

# Cam-Tite Ball Valve Operating Instructions

## Warning

ITT Industries valves and valve actuators are designed and manufactured using good workmanship and materials, and they meet all applicable industry standards. These valves are available with components of various materials, and they should be used only in services recommended in our product catalog or by a company valve engineer.

Misapplication of the product may result in injuries or property damage. A selection of valve components of the proper materials consistent with the particular performance requirements is important for proper application. Examples of the misapplication or misuse of ITT Industries products include use in an application in which the pressure/temperature rating is exceeded or failure to maintain the valve as recommended.

If the valve exhibits any indication of leakage, do not operate. Isolate the valve and either repair or replace it.

## Installation/Operating Instructions

1. This valve can be installed in any position consistent with good piping practice.
2. If this valve has been furnished with a means for relieving body cavity pressure (i.e. a cavity vent), an arrow on the exterior of the valve indicates the direction of pressure tightness. Note: Vented valves are unidirectional.
3. Prior to installation, inspect valve for shipping damage.
4. If this valve is weld end, it may be welded into the pipeline without disassembly provided certain procedures and precautions are taken. The valve should be in the "open" position during welding and should remain open until it cools to ambient temperature. Welding procedures in accordance with Section IX of the ASME Boiler and Pressure Vessel Code should be utilized. In addition, a 350°F Tempilstik (for PTFE and RTFE seats and seals) or a 200°F Tempilstik (for UHMWP seats and seals) must be used to monitor the temperature of the seat/gasket area. Page 12 shows the location on the valve body where the Tempilstik marks should be placed. This is the area in line with the body/cover flange. Welding should be controlled to maintain this area below 350°F or 200°F as noted above. If valves are furnished with other than PTFE, RTFE, or UHMWP seats/seals, contact the factory for recommended welding procedures. (See Page 12 of this brochure for additional details.)
5. Prior to installation or system pressurization, tighten the stem seal nut in accordance with the torques listed in Chart #1. **CAUTION: Do not back off stem seal nut while the valve is pressurized.**
6. Install the operating handle on the valve stem. Insure that the handle is sitting flush with the top of the packing nut and that the handle posts (1/2"–2") are aligned with the groove pin travel stop to assure proper rotation of the handle. Tighten hex jam nut and handle screw (1/2"–2" sizes) or tighten handle screw only (3"–6" sizes).
7. Prior to installation or system pressurization, evenly tighten all cover bolting using the cross-cross method in accordance with the torques listed in Chart #2. **CAUTION: Do not loosen cover bolts while the valve is pressurized.**
8. If necessary, repeat steps 5, 6, and 7 approximately 24 hours after system reaches operating temperature and pressure.
9. Refer to the exploded view on page 41 of this brochure for proper parts identification. Always utilize factory authorized replacement parts.
10. Good operating procedure requires periodic inspection of valves and replacement of necessary parts to ensure proper valve function.
11. NOTE: Valves showing through leakage or high operating torque may be damaged. DO NOT use excessive force or cheater bars to operate valve. Disassemble valve, inspect components, and replace damaged parts.

**CAUTION: Before attempting removal/repair, always cycle valve with system pressure isolated to relieve excess pressure which may be trapped in body cavity.**

## Maintenance Instructions — Cover Gasket Repair

1. Periodically inspect condition of external valve components. Replace all parts showing excessive wear or corrosion.
2. If cover gasket leaks, immediately tighten cover bolting as described under **Installation Instructions, Item 7**. If tightening cover bolting does not stop leak, remove pressure from valve and place valve in open position.
3. Remove cover bolting and lift cover assembly off of valve body.
4. Carefully remove cover gasket from body recess or from cover.

5. Inspect sealing surfaces of both valve body and cover for damage. Replace damaged components as necessary.
6. Replace cover gasket and install cover assembly onto valve body. NOTE: When replacing cover gasket, always place the gasket on the cover and carefully install the cover (with gasket) onto the body to avoid damage to the seal.
7. Install and tighten cover bolting in accordance with **Installation Instructions, Item 7**.

