



Worcester Control Valves

06784-E

Tank Bottom Valves 1" and 1½" 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.

3. CAUTION: The TFE body seals (code T) make excellent seals. However, some points of caution in their use need emphasizing:

- a. No TFE part (except seats) is reusable. Upon disassembly of the valve, they should be discarded and replaced with new parts.
- b. Care must be taken to avoid scratching the TFE body seals during installation. Light lubrication of these seals can help prevent damage.

A. Installation

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

NOTE: prior to welding or brazing, thoroughly clean all joint surfaces to prevent contamination.

- a. Tack weld valve in place.
- b. Remove three body bolts, loosen fourth, swing out body, with valve open. Close valve, remove ball, seats and body seals. Return body to its original position and temporarily secure it with two body bolts diagonally opposite each other.
- c. Weld valve in line (when gas welding or brazing do not play flame on valve body).
- d. Allow valve to cool, reassemble valve. Install new body seals, if they were shipped separately from the valve. Temporary Buna body seals found in the valve as received are not to be reused.
- e. Tighten and torque body bolts evenly and diagonally opposite each other, alternating in a criss-cross pattern. Use torque figures below:

1" & 1-1/2" 59 VALVES WITH STAINLESS STEEL BOLTS

Bolt Dia.	In. Lbs.	Ft.—Lbs.
3/8"	192-216	16-18
1/2"	504-552	42-46

B. Operation

1. The operation consists of turning the stem 1/4 turn clockwise to close and 1/4 turn counter-clockwise to open. When the stem flats are in line with the pipeline, the valve is open. These valves may be automated or operated manually.
2. These valves will provide bubble-tight shut-off 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 the 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

Tighten retaining nut if seepage is noted at stem.

Cautions: For maximum stem seal life, proper stem, adjustment procedure must be followed. Excessive tightening causes higher torque and shorter stem seal life.

1. Tighten self-locking stem nut until Belleville washers are flat, the nut will “bottom”.
2. Back off nut 1/3 turn.

CAUTION: The self-locking stem nut is difficult to tighten, and must fully flatten Belleville washers before backing off.

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 are 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 (Worcester’s recommended spares) may be ordered for these valves, consisting of seats, body seals, Belleville washers, stem seals, thrust bearing, stem seal protector and thrust bearing 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, as found on the valve nameplate or on the actuator mounting bracket nameplate.

Ordering Examples:

1" TBRK59 T RO

1 1/2" TBRK59 T TO244

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. To replace seats and seals:
 - a. Place valve in open position. Remove four body bolts and remove center section from between pipe end and tank bottom flange.
 - b. With valve in closed position, remove old body seals, seats or one—piece seats/body seals and ball.
 - c. Using a wrench to prevent stem from turning, remove self-locking stem nut, (4) Belleville washers and follower from stem. Remove stem through body cavity.
 - d. Remove thrust bearing, thrust bearing protector from body or stem, stem seals and stem protector from recess in top of body.
 - e. Clean all sealing surfaces of valve including the ball.

Note: *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. Flaws which can be seen but barely detected with fingertips are acceptable. The stem surfaces that the thrust bearings and stem seals contact must be undamaged, clean and free from pit marks and scratches.*

- f. Lightly lubricate the ball, seats, body seals, stem seals, stem seal protector, thrust bearing, and thrust bearing protector with a lubricant compatible with the media being handled, except for valves, with V20, V33 or V38 option, which are assembled dry. White petroleum jelly is good general purpose lubricant. For oxygen prepared valves (prefix code “X”), use a PTFE-based (Teflon, Fluon) lubricant such as Fluorlube S-30 or equivalent.
- g. Place a new PEEK thrust bearing protector and the Polyfill thrust bearing on the stem and insert assembly through body cavity. Place a new thin Polyfill stem seal, a new thick Polyfill stem seal (black), and new PEEK stem seal protector, and the follower in position. The thin stem seal and the thrust bearing are the same size, black in color, and interchangeable. The PEEK thrust bearing protector and stem seal protector are the same size, tan in color, and interchangeable.

NOTE: *If valve has been cleaned for and is used in oxygen service (identified by “X” prefix, or V20 or V33 suffix in valve code), Polyfill thrust bearing and stem seal protectors must be used. They are included in the repair kit and are the same size, black in color, and interchangeable with the thrust bearing and thin stem seal.*

- h. Place four new Belleville washers in position (two pairs of washers with larger diameter sides touching each other).
- i. Place the self-locking stem nut on stem and using a wrench to prevent stem from turning, tighten selflocking stem nut until Belleville washers are flat. Follow Section C, Maintenance for proper stem adjustment.
- j. With valve in closed position (stem flats going across pipeline), replace ball and seats. Valves with Teflon seats have a one-piece seat/body seal and it is inserted with valve in

closed position. Rotate stem and ball to open position. Carefully insert new separate body seals (if used) and place center section between pipe end and tank bottom flange. Replace and tighten body bolts per torque figures and method found in Sect. A.2.e

CAUTION: Do not scratch body seals when replacing valve body.

