



## **Flo-Tite ECONOFLO Series**

### **Models DM310 / 320**

### **3-Piece Ball Valves 1000 WOG**

## **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, ECONOFLO Series. **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 ECONOFLO 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 to 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 may 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** 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. In some applications, screwed valves are back-welded on site. These valves must be disassembled as per instructions for Weld-End Valves.

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

### C. OPERATION:

C1. Manual operation of the valve is accomplished by turning the handle  $\frac{1}{4}$  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 DM 310 /320 Series valves can also 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 DM 310 /320 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 service, 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, 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 your 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 the valve.

**WARNING**- Use extreme caution disconnecting any electrical and/or pneumatic sources from 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 with 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, thrust washers, follower 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).

### **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 are 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 or calling FloTite directly. Replacement parts should be purchased prior to valve disassembly. Required information to purchase replacement parts include:

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>a. Line size</li> <li>b. Model designation</li> </ol> | <ol style="list-style-type: none"> <li>c. Seat/seal materials – see stamping on a metal tag attached to the valve body.</li> </ol> |
|--|--|

### 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 tang and the ball slot. 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. 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 reingressurized 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 the 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 DM 310 /320 Series valves with a top works that are 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 DM 310 /320 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 below, 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						

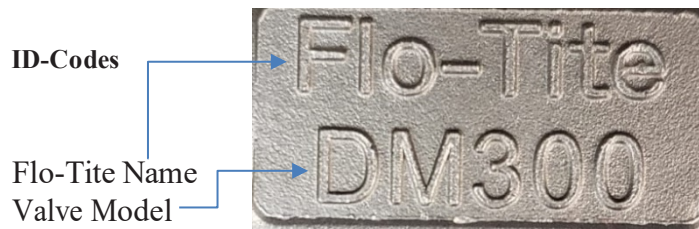
**Flo-Tite's marking system follows MSS SP-25-1998**

**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**

**Valve Side A**



**Valve Side B**



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

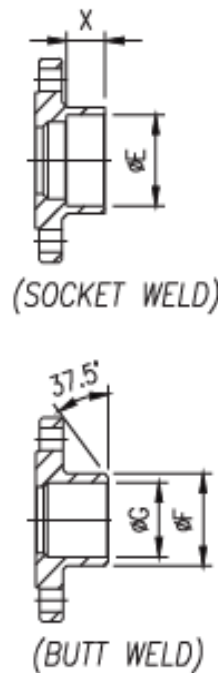
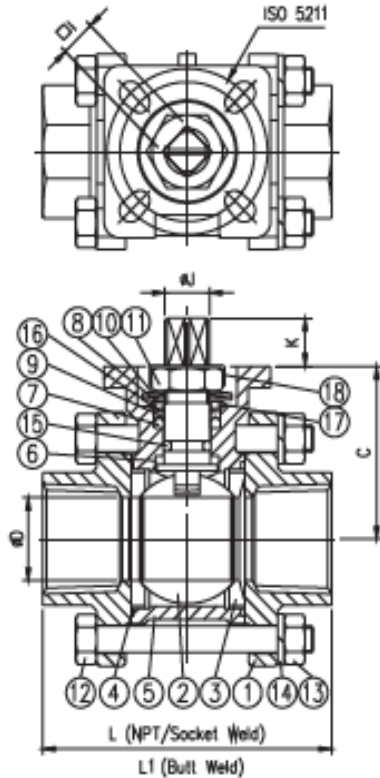
# Design and Technical Data

**Standards**  
 ANSI/ASME - B16.11  
 ISO - 5211  
 MSS - SP25, SP72

**Models**  
 Threaded - DM310  
 Socket - Weld - DM320

## Materials of Construction

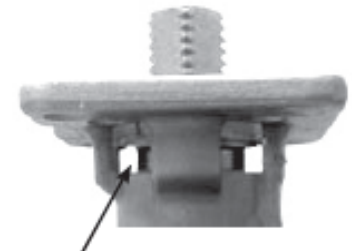
ITEM	DESCRIPTION	DM300
1	End Cap	ASTM A351-CF8M
2	Ball	ASTM A351-CF8M/316
3	Seat	PTFE/RPTFE/TFM-1600
4	Gasket	PTFE
5	Body	ASTM A351-CF8M
6	Thrust Washer	PTFE
7	Stem Packing	PTFE
8	Packing Follower	AISI 304
9	Stem	ASTM A276-316
10	Belleville Washer	AISI 301
11	Packing Nut	AISI 304
12	Bolt	AISI 304
13	Bolt Nut	AISI 304
14	Bolt Washer	AISI 304
15	O-Ring	VITON
16	Packing Protector	CARBON 25% PTFE
17	Anti-Static	AISI 301
18	Lock Washer	AISI 304



