



Tank Bottom Valves: 2" – 4" TB59

Installation, Operation and Maintenance Instructions

CAUTION: Flowserve recommends that all product which must be stored prior to installation be stored indoors, in an environment suitable for human occupancy. Do not store product in area where exposure to relative humidity above 85%, acid or alkali fumes, radiation above normal background, ultraviolet light, or temperatures above 120°F or below 40°F may occur. Do not store within 50 feet of any source of ozone.

A. INSTALLATION

1. Valves may be installed for flow or vacuum in either direction. Use care to exclude pipe sealants from the valve cavity.
2. For weld-end style valves (SW, BW):

NOTE: Prior to welding or brazing, THOROUGHLY CLEAN ALL JOINT SURFACES to prevent contamination.

 - a. Tack weld valve in place.
 - b. With the valve open, remove all of the studs and remove the center section from the valve. Close valve and remove the ball, seats and body seals.

Return body back to its original position and temporarily secure it with two studs diagonally opposite each other.
 - c. Proceed to weld valve inline (when gas welding, do not play flame on valve body).
 - d. Allow valve to cool, remove two studs and reassemble the valve. Note that all valves with fluoropolymer body seals are reassembled using the original white fluoropolymer body seals.
- e. Tighten and torque the studs evenly and diagonally opposite each other, alternating in a criss-cross pattern. Use torque figures below:

STAINLESS STEEL STUDS		
Bolt Diameter	in-lb	ft-lb
9/16"	682-730	57-61
5/8"	972-1020	81-85
3/4"	1402-1450	117-121

B. OPERATION

1. The operation consists of turning the stem ¼ turn clockwise to close and ¼ turn counter-clockwise to open. When stem flats or stem groove is in-line with the pipeline, the valve is open.
2. These valves will provide bubble-tight shutoff when used in accordance with Worcester’s published pressure/temperature chart.
3. It is not good practice to leave a ball valve partly open (throttling operation) without knowledge of the pressure drop and flow at that position.
4. As shipped from the factory, valves (except oxygen prepared (V20, V33 or prefix code “X”), and valves with V38 or V46 options) contain a silicone-based lubricant. This is for break-in purposes, and may be removed if it is objectionable for a particular application by disassembling and solvent washing. Lacquer thinner will remove the lubricant.
5. Media which can solidify, crystallize or polymerize should not be allowed to stand in ball valve cavities.
6. Torque Requirements - Operating torque requirements will vary depending on the length of time between cycles, line pressure, type of valve seats, and the media in the system. For a detailed analysis of valve torque requirements, see Worcester’s Actuator Sizing Manual.

C. MAINTENANCE

If seepage is noted at stem, tighten remaining nut ½ turn at a time until seepage stops.

CAUTION: Excessive tightening causes higher torque and shorter stem seal life.

D. REBUILDING

▲ WARNING: Ball valves can trap pressurized fluids in ball cavity when closed.

Special handling and cleaning procedures are necessary for oxygen and vacuum service valves. Refer to industry practices when overhauling these units.

If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps be taken for safe removal and disassembly:

- Relieve the line pressure. Operate the valve prior to attempting removal from line.
 - Place valve in half-open position and flush the line to remove any hazardous material from valve.
 - All persons involved in the removal and disassembly of the valve should wear the proper protective clothing such as face shield, gloves, apron, etc.
1. A standard repair kit may be ordered for these valves, consisting of seats, body seals, Belleville washers, stem seals, thrust bearing, and stem seal protector. Specify the material of seats and body seals, size, series and R number (revision number) of valve or for non-standard valve the "P" number, "T" number, "C" number, or similar number. The information is found on either the valve nameplate or on the actuator mounting bracket nameplate.

Repair kit ordering examples: 2" TBRK59 RT R0
3" TBRK59 PT T0244

CAUTION: If the seats and seals installed differ from those removed, the valve nameplate must be replaced or remarked to indicate the altered materials and ratings, or valve tagged to so indicate.

2. Disassembly of valve:

- a. Place valve in open position. Remove all studs and nuts, and lift out center section from between pipe end and tank bottom flange.
- b. With valve in closed position, remove old seats, seat retainer (if present), body seals and ball.
- c. Remove retaining nut from stem — prevent stem from rotating by holding inside body. (The ball can be inserted and prevented from rotating with a non-metallic rod such as a screwdriver handle). This will hold the stem stationary without damaging the ball.
- d. Push stem into body cavity and remove. Retain follower and centering washer. There is no centering washer on 2" valves.

- e. Remove and discard stem seals, stem seal protector and thrust bearing, which may be stuck on the stem or in the body cavity. Remove Belleville washers.
- f. Clean all sealing surfaces of valve including ball.

3. Visual Inspection:

- a. The ball and the surfaces against which the seats are installed should be undamaged, clean and free of pit marks and scratches. Light marring from the action of the ball against the seats is normal and will not affect the operation of the valve. Visible tracking is normal. Tracking which can be felt is a potential problem.
- b. The stem and body surfaces that the thrust bearing and stem seals contact must be undamaged, clean, and free of pit marks and scratches.

4. Reassembly:

- a. Lightly lubricate the ball, seats, body seals, stem seals, stem seal protector and thrust bearing with a lubricant compatible with the media being handled, except for valves with V20, V33 or V38 options, which are assembled dry. White petroleum jelly is a good general purpose lubricant. For oxygen prepared valves (prefix code "X"), use a PTFE-based lubricant such as Fluorolube S-30 or equivalent.

