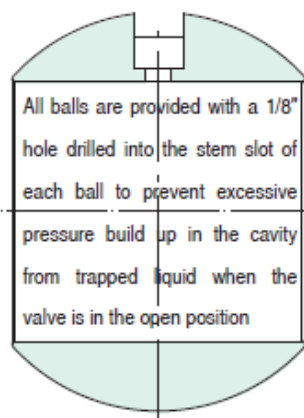
ITEM	NAME	STAINLESS STEEL	CARBON STEEL	QTY
1	BODY	ASTM A351 CF8M	ASTM A216 WCB	1
2	CAP	ASTM A351 CF8M	ASTM A216 WCB	2
3	BALL	ASTM A351 CF8M	ASTM A351 CF8	1
4	SEAT	TFM	TFM	2
5	GASKET	TFM	TFM	2
6	GASKET	Graphite	Graphite	2
7	BOLT **	SS304	SS304	8
8	STEM	17-4PH	17-4PH	1
9	THRUST BEARING	Carbon PTFE	Carbon PTFE	1
10	THRUST WASHER	50%SS PTFE	50%SS PTFE	1
11	STEM PACKING	Graphite	Graphite	1
12	PACKING FOLLOWER	SS304	SS304	1
13	BELLEVILLE WASHER	SS304	SS304	2
14	LOCK WASHER	SS304	SS304	1
15	STEM NUT	SS304	SS304	2
16	HANDLE	SS304	SS304	1
17	STOPPER	SS304	SS304	1
18	PLASTIC COVER	Plastic	Plastic	1
19	LOCKING DEVICE	SS304	SS304	1
20	ANTI-STATIC SPRING	SS301	SS301	2
21	ANTI-STATIC BALL	SS316	SS316	2