Steam Rating 150 PSI WSP      Vacuum Service to 20 microns  
 175 PSI available with SuperTek  
 II seats. Consult Factory

## Dimensions and Weights

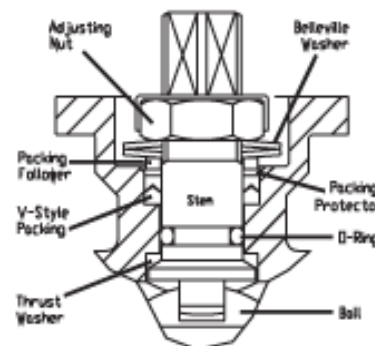
SIZE	C	øD	E	F	G	I	J	K	L	L1	X	Cv	Torque In-Lb	Weight Lb	ISO 5211 Pattern
1/4"	1.85	0.41	0.58	0.57	0.39	0.35	0.47	0.35	2.76	2.76	0.39	7	50	0.85	F03-F04
3/8"	1.85	0.49	0.80	0.72	0.53	0.35	0.47	0.35	2.76	2.76	0.39	10	50	0.84	F03-F04
1/2"	1.85	0.59	0.86	0.88	0.66	0.35	0.47	0.35	2.76	2.80	0.51	15	55	1.43	F03-F04
3/4"	1.77	0.79	1.07	1.09	0.87	0.35	0.47	0.35	3.15	3.23	0.59	35	70	1.85	F03-F04
1"	2.05	0.98	1.33	1.37	1.09	0.43	0.55	0.55	3.54	3.62	0.59	68	100	2.91	F04-F05
1 1/4"	2.30	1.26	1.68	1.70	1.42	0.43	0.55	0.55	4.13	4.33	0.59	110	190	3.92	F04-F05
1 1/2"	2.89	1.50	1.92	1.94	1.65	0.55	0.75	0.71	4.72	5.00	0.63	155	390	5.42	F05-F07
2"	3.13	1.97	2.41	2.42	2.11	0.55	0.75	0.71	5.51	6.14	0.67	300	480	8.16	F05-F07
2 1/2"	4.13	2.56	2.91	2.95	2.54	0.67	0.94	0.87	6.61	7.32	0.67	500	735	18.8	F07-F10
3"	4.57	3.15	3.54	3.54	3.10	0.67	0.94	0.87	7.60	8.58	0.67	750	800	28.8	F07-F10
4"	5.33	3.94	4.54	4.55	4.06	0.87	1.10	1.18	9.09	10.43	0.79	1015	1410	47.8	F10-F12



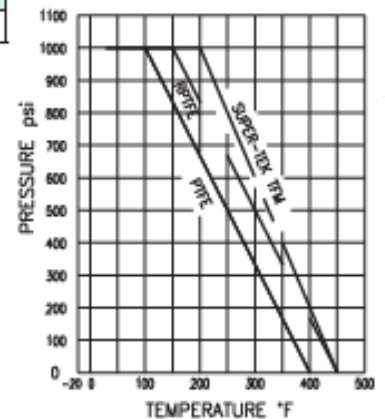
Leak Detection Window Prevents actuator damage in the unlikely event of stem leakage

## Stem Seal Design

Flo-Tite's triple stem seal detail provides for an extended valve cycle life. The primary seal is a seal ring that fits firmly on a flat portion of the stem shoulder. The secondary (back-up) seal is provided by an O-ring and a set of Vee packing rings, energized by belleville washers. This design adjusts packing compression to compensate for wear, pressure or temperature fluctuations.



## Pressure/Temperature Chart



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