- b. On 3" and 4" valves, reinstall stem-centering washer inside recess at top of the body.

- c. Place new thrust bearing on stem and insert through body cavity. The Polyfill thrust bearing, stem seals and stem seal protector are the same material, size, black in color, and they are interchangeable.

NOTE: Valves that had a tan colored PEEK stem seal protector removed must now use a Polyfill stem seal protector.

- d. Install new stem seals, new stem seal protector over the top of the stem and down into the recess in the top of the body. The follower is assembled on top of the stem seal protector. Add two Belleville washers over the follower, with the larger diameter sides touching each other.

- e. Replace retaining nut onto stem. Using a wrench to prevent stem from rotating, tighten retaining nut to fully flatten Belleville washer, then back off 1/8 turn.

CAUTION: Excessive tightening causes higher torque and shorter stem seal life.

- f. With the valve in the closed position (stem flats or stem groove going across the pipeline), install ball, new seats, and seat retainer (if used). Open the valve and install new body seals.

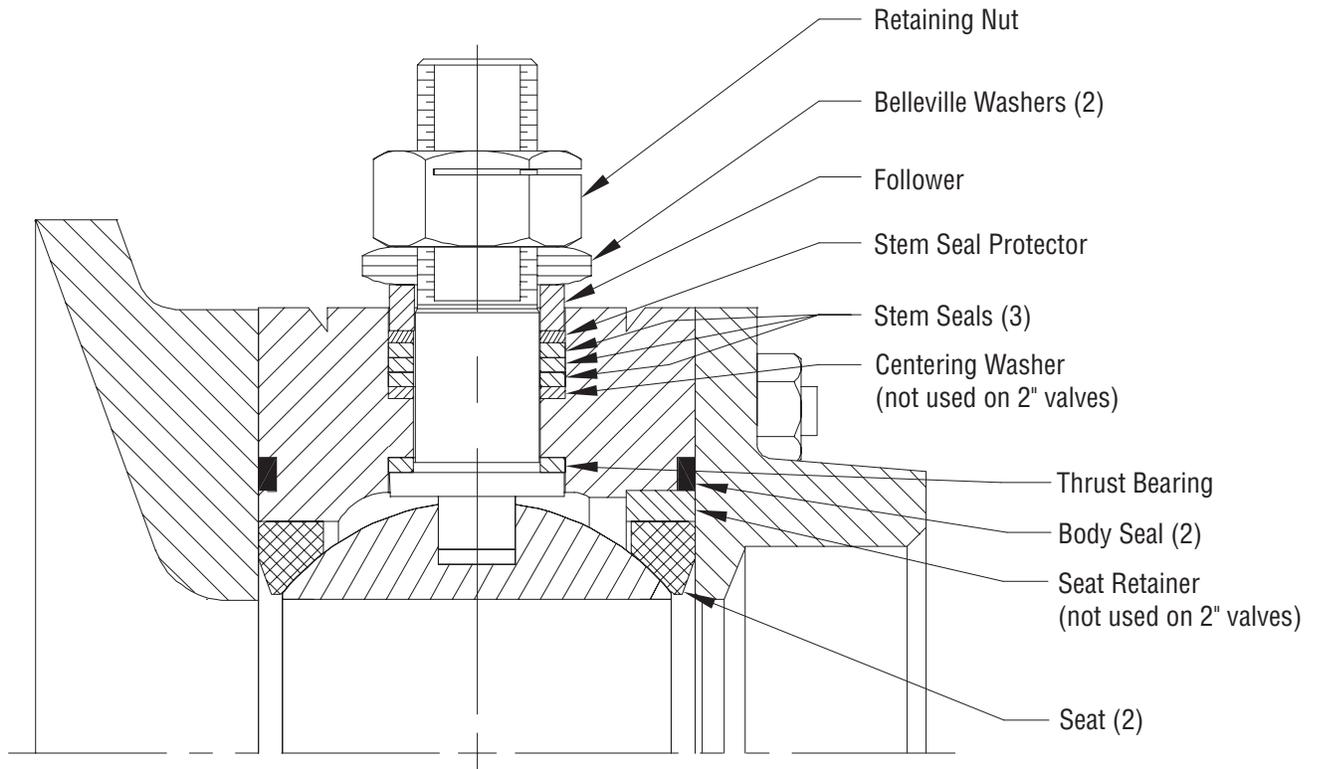
g. Place center section between pipe end and tank bottom flange, then replace body studs and nuts and torque to figures in paragraph A.2.e.

After the valve is assembled it should be cycled a few times to ensure that the valve operates smoothly with no chattering of the ball. The normal operation is an initial high torque to “break” from the closed position to a smooth running lower torque mid-cycle, to a high torque at the end of the 90° cycle or open position. The torque is similar when closing.

When ordering parts, please provide the part name and the following information, as found on the valve nameplate.

1. Valve Size, Style and Revision Number:
Example: 3" TB59 66RTSE RO STEM
2. Valve size, style and five-character code, known as a “P” number, “T” number, “C” number, or similar number, the designation for a non-standard product:
Example: 4" TB59 66RTSW T0244 Ball

The terminology shown in the parts listing below is standard.



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