Parts included in the repair kits

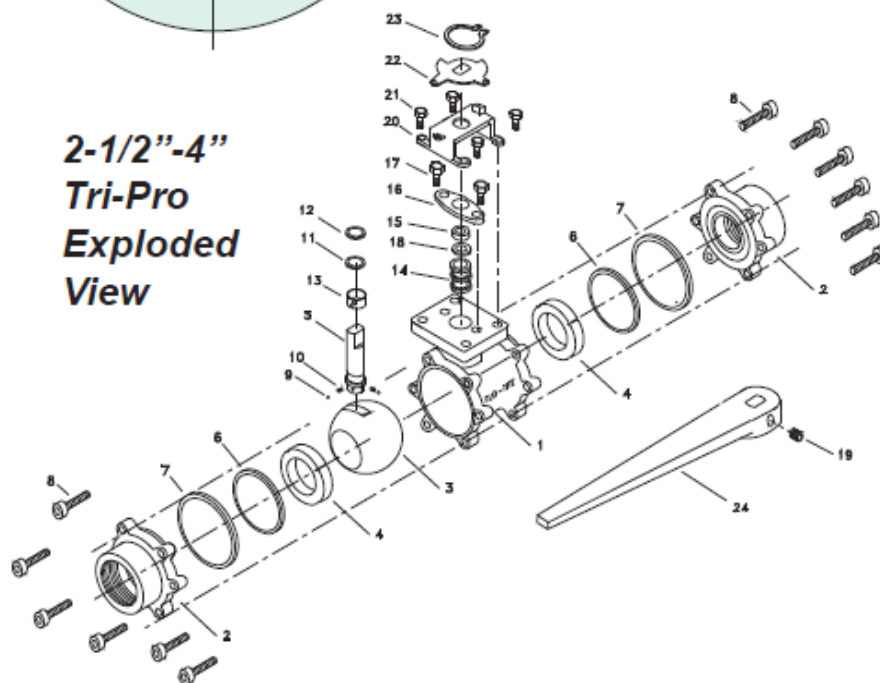
* All SS welded ends 316L

** 316SS bolting available, C/F

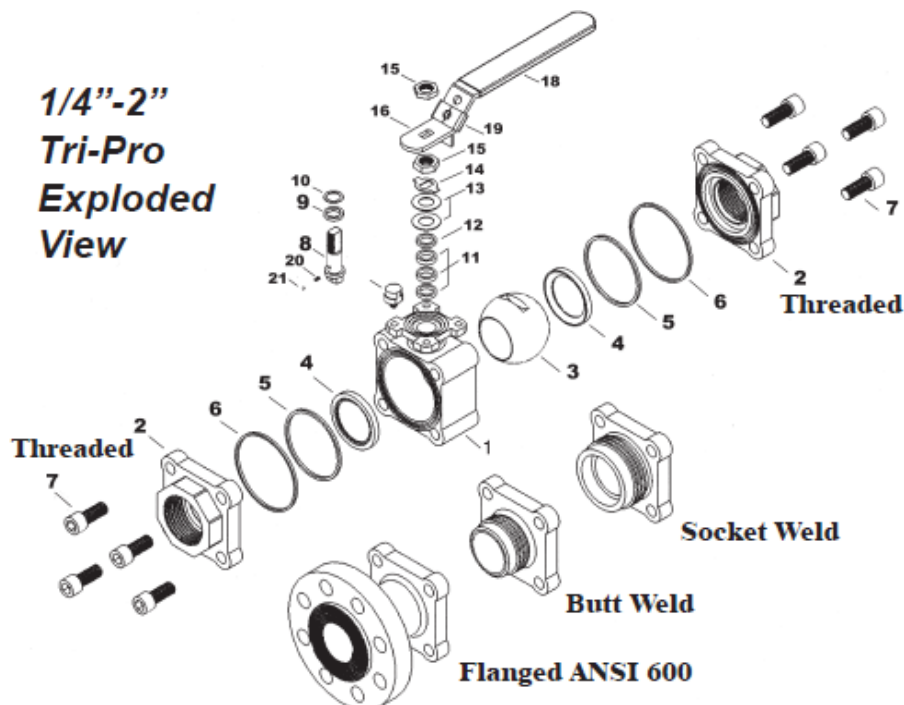
Ball Design Added Safety Feature



2-1/2"-4" Tri-Pro Exploded View



1/4"-2" Tri-Pro Exploded View



Flo-Tite's Van Guard Stem Sealing System

Flo-Tite's Van Guard Seal, state of the art stem sealing system. Incorporating a triple set of valve stem seals, this unique system eliminates the possibility of valve stem leaks in most all media applications. Improved thrust washer design allows more sealing surface effectively blocking all leak paths during rotation. V-Ring Packing Set expands sideways as it is compressed and pressurized blocking all air pockets. The Van-Guard stem system is energized by Belleville washers which continuously adjusts packing compression to compensate for wear, pressure, or temperature fluctuations.

Optional Viton O-Ring can be added

Note: Standard Valve is Fire Safe Design with Graphite Packing.

BILL OF MATERIALS:

ITEM	NAME	STAINLESS STEEL	CARBON STEEL	QTY
1	BODY	ASTM A351 CF8M	ASTM A216 WCB	1
2	CAP	ASTM A351 CF8M	ASTM A216 WCB	2
3	BALL	ASTM A351 CF8M	ASTM A351 CF8	1
4	SEAT	TFM	TFM	2
5	STEM	17-4PH	17-4PH	1
6	GASKET	TFM	TFM	2
7	GASKET	Graphite	Graphite	2
8	BOLT	SS304	SS304	10
9	ANTI-STATIC BALL	SS316	SS316	2
10	ANTI-STATIC SPRING	SS301	SS301	2
11	THRUST BEARING	Carbon PTFE	Carbon PTFE	1
12	THRUST WASHER	50%SS PTFE	50%SS PTFE	1
13	STEM PACKING	Graphite	Graphite	1
14	ANTI-EXTRUSION	50%SS PTFE	50%SS PTFE	1
15	PACKING FOLLOWER	SS304	SS304	1
16	GLAND	SS304	SS304	1
17	GLAND BOLT	SS304	SS304	2
18	STOP HOUSING	ASTM A351 CF8	ASTM A216 WCB	1
19	HOUSING BOLT	SS304	SS304	4
20	TRAVEL STOPPER	SS304	Zinc Plated C.S.	1
21	SNAP RING	Nickel Plated C.S.	Nickel Plated C.S.	1
22	HANDLE	Ductile Iron	Ductile Iron	1
23	SET SCREW	SS304	SS304	1



Flo-Tite, Inc.
4815 West 5th St.
Lumberton, NC 28358

P. O. Box 1293 # Parts included in the repair kit: (910) 738-8904
Lumberton, NC 28359 ** 316SS bolting available, C/F Fax: (910) 738-9112
Website: www.maxsealinc.com E-mail: sales@maxsealinc.com