

### 3-WAY Flanged Ball Valve

Three-way multi-port ball valve allows easy replacement of gasket, seal, and seats without special tools.

The ball stem and bottom shaft are in one piece.

#### 1. USE:

- 1.1 Life of valve can be maximized if the valve is used within the rated range, in accordance with pressure, temperature, and corrosion data.

#### 2. MANUAL OPERATION:

- 2.1 To change flow pattern of the valve, turn the handle 90 degrees.
- 2.2 Both T port and L port are available. Consult specification sheet for different flow patterns.
- 2.3 Flow path is clearly marked on the stem top.

#### 3. AUTOMATED OPERATION:

- 3.1 Valves with actuators should be checked for valve stem alignment. Angular or linear misalignment will result in high operational torque and unnecessary wear on the stem seal.

#### 4. GENERAL INFORMATION FOR ON-SITE INSTALLATION:

- 4.1 The valve may be fitted in any position on the pipeline.
- 4.2 To prevent damage to the seats and ball surface, the pipeline must be flushed, free of dirt, burrs, and welding residues before installing the valve.

#### 5. DISASSEMBLING & CLEANING THE VALVE:

If the valve has been used in hazardous media, it must be decontaminated before disassembly.

#### 6. REPLACING STEM PACKING, SEATS, GASKETS, AND BUSHING

- 6.1 Before replacing the stem packing, the pipeline must be de-pressurized.

Note: Stem seal leakage may be corrected without replacing the stem packing. Tighten the bonnet cap bolt to until leakage stops. If leakage continues or valve's operating torque becomes excessive, the stem seal is worn and must be replaced.

- A. Remove flange bolts and nuts and lift the valve from the line. Care should be taken to avoid scratching or damaging serrated gasket. The valves are heavy, and they should be adequately supported before removing it from the line.
- B. Loosen the handle nut and remove handle, retainer ring and stop plate. Next, remove bonnet cap bolt. Bonnet Cap can be slide up easily.
- C. Loosen and remove the cover bolts, then slide the top cover off the top of the valve body.
- D. The stem packing is placed in the center recess of the top cover. A tap to the bottom of the stem packing should pop the packing out of the recess.
- E. Upon removing the top cover, the top cover gasket is revealed placed between the contacting surface of the top cover and the valve body.



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- 6.2 To replace the seats and the end cap gaskets, the end caps must be removed. We recommend that seats and gaskets be replaced at the same time.
- A. Use a proper wrench, remove body bolt nuts on all three end caps. Slide off all three end caps. Seats should come out with the end caps. End cap gaskets may be attached to the valve body recess or it may slide off with the end cap.
- B. Once the end caps are removed, the ball can be removed from the valve body. Extreme caution should be taken to avoid damaging the ball. After the ball is removed, the bottom bushing is revealed.

### 7. VISUAL INSPECTION:

- 7.1 Clean and inspect metal parts. It is not necessary to replace the ball unless the surface has signs of abrasion or corrosion. We strongly recommend replacement of all soft parts whenever the valve is disassembled for reconditioning. We provide replacement kits that contain all the replaceable parts.
- Note: The valve may be assembled and operated dry with any lubricant. However, a light lubrication will aid in assembly and reduce initial operating torque. Lubricant used must be acceptable with the intended line fluid.*

### 8. ASSEMBLY

- 8.1 Install seats on the end caps. Place the seats in the end caps recess such that the seat curvature is facing the ball.
- 8.2 Install gaskets on the end caps. The end cap gaskets should fit on the outer diameter of the end cap.
- 8.3 Replace the bottom bushing in the valve body cavity.
- 8.4 Place ball on top of the bushing. It should lay in the center of the valve body cavity.
- 8.5 Carefully attach the end caps to the valve body. Screw in the nuts but do not tighten them.
- 8.6 Tighten the nuts in a star pattern to the torque specified in **Table 1**. Extreme care must be exercised during adjustment of cap end nuts to make sure that complete engagement of the studs with body flange is maintained. There should be at least one stud thread exposed on each side.
- 8.7 The next end cap to be tightened should be the one directly opposite the one that has been tightened. Follow the same procedure as outlined in 8.6.
- 8.8 Afterwards, tighten the remaining end cap in the manner as described above.
- 8.9 Install the stem packing in the center recess of the top cover. Install the top cover gasket.
- 8.10 Place the top cover back to the top of the valve body. Tighten the nuts in a star pattern to the torque specified in **Table 1**.
- 8.11 Install the bonnet cap and screw in the bonnet cap bolt.
- 8.12 Cycle the valve slowly, with a gentle back and forth motion, to build gradually to the full quarter turn. By cycling slowly, the seat lips will assume a permanent seal shape against the ball. A fast turning motion, at this point, may cut the seats before they have a chance to form the proper seal.
- 8.13 Test valve, if possible, prior to placing valve back into line position. If not properly secured, the valve can separate from the pressure source, resulting in possible injury. Always join the valve to companion flanges of same pressure rating as valve and secure with a full set of flange bolts.

#### TEST AS FOLLOWS:

- A. Secure valve to a test fixture by means of a mating flange with full bolting and a suitable gasket.



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Orient valve so seat to be tested is facing up.

- B. Introduce 50 to 100 psig air. Partially cycle the valve, under pressure, then slowly close to make sure the cavity is pressurized (use hearing protection). Pour water into the upper port to cover the ball and visually check for bubbles. If bubbles appear, pour the water out, cycle the valve several times and recheck. To check for leakage in the other port, reverse the valve and introduce air pressure to the port just checked.
- C. Check stem seal at this time by coating the stem top area with a water/soap solution. If leakage occurs, tighten stem seal just until leakage stops.

Valve Size Requirements	Torque (N-M)
1-1/2" ~ 2"	408
2/1/2" ~ 4"	500
6" ~8"	1050
10"	Consult Factory

Table 1

## MATERIALS LIST

NO.	PART NAME	MATERIAL	QTY
1	BODY	ASTM A351 Gr.CF8M	1
2	FLANGED CAP	ASTM A351 Gr.CF8M	3
3	COVER	ASTM A351 Gr.CF8M	1
4	BALL & STEM	SS316	1
5	BALL SEAT	PTFE	3
6	JOINT GASKET	PTFE	3
7	GASKET	PTFE	1
8	STEM PACKING	PTFE	1
9	GLAND	ASTM A351 Gr.CF8	1
10	STOPPER	SS304	1
11	C RETAINER RING	SK7	1
12	BOLT	ASTM A193 B8	2
13	HANDLE	FCD45	1
14	BOLT	ASTM A193 B8	4~12
15	NUT	ASTM A194 8	4~12
16	SLEEVE	PTFE	1
17	STUD BOLT	ASTM A193 B8	12~24
18	NUT	ASTM A194 8	12~24