## Maintenance Instructions — Stem Seal Replacement

1. **Relieve pressure from valve and place valve in open position.** Remove cover bolting and lift cover assembly off of valve body.
2. Remove hex jam nut on top of handle ( $\frac{1}{2}$ "–2" sizes) and remove handle by loosening the handle screw and nut. Remove the packing hex nut, spring washers (2), flat washer ( $\frac{1}{2}$ "–2" sizes), rotational stop (3"–6" sizes), gland ring, and grounding spring on stem. Remove stem from bottom of cover and carefully remove upper and lower stem seals from cover counterbore. Refer to Page 41 of this brochure for details of components.
3. Inspect and clean stem and counterbore of cover and replace any components which appear damaged.
4. Replacing stem seals:
  - A. Non-Firesafe Valves: Where lubricant is permitted, apply a light film of DuPont Krytox GPL 206 or other compatible lubricant to stem and (1) stem seal. Install stem seal over threaded end of stem and position it on the stem shoulder. Insert stem through cover from the bottom side.
  - B. Firesafe Valves: Install lower bearing over threaded end of stem and position it on the stem shoulder. Install graphite stem seal over threaded end of stem and position it on the lower bearing. Insert stem through cover from the bottom side.
5. Install the following parts over threaded stem in the order listed:
  - A. Stem seal — Apply a light film of DuPont Krytox GPL 206 or other compatible lubricant, if permitted, to second stem seal.
  - B. Upper bearing — Firesafe valve only.
  - C. Gland Ring
  - D. Flat Washer ( $\frac{1}{2}$ "–2" sizes)
  - E. Rotational Stop (3"–6" sizes)
6. Install spring washers and packing hex nut. Hand tighten packing nut to take up the pre-travel caused by seating the stem seals, gland ring and washers.
7. Tighten packing nut in accordance with the torques listed in Chart #1.
8. For  $\frac{1}{2}$ "–2" sizes, install handle and tighten hex jam nut and handle screw. For 3"–6" sizes, install handle and tighten handle screw.
9. Clean and inspect cover gasket recess in valve body and cover. Inspect gasket. If damaged, replace cover gasket in accordance with **Cover Gasket Repair Instructions**.
10. Be sure that ground spring is in place over flat of stem and stem shoulder. Spring should bear against bottom of cover and top of ball. Be sure that stem is inserted into the ball and that the cover gasket is properly in place. Align cover holes with tapped body holes.
11. Install and tighten cover bolting in accordance with **Installation Instructions, Item 7**.
12. Cycle valve several times to assure proper operation and break in of seals.
13. If valve has been removed from pipeline for maintenance, reinstall in accordance with **Installation Instructions**.

## Maintenance Instructions — Seat Replacement

1. **Relieve pressure from valve and place valve in open position.** Remove cover bolting and lift cover assembly off of valve body.
2. Use a screwdriver or similar tool to lift the ball and seats out of the body. If the ball and seats do not slide easily out of the valve, check to make sure that the ball is in the open position. The slot for stem engagement should be perpendicular to the pipeline during removal and insertion of the ball. Care should be taken not to damage the surface of the ball while the ball and seats are being removed from the body.

3. Inspect and clean the ball and the body sealing surfaces. Replace any components which are badly scratched or gouged.
4. Apply a light film of lubricant, DuPont Krytox GPL 206 or other compatible lubricant, to the ball and both sides of each of the seat assemblies. Hold the ball and seats such that the I.D.'s of the seats are aligned with the I.D. of the ball port. That is, place the seats on either side of the ball to simulate their position with the valve in the open position. Simultaneously slide the two seat assemblies and the ball into the valve body. Force is not necessary to properly position the components in the valve. Should the ball and seats not slide easily into place, check to make sure that the ball is being inserted while in the open position.
5. Clean and inspect cover gasket recess in valve body and cover. Inspect gasket. If damaged, replace cover gasket in accordance with **Cover Gasket Repair Instructions**.
6. Be sure that ground spring is in place over flat of stem and stem shoulder. Spring should bear against bottom of cover and top of ball. Be sure that stem is inserted into the ball and that the cover gasket is properly in place. Align cover holes with tapped body holes.
7. Install and tighten cover bolting in accordance with **Installation Instructions, Item 7**.
8. Cycle valve several times to assure proper operation and break in of seats.
9. If valve has been removed from pipeline for maintenance, reinstall in accordance with **Installation Instructions**.

### Chart #1 — Stem Seal Packing Nut Torques

**Caution:** Tighten Cam-Tite stem seals by turning the adjusting nut in a clockwise direction. Do not back off packing nut while valve is under pressure or in the closed position.

VALVE SIZE	TORQUE (ft-lb)
1/2"-1"	9
1 1/2"	10
2"	16
3"	40
4"	40
6"	105

**Note:** The above packing nut torques apply to all non-firesafe stem seals. For firesafe graphite stem seals, the correct method of adjustment is to tighten the packing nut until the belleville spring washers are flat.

### Chart #2 — Cover Bolt Torques

**Caution:** The torques below apply to coarse thread bolts when a lubricant having a coefficient of friction between 0.05 and 0.06 is utilized on the threads and under the head of the bolt. If tightening of the cover is attempted without the use of a lubricant, consult the factory for recommended procedures.

VALVE SIZE	UHMWP, PTFE AND REINFORCED PTFE GASKET TORQUE BY PRESSURE CLASS (ft-lb)		
	150	300	600
1/2"-1"	10	10	20
1 1/2"	15	15	30
2"	25	25	50
3"	25	25	50
4"	33	33	78
6"	50	75	—

VALVE SIZE	GRAPHITE GASKET TORQUE BY PRESSURE CLASS (ft-lb)		
	150	300	600
1/2"-1"	23	23	23
1 1/2"	29	29	29
2"	46	46	46
3"	58	58	58
4"	60	60	60
6"	145	200	—