2. Valve Size, Style and Five-Character Code, known as a "P" Number, "T" Number, "C" number, or similar, the designation for a non-standard product.

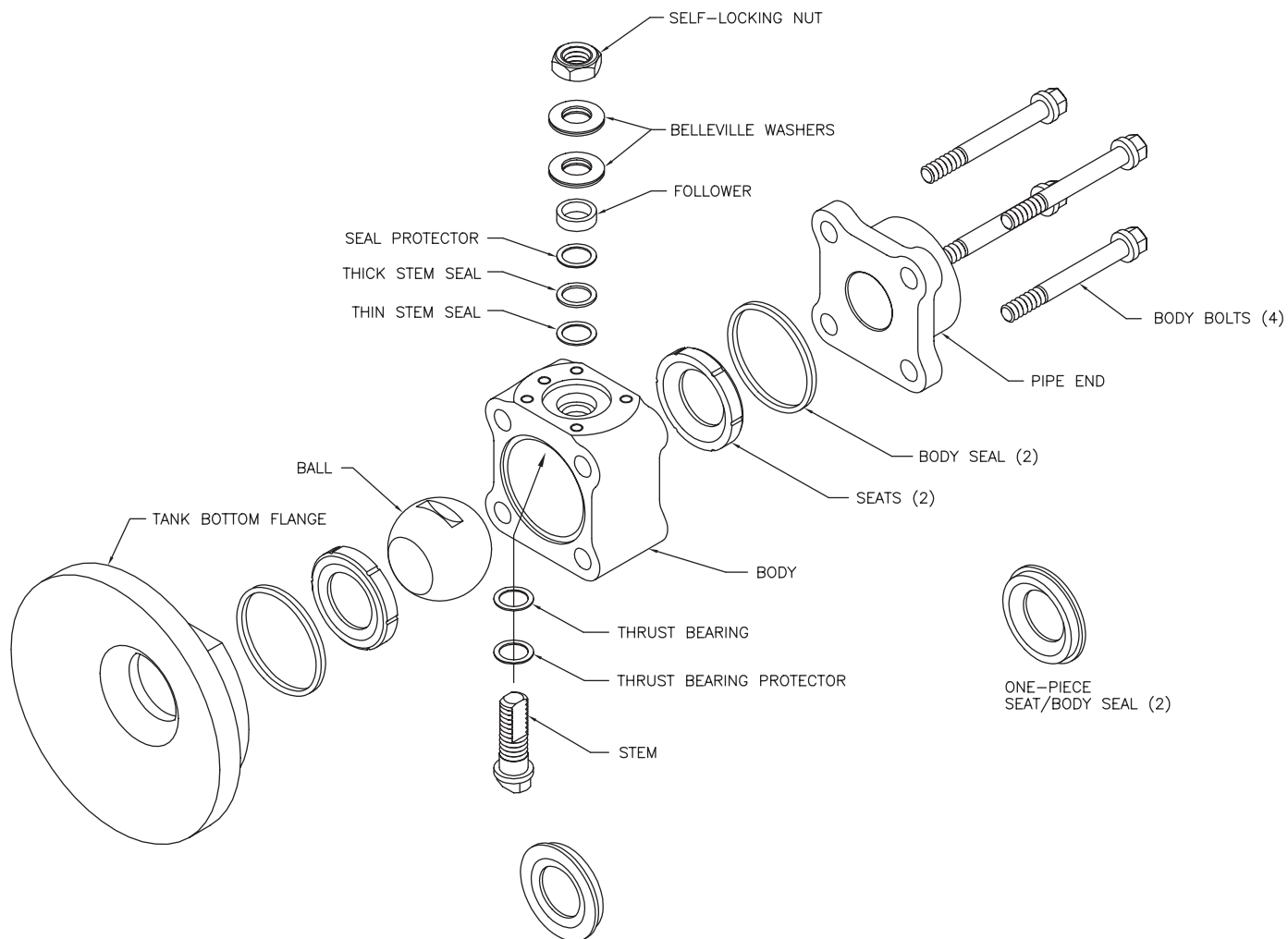
Example:

1" TB59 66PT SE T0244 Ball

The terminology shown in the exploded view Parts Listing below is standard.

When ordering parts, please provide the part name and the following information as found on the valve nameplate or mounting bracket nameplate:

1. Valve Size, Style and Revision Number – Example: 1" TB59 66T SE RO Stem



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